GUIDELINES

Infection Prevention and Control in the Dental Office

Royal College of
Dental Surgeons of Ontario

Ensuring Continued Trust

Revised – February 2010
Approved by Council – November 2009
This is a revision to the Guidelines on Infection Control
in the Dental Office issued in January 2002.

The Guidelines of the Royal College of Dental Surgeons of Ontario contain practice parameters and standards which should be considered by all Ontario dentists in the care of their patients. It is important to note that these Guidelines may be used by the College or other bodies in determining whether appropriate standards of practice and professional responsibilities have been maintained.

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Introduction

Infection prevention and control is an important part of safe patient care. Concerns about the possible spread of blood-borne diseases, and the impact of emerging, highly contagious respiratory and other illnesses, require practitioners to establish, evaluate, continually update and monitor their infection prevention and control strategies and protocols.

These Guidelines are significantly broader than previous documents, and they reflect current knowledge of the transmission of infection, and how to prevent and control it.

IMPORTANT

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, anaesthetists 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.
- ✔ These guidelines contain practice parameters and standards, but respect the autonomy of each dental office. Guidelines, by definition, are directing principles, and indications or outlines of policy and conduct.
- ✔ 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 infection prevention and control 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 infection prevention and control program and ensure that it remains current. While infection prevention and control is the responsibility of all OHCWs, implementation and oversight rests with the principal dentist(s).

Purpose of the Document

This document is intended to provide all OHCWs with the knowledge to properly implement necessary infection prevention and control measures in dental practice. It consolidates published recommendations from government and other agencies, regulatory bodies and professional associations.

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. In addition, some recommendations are derived from provincial and federal regulations.

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

Professional and Regulatory Considerations

Dentists have an obligation to maintain the standards of practice of the profession and, accordingly, must ensure that recommended infection prevention and control procedures are carried out in their offices.

OHCWs must maintain current knowledge of infection prevention and control procedures, and apply and maintain them appropriately and consistently. To this end, it is the dentist's responsibility to ensure that staff are adequately trained in infection prevention and control procedures, and that the necessary supplies and equipment are available, fully operational, up-to-date and routinely monitored for efficacy.

In addition to professional obligations, 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 infection prevention and control principles (IPAC), OHCWs can develop strategies to interrupt the transmission of micro-organisms among patients and OHCWs, and from dental instruments, handpieces, devices and equipment.

IPAC principles include:

- patient 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 should focus on strategies to reduce the risk of transmission. These strategies include:

a) identifying, communicating and implementing standards and guidelines by setting specific policies and procedures;
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.

Patient Safety

Three main elements are required to spread infection:

1 susceptible host

2 causative agent

3 mode of transmission

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

Transmission of Micro-organisms

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

Dental patients and OHCWs can be exposed to pathogenic micro-organisms, including viruses (e.g. HBV, HCV, HIV, human herpes group of viruses, human papilloma virus), bacteria (e.g. Mycobacterium tuberculosis, 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 micro-organisms are:

direct transmission – direct physical contact with blood, oral fluids or other materials

indirect transmission – contact with an intermediate contaminated object, such as a dental instrument, equipment or an environmental surface

droplet transmission – contact of oral, nasal or conjunctival mucosa with droplets, spatter or spray containing micro-organisms 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 postoperative 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 micro-organisms, patients who appear to be ill should be rescheduled if at all possible. If their dental condition is of an urgent nature, every effort should 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 micro-organisms by direct or droplet transmission can be minimized.

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 rescheduled.

Routine Practices

Health Canada uses the term "routine practices" to describe basic standards of infection prevention and control that are required for safe patient care. A similar term, "standard precautions," is used by the Centers for Disease Control and Prevention in the United States. Routine practices synthesize the major principles of "universal precautions," which are designed to reduce the risk of transmitting pathogens that are blood-borne, and those of "body substance precautions," which are designed to reduce the risk of transmitting pathogens from moist body substances.

Routine practices are based on the concept that all patients are potentially infective, even when asymptomatic, and that the same safe standards of practice should 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 micro-organisms 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.

IMPORTANT

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 single most important measure for preventing the transmission of micro-organisms. The term "hand hygiene" has replaced handwashing and includes the use of plain or antimicrobial soap with running water, as well as alcohol-based hand rub.

When should hand hygiene occur and with what type of product?

Hands should be washed with plain or antimicrobial soap and running water:

- when hands are visibly soiled (including with powder from gloves) or contaminated with body fluids;
- following personal body functions.

If hands are NOT visibly soiled (i.e. the majority of instances), the use of a 70-90% alcohol-based hand rub is the preferred method of hand hygiene. This includes:

- 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 eating or drinking.

