

# Infection Prevention and Control Standards in the Oral Health Care Facility

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*The Saskatchewan Oral Health Professions thank the Canadian Dental Association, the Ad Hoc IPC Committee, the internal and external reviewers and the Councils of CDSS, DSS, SDTA, SDHA, and SDAA for their efforts in developing and reviewing this document, and acknowledges that this document draws from the CDA's IPC Guidelines, 2006*



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# INTRODUCTION

## IPC-01-01 - Purpose of this document

The major goal of an infection control program is to prevent the transfer of pathogens between contaminated items and individuals. Dentists, dental hygienists, dental therapists and dental assistants have dealt with the concepts and principles of infection control and infection prevention since early in the history of these professions. All Saskatchewan Oral Health Care Professions hold the responsibility of infection control in dental facilities in Saskatchewan. Historically, the profession of dentistry has been at the forefront of developments in infection control in ambulatory health-care settings. Due to the biologic and micro-floral realities of the oral environment, creating a medical surgical operating room level of sterility is not necessary. Furthermore, it is virtually impossible to provide dental care in a completely sterile environment, but it is necessary to strive to efficiently create an environment which is as pathogen free as possible.

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

Due to the very nature of infection prevention and control, it is difficult, if not impossible, to establish the scientific validity for every recommendation provided in this document. Wherever possible, these recommendations are based on data from well-designed scientific studies. (see References; IPC-07-01)

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

This document is intended to protect all oral health care personnel and their patients from infectious disease transmission. Saskatchewan Oral Health Care Professionals are encouraged to apply this information as their standard of practice in a diligent, conscientious manner.

In this document, **Saskatchewan Oral Health Care Professions (SOHCP)** refer to dentists, dental therapists, dental hygienists, dental assistants and denturists that are regulated and licensed to provide oral/dental care.

In this document, **other personnel** refers to the variety of paid and unpaid personnel in the dental health-care setting who might be exposed to infectious materials, including body substances (blood, saliva, etc.) and contaminated supplies, equipment, environmental surfaces, water, or air. Other personnel could refer to dental laboratory

technicians (on-site and commercial), students and trainees, contractual personnel, as well as other personnel that may not be directly involved in patient care, but may be potentially exposed to infectious agents (e.g., administrative, clerical, housekeeping, maintenance, or volunteer personnel).

## **Acknowledgement**

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## **IPC-01-02 - Ethical Considerations**

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

The oral health professions in Saskatchewan have a long tradition of providing appropriate and compassionate care to the public, including special groups with special needs. Individuals with infectious diseases should have access to oral health care, including dental treatment. This care and treatment should provide for the well-being of these patients/clients, as well as for the protection of the health of the public and all SOHCP and other personnel.

- As professionals with a unique body of knowledge and skills rendered by their educational preparation and license to practice, SOHCP recognize a moral and ethical requirement to provide necessary dental treatment to all members of the public without discrimination. Accordingly, all SOHCP must not refuse to treat a patient on the grounds of the patient's infectious state.
- People living with infectious diseases may, however, be severely or profoundly medically compromised as a result of that infectious disease. Such individuals may have severe hepatic or renal dysfunction, coagulopathies, respiratory depression, altered states of consciousness and may be taking multiple medications which may interact or interfere with planned oral health care.
- Any SOHCP providing oral health care to such individuals must be familiar with the oral manifestations of the specific infectious disease involved, the oral and systemic effects of the medications used to treat that infectious disease, any potential medication interactions, as well as any treatment modifications necessary to realistically provide appropriate oral health care. When a person living with an infectious disease is severely or profoundly medically compromised, it may be safest for the patient to treat that individual in a multidisciplinary hospital setting or treatment be delayed until the disease is controlled or not in an infectious state.
- A SOHCP with an infectious disease does not pose a significant risk of infecting patients, other SOHCP or the public, provided he or she is practicing current recommended infection prevention and control procedures. (Reporting is mandatory for the College of Dental Surgeons). However, if the condition has either immediately affected, or may affect over time, his or her ability to practice safely and competently, the SOHCP must inform their licensing authority of the infectious status. Appropriate measures will then be taken to ensure the protection of the public and other personnel, including possible review by an expert panel.
- The SOHCP has a professional obligation to maintain the standards of practice of the profession and, accordingly, should ensure that infection prevention and control procedures are carried out in his or her practice. Only those products specifically

designed to be used for infection prevention and control should be utilized in a dental health-care setting.