IMPORTANT

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

Liquid soap should be provided in disposable pump dispensers. Bar soap should not be used. Hand lotion to prevent dry or cracked skin also should be available in disposable pump dispensers. Petroleum-based hand lotions should not be used, because they can affect glove integrity. To avoid contamination, disposable pump dispensers of liquid products should be discarded when empty and not "topped-up" or refilled.

Despite perceptions to the contrary, alcohol-based hand rubs have been shown to be less irritating to skin than soap and water. Select a product that contains emollients.

IMPORTANT

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

How should hand hygiene be done?

When using soap and water for routine care:

- Wet hands with warm, not hot, water.
- Apply adequate amount of soap to achieve lather.
- Rub vigorously for a minimum of 15 seconds, covering all surfaces of hands and fingers. Pay particular attention to finger tips, between fingers, backs of hands and base of thumbs, which are the most commonly missed areas.
- Rinse well with running water.
- Dry thoroughly with a disposable paper towel. Turn off taps with towel and discard towel in a bin.

IMPORTANT

Avoid the use of hand jewellery and prosthetic nails. Jewellery interferes with proper hand hygiene, while prosthetic nails have been implicated in hospital outbreaks involving fungal and bacterial infections.

When using antimicrobial soap and water for surgical procedures:

- Remove all hand and wrist jewellery.
- Wash hands and at least 2 inches above wrists thoroughly for the length of time recommended by the manufacturer, which is usually 2 to 5 minutes.
- Clean under nails. A disposable manicure stick may be used, but nailbrushes are NOT recommended, as they can become contaminated and damage the skin around the nails. Nails should be short enough to allow thorough cleaning underneath and not cause glove tears.
- Rinse off soap and dry hands thoroughly before donning sterile gloves.

When using an alcohol-based hand rub for routine care:

- Apply the product to one palm and rub both hands together for a minimum of 15 seconds, covering all surfaces of hands and fingers, until they are dry.

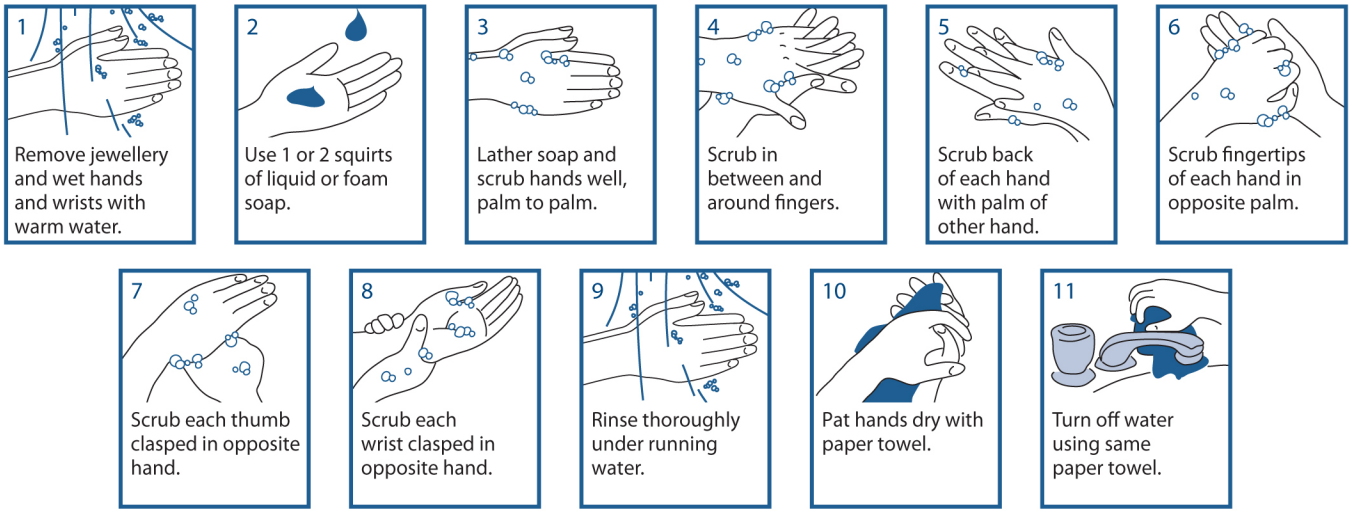
When using an alcohol-based surgical hand rub for surgical procedures:

- Remove all hand and wrist jewellery.
- Apply the product to dry hands only and follow the manufacturer's instructions.
- Allow hands to dry thoroughly before donning sterile gloves.

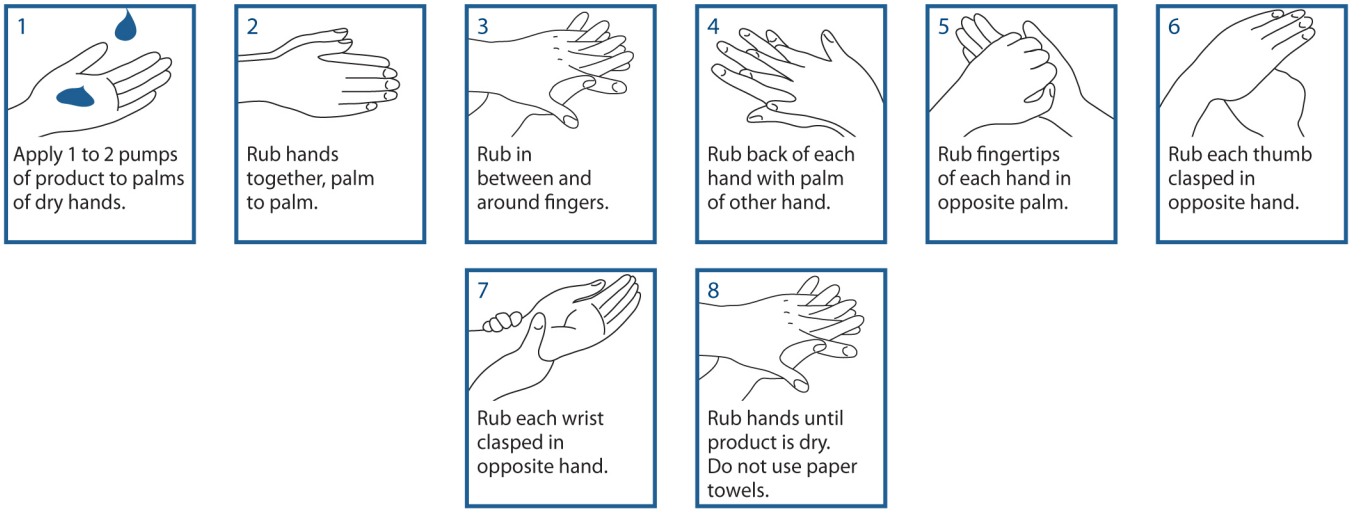
Hand hygiene facilities should be located as close as possible to all dental operatories and, preferably, in clear sight of patients. If they are out of sight, patients should be made aware that hand hygiene is taking or has taken place. In addition:

- Soap dispensers should be placed at every sink.
- Alcohol-based hand rub dispensers should be strategically located for ease of use.
- Disposable towels should be readily available at each facility.
- Taps should be turned off with the aid of a paper towel to avoid recontamination of hands. If renovating, consider installing hands-free faucets.
- A hand wash sink should not be used for any other purpose. Do not clean equipment or discard waste in a hand wash sink. Maintain separate facilities for these tasks. Keep clean equipment away from sinks to avoid contamination.

Handwashing with soap and water



Cleaning with alcohol-based hand rub



Source: Ontario Ministry of Health and Long-Term Care

Personal Protective Equipment

General considerations

OHCWs wear personal protective equipment (PPE) to shield their own tissues from exposure to potentially infectious material. This also protects patients, by preventing the OHCW from becoming a vector for the transmission of micro-organisms from patient to patient.

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

Protective eyewear

Large particle droplets of water, saliva, blood, micro-organisms 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 should 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 should 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 predisposing 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 should 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 should be removed from the operatory or adequately covered and isolated.

IMPORTANT

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 should 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 micro-organisms 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 micro-organisms. 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 infection prevention and control 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 micro-organisms 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 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 micro-organisms by droplet transmission can be minimized.

For more information about additional precautions, refer to *Routine Practices and Additional Precautions in All Health Care Settings*, released by the Provincial Infectious Diseases Advisory Committee (PIDAC) in 2009. (See Appendix 2 for the link to this document.)

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. Therefore, it is important to remember that patient records should be stored securely and not left unattended or in public areas of the office.

Sensitive medical information should 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 should be documented within the patient's chart.

If patient records are computerized, login and password protection should be used to prevent unauthorized access. In addition, screen savers and other measures should 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 infection prevention and control 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 infection prevention and control 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 should receive training that includes information about their exposure risks, infection prevention and control strategies specific to their occupational tasks, and the management of any work-related illness or injury.

It is also recommended that this document, as well as key reference materials identified in it, form part of an in-office Infection Prevention and Control Manual.

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 infection prevention and control 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 family physician about the need for immunizations, as well as baseline and annual tuberculosis skin testing. 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.

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.