- SOHCP have an obligation to maintain currency of knowledge of infection prevention and control procedures and to apply these procedures in the practice setting. Dental personnel should accept a responsibility to contribute to public understanding of effective approaches to infection prevention and control.

Dental patients, SOHCP, and other oral health care facility personnel, can be exposed to pathogenic microorganisms, including, but not limited to viruses (HIV, HCV, HSV-1/HSV-2), bacteria (*M. tuberculosis*, staphylococci, streptococci), and other microbes that colonize or infect the oral cavity and respiratory tract.

Recommendations in this document are designed to prevent or reduce the potential for infectious disease transmission.

# IPC-01-03 - Principles of Infection Prevention and Control in the Dental Setting

## Modes of Transmission

Organisms can be transmitted in oral health care settings through:

1. **Direct transmission**  
Direct physical contact with blood, oral fluids, or other substances.
2. **Indirect transmission**  
Contact with an intermediate contaminated object (e.g., instruments, equipment, or environmental surfaces),
3. **Droplet transmission**  
Contact of conjunctival, nasal, or oral mucosa with droplets (e.g., spatter) containing microorganisms generated from an infected person and propelled a short distance (e.g., by coughing, sneezing, or talking), and
4. **Airborne transmission**  
Inhalation of airborne microorganisms that can remain suspended in the air.
5. **Other transmission**  
Contact with a vehicle such as food or water causing the transfer of the pathogen.

## Criteria for infection

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

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

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

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



transmission of any diseases. Infection prevention and control protocols must be designed procedure specific rather than patient specific.

This concept is known as **Standard Precautions** or **Routine Practices**.

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

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

# PERSONNEL HEALTH

## IPC-02-01 - General Considerations

An oral health care setting must have written infection prevention and control policies (manual) to maintain the health of all patients, SOHCP and other personnel.

The facility manual should include the following elements:

1. Policies that describe procedures and practices and that is reviewed, dated and signed annually by all employees.
2. Identification of an Infection Prevention and Control Officer (dentist or other SOHCP) assigned to instigate, coordinate and evaluate the infection prevention and control policies. The officer's duties would include the education of SOHCP and other personnel regarding the principles of infection prevention, identifying work-related infection risks, instituting preventive measures, and ensuring prompt exposure management and medical follow-up.
3. Infection prevention practices that clearly describe the policies used during the pre-treatment, treatment and post-treatment periods of patient care respectively. Daily, weekly and monthly routines should be outlined as well.
4. Policies that include, but are not limited to, a record of immunization of staff, all local and provincial guidelines, as well as a record of all exposures to infectious agents, and the actions taken in accordance with HIPA Regulations.
5. Guidelines for education and training (documented in employee file).
6. Immunization policies (documented in employee file).
7. Exposure prevention and post-exposure management.
8. Special considerations regarding medical conditions, work-related illness, and associated work restrictions.
9. Considerations regarding contact dermatitis and latex hypersensitivity.
10. Documentation of sterilizer monitoring (dated and signed).
11. A record of infection prevention equipment maintenance. (e.g., ultrasonic instrument cleaners and heat sterilizers).

Oral Health Care Facilities must be aware of Regional Health Authority emergency (infections) protocols.

## **IPC-02-02 - Education and Training**

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

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

For SOHCP and other personnel who perform tasks or procedures likely to result in occupational exposure to infectious agents, training should include:

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

Educational materials should be appropriate in content and vocabulary for each person's educational level, literacy and language, as well as be consistent with existing federal, provincial and municipal regulations. All education and training should be documented.

## **IPC-02-03 - Immunizations**

Immunizations for vaccine-preventable diseases substantially reduce both the number of SOHCP susceptible to infectious diseases and the potential for disease transmission to others. SOHCP should consult their employer or OH&S department for their immunization requirements. RHAs may have record of some of an employee's immunizations and employees may be required to pay a fee to obtain these records.

The following vaccines are publicly funded for RHA or First Nations employed HCWs and non-RHA or First Nations employed HCWs:

- Tetanus and diphtheria
- Pertussis (one adult dose covered)
- Influenza
- Hepatitis B
- Pneumococcal polysaccharide 23 for those 65 and older
- Varicella (chickenpox) for lab-confirmed non-immune individuals born since January 1, 1993.