IMPORTANT

OHCWs who might perform exposure-prone procedures have an ethical obligation to know their serologic status. If infected, dentists should seek guidance from the College 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 practising the principles discussed in this document, including:

- ensuring adequate and appropriate immunization of all OHCWs;
- triaging patients and rescheduling 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 micro-organisms, 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 exzema, the OHCW is at increased risk of acquiring and transmitting infection through the exposed area. Good skin care should always be practised. Any areas of dermatitis should be covered with bandages, in addition to wearing gloves.
- Immunocompromised staff – Immunocompromised OHCWs are at increased risk of becoming infected and may suffer more severe consequences. 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) should take the necessary precautions to prevent the transmission of micro-organisms 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 should stay at home until their symptoms have subsided.

OHCWs who have oral and/or nasal herpes simplex infections (i.e. cold sores) should pay particular attention to hand hygiene and not touch the affected area. In this situation, the use of a mask might 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 (PPE), such as gloves, protective eyewear, masks and protective clothing, and safe work habits for the handling and disposal of sharps.

PPE should be used consistently during the treatment of patients, 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 should be covered with a water-proof bandage or protective dressing (e.g. Opsite, Tegaderm), which should be changed as needed. Large cuts might 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:

- Always use extreme caution when passing sharps during four-handed dentistry.
- Needles should remain capped prior to use.
- Needles should not be bent, recapped or otherwise manipulated by using both hands.
- Following use, needles should be recapped as soon as possible by using a one-handed scoop technique or a commercial recapping device.
- When suturing, tissues should 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 should be used.

IMPORTANT

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 anaesthetic needles and dental units that shield burs in handpieces. Safer versions of sharp devices should be considered as they become available in the dental marketplace.

Personal Protective Equipment

General considerations

Personal protective equipment (PPE) 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 micro-organisms 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 should be removed prior to leaving the operatory. Single-use barriers, such as gloves and masks, should be discarded immediately after use.

Gloves

Gloves are worn to protect the hands of the OHCW from contamination. 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 should be followed before donning gloves and after removing them.

In the dental office:

- Gloves must be worn when contact with mucous membranes, non-intact skin or body fluids is anticipated.
- The same pair of gloves must not be used for more than one patient.
- Gloves should 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 should not be worn outside any room or area where they are required for personal protection.
- Gloves must not be washed and reused.
- 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 should be procedure-specific, not patient-specific. This would be in keeping with human rights considerations.

Protective eyewear

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

It is also recommended that an eye-wash station should 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 should 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 should be changed when they become contaminated, wet or more often, such as during longer appointments.

Protective clothing

Whenever spatter or spray is anticipated during dental procedures, the forearms of OHCWs should be protected by wearing long-sleeved protective clothing. This includes gowns and lab coats, which are meant to be worn over regular clinic clothing, such as uniforms, scrubs or street clothing.

It is the dentist's responsibility to develop a policy that uniforms and scrubs worn during patient care procedures should NOT be worn 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 Splatter

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 should 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 in-office Infection Prevention and Control Manual.

IMPORTANT

All OHCWs should know the dental office's exposure management protocol and review it periodically.

Significant exposures include percutaneous injuries with contaminated needles, burs or other sharp instruments, as well as accidents in which blood, saliva or other body fluids are splashed onto 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 should 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 should be reported to a dentist in the practice. However, in all cases involving a significant exposure, the dentist should 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 should 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 his or her 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 material safety data sheets (MSDS) 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 should 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 processing areas and in-office dental laboratories should be prohibited.

Cleaning, Disinfection and Sterilization of Patient Care Items

General considerations

The goals of safe processing 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 should be handled carefully at all times to prevent percutaneous injuries.

All instruments must be properly cleaned, rinsed and dried prior to either disinfection or sterilization. This step is essential, as residual organic 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 processing requirements.

Category	Definition	Processing
Critical items	Penetrate soft tissue or contact bone (e.g. all surgical instruments, periodontal scalers, etc.)	Cleaning followed by sterilization
Semi-critical items	Contact mucous membranes or non-intact skin (e.g. mouth mirrors, amalgam condensers, reusable impression trays, handpieces, etc.)	Cleaning followed by sterilization*
Non-critical 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

* The majority of semi-critical items used in dentistry, including handpieces, are heat-tolerant and should always be heat-sterilized between uses. If a semi-critical item is heat-sensitive, at a minimum it should be processed using high-level disinfection.

Processing of Critical and Semi-critical Items

To achieve sterilization, the processing 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, drying, packaging, sterilizer loading procedures and sterilization methods should be followed to ensure that all instruments are adequately processed and safe for reuse on patients.

All instruments should be processed in a central area of the dental office that is designed to facilitate quality control and ensure safety. The instrument processing area should have clear separation of clean and dirty areas with separate sections for:

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

Receiving, cleaning and decontamination

To prevent percutaneous injuries, contaminated instruments should be placed in a puncture-resistant container at the point of use and then transported to the instrument processing area. Reusable instruments should be received, sorted, cleaned and rinsed in one section of the processing area.