For other immunizations, employees must consult with their employer.

Employers need to be aware of immunization recommendation for adults as noted in the Saskatchewan Immunization Manual. There is an employer duty to inform workers about recommended immunizations. There is an employer duty to inform workers about recommended immunizations, arrange for workers to receive these immunizations during normal working hours, and reimburse workers for the associated costs.

A yearly skin test for tuberculosis is not required if a baseline test has been established as negative. Employees and employers must be aware that Public Health Centres will charge a fee for this test, unless it is a requirement for tuberculosis case contact tracing.

## **IPC-02-04 - Hepatitis B Immunization**

SOHCP are at an increased risk of acquiring hepatitis B in an occupational setting. Therefore, all SOHCP should be immunized against hepatitis B and be provided hepatitis B immunization by their employer.

SOHCP must be tested for the presence of adequate amounts of hepatitis B surface antibody approximately 1-2 months following completion of the 3-dose vaccination series. Serologic testing should produce antibody levels of anti-HBs  $\geq 10$  mIU/mL.

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

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

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

Employers may wish to require SOHCP who are non-respondent to vaccination to sign a waiver.

## **IPC-02-05 - Exposure Prevention**

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

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

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

### **Standard Precautions**

Standard Precautions includes the consistent and universal use of Personal Protective Equipment, including the use of gloves, masks, protective eyewear or face shields and protective clothing (see IPC-03-01).

### **Engineering Controls**

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

### **Work-Practice Controls**

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

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

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

Engineering controls and work-practice controls for needle handling safety are of particular importance to prevent percutaneous exposures. Aspirating anesthetic syringes, and self-

sheathing needles should be considered for routine use. Newer designs should be considered as they become available.

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

- Used disposable syringes and needles, scalpel blades and other sharp items must be placed in approved puncture-resistant containers located as close as feasible to where the items were used.
- Approved biohazard puncture resistant containers are to be filled to the fill line only and disposed of according to local regulations.
- Needles must remain capped prior to and after use.
- Needles must not be bent or otherwise manipulated by hand, or handled so that they are pointed towards any part of an SOHCP or other personnel's body.
- Used needles must be recapped using a needle guard, a one-handed scoop technique, or an engineered sharps injury protection device (e.g., needles with re-sheathing mechanisms)
- Needles must be recapped immediately by the operator after use, and before removing the needles from the syringe for disposal.
- One needle may be used for multiple injections on the same patient; however, the needle must be recapped between each use.
- Extreme caution should be used whenever contaminated sharps are passed between SOHCP or other personnel, such as during four-handed dentistry.
- Keeping instruments on the work surface organized will reduce the risk of sharps injury.
- Extreme caution must be used whenever contaminated sharp instruments are processed for sterilization. Wear sturdy puncture resistant utility gloves for instrument processing, keep in mind that no glove is foolproof. Avoid handling these instruments by the hand-full.

## **IPC-02-06 - Exposure Management**

### **Percutaneous Injury**

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

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

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

Exposure to the patient's blood or saliva on the unbroken skin is not considered significant.

The steps in managing a significant exposure are:

1. Remove gloves or immediate clothing, if necessary, to assess the extent of the injury.
2. First-aid should be administered, if necessary, for percutaneous exposures.
3. Immediately wash the area, including the puncture or wound using antimicrobial soap and water. Allow a puncture to bleed. Exposed eye, mouth or nose mucosa should be flushed with copious amounts of water.
4. The application of caustic agents such as bleach, or the injection of antiseptic agents into the wound is not advisable.
5. Report the injury to the facility Infection Prevention and Control Officer, who must then contact the appropriate health-care professional for advice and possible referral, and begin the necessary documentation.
6. If possible, source patient's serology test (HBsAg, HCVAb & HIV Ab) should be conducted with patient's consent.
7. The facility must report the injury to Saskatchewan Workers Compensation Board within 5 days.



## **IPC-02-07 - Post-Exposure Prophylaxis**

Documentation should include (see IPC-02-08):

- The name of the exposed person, and details regarding the exposed person's vaccination status.
- The date and time of the exposure.
- The nature of the exposure, including the dental procedure being performed, the extent of the exposure, and immediate action taken.
- The name and health status of the source person, including details regarding any infectious diseases known or suspected.
- Follow-up counseling and post-exposure management.
- The employer must be kept informed of the exposure recipient's status as well (including copies of all documentation).

Every significant exposure must be immediately evaluated by a qualified health-care professional for the potential to transmit an infectious disease. The assessment of risk to transmit an infectious disease will be based on the following:

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

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

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

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

As discussed in item IPC-02-01, the appropriate arrangements and contact health care personnel should be determined well before an actual significant exposure.

Note: An incident report will be completed within the Regional Health Authority and the injury must be reported to Workers Compensation Board. It is critical to document all communication in regard to the injury.

## IPC-02-08 - Exposure Documentation

**A COPY OF THIS FORM MUST BE TAKEN TO THE HOSPITAL  
PLEASE HAVE ADDITIONAL COPIES AVAILABLE  
A COPY MUST BE RETAINED IN THE EMPLOYEES PERSONNEL FILE**

**(NOTE: Confidentiality of this form MUST be ensured)**

**Name** of Exposed Person:

Hepatitis B vaccination completed: date    /    /                      Post-vaccination titre:                      mIU/mL

**Date and time** of Exposure:

**Procedure** being performed:

Where and how exposure occurred:

Did exposure involve a sharp device: Yes  No

Type and brand of device:

How and when during handling exposure occurred:

**Extent of the exposure** (describe):

Blood  Saliva  Other body fluid  Describe:

Percutaneous injury:

Depth of wound:

Gauge of needle:

Was fluid injected: Yes  No

Skin or mucous membrane exposure:

Estimated volume of fluid:

Duration of contact:

Condition of skin: Intact  Chapped  Abraded

**Source person information:**

Known infectious disease(s):

HIV: Yes  No  Possible

Anti-retroviral therapy: Yes  No  Viral load:



## **IPC-02-09 - Hand Hygiene**

Hand hygiene is often the weak link in an effective infection prevention and control program. The purpose of hand hygiene is to reduce the quantity and diversity of the transient microorganisms found on the surface of the hands, versus the resident microorganisms found in the deep skin layers. The spread of these transient microorganisms, through non-compliance with hand hygiene protocols, is connected with health-care associated infections and the spread of multi-resistant organisms.

Hand hygiene may be performed by thorough handwashing (at least 15 seconds) using a soap/water/single use towel combination, or hand disinfection using an alcohol hand-rub, depending on the situation.

### **Hand Washing**

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

- At the beginning of the workday with two consecutive 15-second hand washes.
- Between patients, or when gloves are changed during an appointment.
- After eating.
- After using the washroom.
- Whenever the hands have become contaminated with blood, saliva or some other body fluid, or whenever the hands have come in contact with some instrument, agent or surface that may have been contaminated with blood, saliva or some other body fluid.

Hand washing should be done using a plain or anti-microbial soap with persistent activity (e.g., chlorhexidine, chloroxylenol [PCMX], octenidine, or triclosan), cool or warm (not hot) water, and single use towels. Hands should be thoroughly dried after washing, as bacteria can quickly multiply.

### **Hand Antisepsis Using Alcohol-Based Hand Rub**

Hand antisepsis may be achieved using an alcohol hand-rub:

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

Only medical grade (70% alcohol) commercial products specifically designed as an alcohol hand-rub should be used for hand hygiene. Hands should be rubbed until the alcohol rub is no longer wet, and according to manufacturer's instructions, as the alcohol can cause glove material degradation and result in loss of glove integrity. If alcohol hand-rubs are not used in a practice, handwashing should be performed for all the above situations.

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

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

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

**Fingernails** are a common area of blood impaction and bacterial contamination. Fingernails should be kept short and trimmed in order to thoroughly clean underneath them and prevent glove tears. During initial handwash, orangewood sticks could be used to clean cuticles and under fingernails. Long natural or artificial nails must be avoided, as they are more difficult to clean, can make donning gloves more difficult and can cause gloves to tear more readily. Freshly applied nail polish on natural nails is acceptable, provided fingernails are kept short; however, chipped nail polish can promote bacterial growth and prevent adequate hand hygiene, and should be avoided.

**Jewellery**, including rings, arm and wrist bands and bracelets and watches must be avoided on the hands or arms, as they prevent adequate hand hygiene, make donning gloves more difficult, can cause increased tearing of gloves and cannot be adequately decontaminated.