Cleaning involves the removal of debris (e.g. organic and inorganic matter). This is achieved either by scrubbing with a surfactant, detergent and water, or by an automated process (e.g. ultrasonic cleaner or washer with a cleaning solution). After cleaning, instruments should be rinsed with water to remove detergent residue and visually inspected to ensure all debris have been removed.

The use of automated cleaning equipment can increase productivity, improve cleaning effectiveness and decrease worker exposure to blood and body fluids. Thus, using automated equipment can be safer and more efficient than manually cleaning contaminated instruments.

Gross debris should be removed from instruments prior to placement in an ultrasonic cleaner. In addition, ultrasonic cleaning solutions should be changed daily or more frequently if they become visibly soiled. Automated washers do not require presoaking or scrubbing of most instruments.

If cleaning cannot be performed immediately, instruments should be placed in a puncture-resistant holding container and soaked with a detergent 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) should 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 should 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). 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 gown or jacket to protect from splashing.

Preparation and packaging

In another section of the processing area, cleaned instruments should be inspected, assembled into sets or trays, and packaged for sterilization. Critical and semi-critical instruments should be processed 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 should be designed for the type of sterilization process being used. Hinged instruments should be processed open and unlocked.

Sterilization

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

Heat-tolerant instruments are usually sterilized by steam under pressure (i.e. autoclaving), which is dependable and economical. Other means include dry heat or unsaturated chemical vapor. All sterilization should 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 of containers, wraps, and chemical or biological indicators, should always be followed.

Instrument packs should 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 must be conducted through a combination of mechanical, chemical and biological means, which evaluate both the sterilizing conditions and the procedure's effectiveness.

IMPORTANT

The information in this section of the Guidelines represents best practices for the monitoring of sterilization in the dental office, and is consistent with the recommendations of the Provincial Infectious Diseases Advisory Committee (PIDAC) and the Canadian Standards Association (CSA). These are the prevailing standards for all health care settings in Ontario, including dental offices, and may be used as a basis for auditing purposes.

1. Mechanical indicators are the gauges or displays on the sterilizer for cycle time, temperature and pressure. Some tabletop sterilizers have recording devices that print out these parameters, which is preferred. All new sterilizers should have this feature.

   Mechanical indicators must be checked and recorded for each load.

2. Chemical indicators (i.e. internal and external) use sensitive chemicals to assess physical conditions during the 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 undergone a sterilization cycle, 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 hollow area into which the sterilizing agent must be drawn or forced in.

For these reasons, each package must have external chemical indicators. In addition, it is recommended that both internal and external chemical indicators be used to detect penetration into the package.

NOTE: Mechanical 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. If either mechanical or chemical indicators demonstrate inadequate processing, then none of the items in the load should be used until they are 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 micro-organisms. 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.

   Include a BI each day a sterilizer is used. In addition, if a load contains implantable devices, it must be monitored with a BI, and these items should be quarantined until the test results are known. Follow the manufacturer's directions concerning the appropriate placement of the BI in the sterilizer.

IMPORTANT

The daily operation of every sterilizer must be reviewed and documented. A logbook should be kept for this purpose. Any malfunction must be noted and appropriate action taken.

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

- Remove the sterilizer from service.
- Review all records of mechanical and chemical indicators since the last negative BI, as well as 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.
- Repeat the spore test immediately. This should be done after addressing any procedural problems and correctly loading the sterilizer, and by using the same cycle that produced the failure. While waiting for the repeat test results, the sterilizer should 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 spore test is negative, and mechanical and chemical indicators demonstrate adequate processing, then the sterilizer may be put back into service.
- If the repeat spore test is positive, and all sterilization procedures have been performed correctly, then the sterilizer should remain out of service until it has been inspected, repaired and successfully rechallenged with BI tests in three consecutive empty chamber sterilization cycles. In addition, all items from suspect loads dating back to the last negative BI should be recalled, to the extent possible, and reprocessed.

Storage

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

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 should be inspected before use to verify barrier integrity and dryness. If packaging is compromised, the instruments should be cleaned, packaged and sterilized again.

IMPORTANT

Critical and semi-critical instruments should be processed 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 cycle (sometimes called flash sterilization) is a method for sterilizing patient care items for immediate use. Unpackaged sterilization should be used only under certain conditions:

- thorough cleaning and drying of instruments precedes the unpackaged cycle;
- mechanical parameters are checked and an internal chemical indicator is used for each cycle;
- care is taken to avoid thermal injury to staff or patients;
- items are transported aseptically to the point of use to maintain sterility.

When sterile items are left open to the air, they can quickly become contaminated. Therefore, critical instruments that are sterilized unpackaged should be used immediately and not stored. Sufficient inventories of critical instruments should be maintained to avoid the need for flash sterilization.

Semi-critical instruments that are sterilized unpackaged on a tray or in a container system should be used immediately or within a short time. Storage, even temporary, of unpackaged semi-critical instruments is discouraged because it permits exposure to dust, airborne organisms and other unnecessary contamination before use on patients.

All implantable devices should be quarantined after sterilization until the results of biological monitoring are known. Accordingly, unpackaged or flash sterilization of implantable items is inadequate and must not be used.

Flash sterilization should not be routinely used in the dental office.

IMPORTANT

Historically, bead sterilizers have been used in dentistry to treat small metallic instruments, such as endodontic files. These devices cannot assure sterility, creating the risk of cross-contamination if instruments are used between patients. Therefore, the use of bead sterilizers is not an acceptable method of sterilization.

Processing of Heat-Sensitive Items

Semi-critical items that are heat-sensitive should be cleaned and then receive high-level disinfection, which may be achieved by immersion in a liquid chemical germicide (e.g. 2% glutaraldehyde, 7% accelerated hydrogen peroxide, 6% hydrogen peroxide, 0.2% peracetic acid and 0.55% ortho-phthalaldehyde).

Liquid chemical germicides are highly toxic and their effectiveness cannot be verified with biological indicators. Accordingly, the manufacturer's instructions regarding dilution, instrument preparation, immersion time, temperature and the changing of solutions should be followed carefully. In addition, appropriate precautions should be taken to safeguard staff, including the use of closed containers to limit vapour release, adequate ventilation and chemically-resistant gloves, aprons, goggles and face shields. Following liquid immersion, instruments should be thoroughly rinsed with sterile water to remove toxic or irritating residues and then dried with clean towels. Liquid chemical germicides should not be used for applications other than those indicated in their label instructions, and they should NOT be used as an environmental surface disinfectant or instrument-holding solution.

The majority of semi-critical items used in dentistry are available in heat-tolerant or disposable alternatives. Avoid the use of heat-sensitive semi-critical items that must be processed with liquid chemical germicides.

Processing 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 micro-organisms. Non-critical items should be cleaned after use or, if contaminated, cleaned and then disinfected with an appropriate low-level disinfectant (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.

Equipment Use and Preventive Maintenance

Tabletop sterilizers undergo frequent use, and wear and tear. The manufacturer's recommendations should be consulted for guidance on a preventive maintenance program, including regular inspection of gaskets and seals.

Office Cleaning, Housekeeping and Management of Waste

General Considerations

Generally speaking, environmental surfaces in the dental operatory 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 micro-organisms. Transmission usually occurs through hand contact or by touching the surface with a contaminated instrument. When this happens, micro-organisms 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 micro-organisms. 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 splatter 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 low-level disinfectant. To facilitate this, treatment areas should be well-organized and kept free of unnecessary equipment and supplies, especially on countertops. Staff should take appropriate precautions, including wearing gloves, while cleaning and disinfecting surfaces to prevent occupational exposure to infectious agents and hazardous chemicals.

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 should be removed and discarded between patients using gloves. Following barrier removal, the underlying surfaces should be examined to ensure they did not inadvertently become contaminated. Those that did should be cleaned and disinfected. Otherwise, clean barriers should be placed prior to the next patient.

Housekeeping Surfaces

Housekeeping surfaces, such as floors and walls, have a limited risk of disease transmission. Accordingly, 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 should be cleaned first and then disinfected with an appropriate low-level disinfectant (e.g. household bleach diluted 1:50 or 1000 ppm). OHCWs should take appropriate precautions, including wearing gloves, for this purpose.

From a general housekeeping point of view, floors should be cleaned regularly and spills should be cleaned up promptly. Cleaning tools, such as mop heads, should be rinsed after use and allowed to dry before they are reused. Fresh cleaning solutions should 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 micro-organisms can be minimized.

IMPORTANT

Carpeting and cloth furnishings are difficult to clean and cannot be reliably disinfected. They should not be used in patient treatment or instrument preparation areas.

Management of Waste

For the purposes of infection control, 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 stored in an enclosed storage area, such as a stand-alone refrigeration/freezer unit, that is marked "Biomedical Waste Storage Area" and displays the universal biohazard symbol. This storage area must be separate from other supply areas, locked and maintained at a temperature at or below 4 degrees Celsius. Once accumulated, anatomical waste must only be released to an approved biomedical waste carrier for disposal.

NOTE: Extracted teeth are not classified as biomedical waste and should be handled differently. Please refer to the section on page 36.

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 stored like anatomical waste in a refrigerated storage area that is marked "Biomedical Waste Storage Area" and displays the universal biohazard symbol. Once accumulated, blood-soaked materials must only be released to an approved biomedical waste carrier for disposal.

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 on the College's website.