# PERSONAL PROTECTIVE EQUIPMENT

## IPC-03-01 - General Considerations

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

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

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

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

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

## IPC-03-02 - Gloves

Gloves are worn to protect the skin of the SOHCP's hands from contamination. Gloves do not replace the need for proper hand hygiene (see IPC-02-08), as gloves may contain small, unapparent holes or can be torn during patient treatment or hands may become contaminated during removal. Further, resident organisms on the hands can multiply rapidly in the warm, moist environment of gloved hands and could be passed on to the next patient.

Appropriate hand hygiene must be performed immediately before donning gloves, and immediately after removing gloves. Hands should be allowed to dry completely before putting new gloves on.

Gloves are designed as single-use disposable items. Gloves must be removed, hand hygiene performed, and then new gloves reapplied between patients, or whenever the gloves are torn or punctured. Ideally, hands should not remain gloved for longer than 90 minutes - the skin needs to breathe.

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

- **Patient Examining Gloves** – Used for routine patient care, examination and other non-surgical procedures involving contact with mucous membranes and skin, as well as laboratory duties. These are typically latex, nitrile or nitrile blends, polyurethane or styrene-based copolymers. Powder-free gloves are recommended as the exposure to latex proteins and the chemicals used in the manufacture of all gloves is reduced. Plastic (polyvinyl chloride) or vinyl gloves may also be used, however, gloves from these materials tend to tear more easily. All of these gloves are for use on one patient only, and are discarded after use.
- **Sterile Surgical Gloves** - Used whenever an open surgical wound is anticipated. These are sterile, in appropriate hand size, and made of latex, nitrile or nitrile blends, polyurethane or styrene-based copolymers. All of these gloves are for use on one patient only, and are discarded after use.
- **Utility Gloves** – Used for cleaning and disinfection procedures, such as instrument processing and may be used during operatory cleanup for greater operator protection. These are typically nitrile or latex-nitrile blends, chloroprene / neoprene, butyl rubber, fluoro-elastomer, polyethylene or other vinyl copolymer. Commonly referred to as utility, industrial or general purpose gloves, these are not for patient care, and should be puncture and chemical resistant. They are relatively thick and should be disinfected or sterilized, as appropriate for the material, at the end of each work day. These gloves should be single person use. The integrity of gloves should be monitored after donning and during use, particularly when manipulating metal instruments. If the surface of the glove is compromised (e.g., manufacturing defect, punctured or torn during use), the glove should be changed as soon as possible.

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

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

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



## IPC-03-03 - Adverse Latex Reactions

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

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

- **Irritant Contact Dermatitis** is a non-immunologic chemical reaction resulting from the destruction of superficial skin cells. Acute irritant contact dermatitis presents as inflammation of the hands, and chronically as dry, cracking sores. Both the acute and chronic signs stop at the glove boundary on the wrist.

Irritant contact dermatitis is due to skin reactions to soaps (plain and antimicrobial), surface disinfectants, powder from gloves, hyper-hydration from inadequate hand drying after washing and towel abrasion.

Management of irritant contact dermatitis would include changing types or brands of soap, towels or gloves, rinsing hands thoroughly after washing and utilizing a proper hand care regimen.

- **Delayed Hypersensitivity Reactions (allergic contact dermatitis)** are Type IV immunologic reactions, which are T-lymphocyte mediated. Acute delayed hypersensitivity reactions present as clustered bumps, vesicles, itching, redness and pain, and chronically as dry, thickened skin, sores and spaced bumps. Both the acute and chronic signs extend beyond glove boundary onto the arm.

Delayed hypersensitivity reactions are due to an immunologic response to the chemical accelerators (typically: thiurams, thiazoles and carbamates) used in the manufacturing of latex, nitrile, and neoprene gloves, as well as to soaps (plain and antimicrobial), surface disinfectants and endotoxins found in the glove material or created by transient microorganisms not completely washed off the hands.

Management of delayed hypersensitivity reactions include referral to a medical dermatologist, using washed (powderless) low-protein latex gloves or non-latex gloves.