Handling of extracted teeth

Extracted teeth may be returned to the patient without any special considerations for infection prevention and control, 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 micro-organisms, 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 micro-organisms 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 micro-organisms can be effectively reduced to counts similar to those in potable water standards by following regular waterline maintenance procedures.

For offices using communal water supplies:

- Waterline heaters should not be used, as the heat encourages the growth of micro-organisms.
- All waterlines should be purged at the beginning of each workday by flushing them thoroughly with water for at least 2 to 3 minutes. Before purging is carried out, handpieces, air/water syringe tips and ultrasonic tips should be removed from the waterlines.
- Handpieces using water coolant should be run for 20 to 30 seconds after patient care in order to purge all potentially contaminated air and water. The handpiece should then be 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 should be followed for daily and weekly maintenance.

Dental Handpieces and Other Intraoral 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 should be activated to discharge air and water for a minimum of 20 to 30 seconds after each patient use.

Dental handpieces and other intraoral devices that are attached to air or waterlines should be sterilized after each patient use. The manufacturer's instructions for cleaning, lubricating and sterilizing these devices should 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 should be covered with barriers that are changed after each patient use. If the item is contaminated or suspected to have been contaminated, it should 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 micro-organisms from the suction lines entering the patient's mouth, a potential source of cross-contamination. Therefore, OHCWs should 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 should be purged between patients by aspirating water or an appropriate cleaning solution, thereby removing loosely adherent debris and micro-organisms. At least once per week, suction lines should 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, and certain orthodontic brackets. 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 should be disposed of appropriately after use.

Dental Radiography Equipment

When taking radiographs, appropriate steps should 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 intraoral radiographs (e.g. film-holders and positioning devices) should 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 should be cleaned and disinfected after each patient use.

After a radiograph is exposed, the film packet should 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 should then be removed before developing the film.

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

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

Digital Radiography Sensors and Intraoral Cameras

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

As with other dental equipment, the manufacturer's instructions should 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 includes particles, gases, tissue debris, viruses and offensive odours.

OHCWs should 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. appropriate 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.

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 should 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 should 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, should 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, should be cleaned and disinfected according to the manufacturer's instructions.

Finished prostheses and appliances delivered to the patient should 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 should be sterilized, cleaned and disinfected or discarded after use.

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 should 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 should 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:

Oral Pathology Laboratory
Faculty of Dentistry, University of Toronto
416-979-4920, ext. 4543

Oral Pathology Diagnostic Services
Department of Pathology, University of Western Ontario
519-661-2111, ext. 86402

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 micro-organisms, 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 minor 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, micro-organisms can be transferred to instruments or other environmental surfaces, and to the eyes, nose or mouth.

For major dental procedures (similar to other surgical procedures), the patient is prepared, hand hygiene is performed, 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 should 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 should 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 should only be retrieved using transfer forceps or by first ensuring that the OHCW's hands are clean.
6. Gloves should 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 reglove where appropriate.

Maintaining aseptic technique is a co-operative responsibility of the entire dental team. Each member must develop a professional conscience for infection prevention and control, as well as a willingness to supervise and be supervised by others regarding aseptic technique.

IMPORTANT

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

Glossary of IPAC Terms

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

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

Aseptic technique: A term used to describe practices that prevent 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 classes of CIs:

Process indicator (Class 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. Class 1 CIs are usually applied to or visible on the outside of packages (e.g. sterilization tape or packaging printed with colour-changing inks). Class 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 (Class 2): An indicator that is designed for use in specific test procedures in special sterilizers (e.g. dynamic air-removal sterilizers). Examples of Class 2 CIs include Bowie Dick and Dart products, which are used for steam sterilizers.

Single-parameter indicator (Class 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 them must be reached for sterilization to occur.

Multi-parameter indicator (Class 4): An internal indicator that responds to two or more critical parameters of the sterilization process.

Integrating indicator (Class 5): An internal indicator that responds to all critical parameters of the sterilization process. Class 5 CIs are correlated to the performance of biological indicators (BIs).

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 micro-organisms. Cleaning and then rinsing is performed before further processing.

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

Disinfection: A process that kills most pathogenic micro-organisms, 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. There are various levels of disinfection:

High-level disinfection (HLD): A process capable of killing vegetative bacteria, mycobacteria (including Mycobacterium tuberculosis), fungi, and enveloped and non-enveloped viruses, as well as some, but not necessarily all bacterial spores. HLD is considered to be the minimum level of decontamination required for semi-critical patient care items. HLD is performed after items are thoroughly cleaned and rinsed. HLDs include 2% glutaraldehyde, 7% accelerated hydrogen peroxide, 6% hydrogen peroxide, 0.2% peracetic acid and 0.55% ortho-phthalaldehyde.

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 include chlorine-based products (e.g. diluted household bleach), 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 health care 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 health care 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.

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 processing 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. Processing 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. Processing of semi-critical items involves meticulous cleaning followed by sterilization (preferred) or high-level disinfection (minimum).

Non-critical items: Items that contact intact skin, but not mucous membranes, or do not directly contact the patient. Processing of non-critical items involves cleaning followed by low-level disinfection.

Routine practices: A term used to describe basic standards of infection prevention and control that are required for 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 should 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 micro-organisms, 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 Items and Environmental Surfaces

Process	Result	Examples for Dentistry	Specific Indications	Comments
Sterilization	Kills all forms of pathogenic micro-organisms, including bacteria, fungi, viruses and spores.	Steam Dry heat	Critical and semi-critical items	Steam sterilization is the preferred method. Sterilization process must be audited and monitored with mechanical, chemical and biological indicators.
High-level disinfection (HLD) All disinfectants must have a Drug Identification Number (DIN) from Health Canada.	Kills vegetative bacteria, mycobacteria, fungi, enveloped and non-enveloped viruses, but not necessarily bacterial spores.	2% glutaraldehyde 7% accelerated hydrogen peroxide, 6% hydrogen peroxide 0.2% peracetic acid 0.55% ortho-phthalaldehyde	Heat-sensitive semi-critical items	**Not for use on environmental surfaces.** Follow manufacturer's instructions regarding dilution, instrument preparation, immersion time, temperature and changing of solutions. Glutaraldehyde is non-corrosive to metals and compatible with most materials. Extremely irritating to skin and mucous membranes. Use in well-ventilated areas. Hydrogen peroxide is active in presence of organic matter, but is corrosive to aluminum, brass, copper and zinc.
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 or household bleach) 0.5% accelerated hydrogen peroxide, 3% 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 aluminum, brass, copper and zinc. 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

Best Management Practices Flowcharts, 2003
Royal College of Dental Surgeons of Ontario
www.rcdso.org/pubs_resources/practice_resources/amalgam_waste.html

Best Practices for Cleaning, Disinfection and Sterilization in All Heath Care Settings, 2006
Provincial Infectious Diseases Advisory Committee
Ontario Ministry of Health and Long-Term Care
www.health.gov.on.ca/english/providers/program/infectious/diseases/best_prac/bp_cds_2.pdf

Best Practices for Environmental Cleaning for Prevention and Control of Infections in All Health Care Settings, 2009
Provincial Infectious Diseases Advisory Committee
Ontario Ministry of Health and Long-Term Care
www.health.gov.on.ca/english/providers/program/infectious/diseases/best_prac/bp_enviro_clean.pdf

Best Practices for Hand Hygiene in All Heath Care Settings, 2009
Provincial Infectious Diseases Advisory Committee
Ontario Ministry of Health and Long-Term Care
www.health.gov.on.ca/english/providers/program/infectious/diseases/best_prac/bp_hh_20080501.pdf

Canadian Immunization Guide for 2006
Public Health Agency of Canada
www.phac-aspc.gc.ca/publicat/cig-gci/pdf/cig-gci-2006_e.pdf

Decontamination of Reusable Medical Devices (CSA Z314.8-08), 2008
Canadian Standards Association
www.csa.ca

Guideline C-4: The Management of Biomedical Waste in Ontario, 2001
Ontario Ministry of the Environment
www.ene.gov.on.ca/envision/env_reg/er/documents/2001/RA01E0023_g2.pdf

Guideline for Disinfection and Sterilization in Healthcare Facilities, 2008
Centers for Disease Control and Prevention
www.cdc.gov/ncidod/dhqp/pdf/guidelines/Disinfection_Nov_2008.pdf

Guidelines for Infection Control in Dental Health-Care Settings, 2003
Centers for Disease Control and Prevention
www.cdc.gov/mmwr/PDF/rr/rr5217.pdf

Infection Control in the Physician's Office, 2004
College of Physicians and Surgeons of Ontario
www.cpso.on.ca/uploadedFiles/policies/guidelines/office/Infection_Controlv2.pdf

Infection Prevention and Control in the Dental Office, 2006
Canadian Dental Association
www.cda-adc.ca/en/dental_profession/practising/resources/infection_control.asp

Routine Practices and Additional Precautions in All Heath Care Settings, 2009
Provincial Infectious Diseases Advisory Committee, Ontario Ministry of Health and Long-Term Care
www.health.gov.on.ca/english/providers/program/infectious/diseases/best_prac/bp_routine.pdf

Workplace Hazardous Materials Information System (WHMIS): A Guide to the Legislation, 2008
Ontario Ministry of Labour
www.labour.gov.on.ca/english/hs/pubs/whmis/index.php

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06/16_4288 Design: Public Good Social Marketing Communications – www.public-good.com

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