- **Immediate Allergic Reactions** are Type I immunologic reactions, which are IgE antibody mediated. This type of reaction is exceedingly rare, and represents a true latex allergy. Immediate allergic reactions to latex may represent a life-threatening situation. Acute immediate allergic reactions present as urticaria, hives and swelling, which extends beyond the glove boundary, and may become systemic as dyspnea, tachycardia, hypotension and anaphylaxis. Immediate allergic reactions are due to an immunologic response to the natural rubber latex protein antigen. Management of immediate allergic reactions would include providing immediate emergency medical care

as required and referral to a medical dermatologist, as well as the use of only non-latex, powder-free gloves, and the absolute avoidance of all latex products in the workplace and at home.

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

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

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

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

## **IPC-03-04 - Masks**

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

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

The mask should be changed between patients or more often if it becomes contaminated or wet during the procedure or from the SOHCP's exhaled moist air during a longer procedure. It is recommended to change your mask every hour when working in a heavy aerosol environment. When aerosols are not a problem, masks may be worn between patients as long as they are not touched with contaminated gloves.

SOHCP should ensure the mask fits tightly over their nose and mouth at all times, so that the SOHCP is breathing through the mask, and not around it. The mask should be either on or off; it should never be worn around the neck or with the nose exposed. Single-use disposable masks should be removed by the earloop or string tie and properly disposed of after use. Never touch the mask itself.

If pandemic or respiratory infection isolation precautions are necessary (e.g., H<sub>1</sub>N<sub>1</sub> flu virus), a particulate-filter respirator or mask (e.g., N95, N99 or N100) should be worn. These masks will filter 1- $\mu$ m particles in the unloaded state with a filter efficiency of greater than 95% (i.e., filter leakage <5%), given flow rates of <50 L/min, which is an approximate maximum airflow rate during breathing. Only masks specifically designed for this purpose should be used. When respiratory infection isolation precautions are necessary, these respirators or masks should be used in the context of a complete respiratory protection program. Such a program should include training and fit-testing of the respirator or mask to ensure an adequate seal between the edges of the respirator and the SOHCP's face. Administrative and clerical staff exposed to the general public must be included in the training and fit testing.

During a pandemic, SOHCP must comply with mask requirements as outlined by Occupational Health and Safety regulations.

## **IPC-03-05 - Protective Eyewear**

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

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

Protective eyewear for the SOHCP and patient should be washed according to manufacturers' recommendations or with antimicrobial soap, rinsed and dried between patients. If the eyewear becomes visibly contaminated it should be cleaned and disinfected with an intermediate-level disinfectant.

A fixed or portable eye-wash station should be available in the oral health care facility, to aid in managing any chemical or body fluid splashes, sprays or spills into the eyes of a SOHCP or patient. All SOHCP staff should be orientated as to the location, function and indications for use of the eye-wash station. The eyewash station should be cleaned and checked regularly according to manufacturer's instruction to ensure proper water flow. Portable eye-wash devices should be checked for an expiry date on the solution.

## **IPC-03-06 - Protective Clothing**

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

Gowns and lab-coats worn over normal protective clothing become protective clothing and must be treated as such.

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

Protective clothing should be donned before entering the work area and removed before leaving the work area. Protective clothing should not be worn outside the clinic. Protective clothing should be washed between uses in a normal wash cycle, or professionally cleaned. Household bleach is an acceptable form of disinfection for laundering protective clothing.

Oral Health Care Facilities could consider installing laundry equipment onsite or ensure that protective clothing is professionally cleaned for SOHCP within oral health care settings.

# STERILIZATION AND DISINFECTION OF PATIENT CARE ITEMS

## IPC-04-01 - General Considerations

The utilization of disposable single-use use items saves time during clean-up and decontamination. Single-use items also solve the problem of decontaminating hard to clean items. Recently disposable handpieces are becoming available. These would be recommended for suspected Creutzfeldt–Jakob disease (CJD) patients.

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

- **Critical Items** are used to penetrate soft tissue or bone. Critical patient care items have the greatest risk of transmitting infection and must be sterilized by heat. Examples of these items could be scalers, burs, scalpels, etc. See IPC-04-02 for further information.
- **Semi-Critical Items** are those items that only touch mucous membranes or non-intact skin and have a lower risk of transmission. As the majority of semi-critical patient care items in dentistry are heat-tolerant, all heat-tolerant semi-critical items must be sterilized by autoclave. If a semi-critical item is heat-sensitive, it should be disinfected with high-level disinfection. As an alternative to high-level disinfection, single use items are recommended, if available. Examples of these items could be mouth mirrors, rubber dam forceps, etc. See IPC-04-03 for further information.
- **Non-Critical Items** contact only intact skin, which serves as an effective barrier to microorganisms. Non-critical patient care items pose the least risk of transmission of infection. In the majority of cases, cleaning, or if contaminated by blood, saliva or other body fluid, cleaning followed by disinfection with a intermediate-level disinfectant is sufficient. Cleaning or disinfection of some non-critical items may be difficult or may damage the surfaces. In those instances, the use of disposable barriers to protect these surfaces may be a preferred alternative. Examples of these items could be bib chains, radiograph cones, blood pressure cuff, etc. See IPC-04-05 for further information.

*Note: Intermediate-level disinfectant means a hospital grade liquid chemical with a Drug Identification Number (DIN) from Health Canada, with a claim of potency as a tuberculocidal.*

Dispensing the correct amount of product/supplies on the working surface with any excess discarded following the procedure (unit dosing) reduces clean up time by limiting the number of items requiring cleaning and disinfection following treatment. Unit dosing also solves the problem of decontaminating hard to clean items.

## IPC-04-02 - Processing Critical Items

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

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

**Operatory Clean-up:** Contaminated instruments must be handled carefully to prevent exposure to sharp instruments that can cause a percutaneous injury. Instruments that have been used on a patient should be handled with puncture-resistant utility gloves during operatory clean-up (see Gloves, IPC-03-02).

**Transportation:** Instruments should be placed in a rigid or puncture-resistant container or IMS cassettes at the point of use to prevent percutaneous injuries during transport to the instrument processing area.

**Instrument Processing** requires multiple steps to achieve sterilization. These steps include: disassembly and sorting, cleaning, rinsing, drying, inspection, corrosion reduction, packaging, heat-processing, cooling / drying, storage and delivery. Ultrasonic cleaners should be used as an alternative to hand scrubbing.

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

**Instrument Processing Area:** A designated instrument processing area or a separate room should be constructed in the oral health care facility. This central processing area should have clear sections for:

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

Walls or partitions should separate the sections to control traffic flow and contain contaminants generated during processing. If physical separation of these sections is not possible, adequate spatial separation is necessary, provided the SOHCP or other personnel processing the instruments are trained in work practices to prevent contamination of clean areas. Space should be adequate for the volume of work anticipated and the items to be stored.

**Decontamination:** Instruments should be cleaned immediately. The surface of an instrument cannot be sterilized if there is blood, saliva, other body fluids or other debris adhering to the surface. Decontamination and cleaning should precede all disinfection and sterilization processes. Cleaning involves the removal of debris as well as organic and inorganic contamination. Removal of debris and contamination is achieved either by scrubbing with a surfactant, detergent, and water, or by an automated process (e.g., ultrasonic cleaner using chemical agents or instrument washer using water). After cleaning, instruments should be rinsed with water to remove chemical or detergent residue, taking care to minimize splashing.

An automated process using equipment specifically designed for cleaning medical instruments (e.g., ultrasonic cleaner or instrument washer) is preferable to hand scrubbing in order to reduce the risk of injury to SOHCP or other personnel. Scrubbing of contaminated instruments or devices prior to placing in an ultrasonic cleaner or washer should not be necessary.

A holding solution may be utilized in exceptional circumstances and should not become routine. When exceptional circumstances present, instruments are placed in a puncture-resistant container and soaked with a detergent, an intermediate level disinfectant, or an enzymatic cleaner to prevent drying of patient material and make cleaning easier and less time-consuming.

Work-practice controls should be used when processing critical items. SOHCP and other personnel should wear masks, glasses and gloves as aerosols may be released when hand scrubbing. Keep the hands away from sharp instruments; e.g. using puncture-resistant utility gloves and long-handled brush when handling or manually cleaning contaminated instruments and devices. SOHCP and other personnel should not reach into trays, ultrasonic cleaners or containers holding sharp instruments that cannot be seen (e.g., sinks filled with soapy water in which sharp instruments have been placed). Work-practice controls should include the use of a strainer-type basket to hold instruments and forceps to remove the items. PPE should be worn during instrument decontamination to avoid exposure from splashing.

### **Instrument preparation and packaging**

Cleaned instruments should be inspected, assembled into sets or cassette trays, and wrapped, packaged or placed into container systems for sterilization. Keep in mind that these instruments are still considered contaminated. Packaging and wrapping materials that are specifically designed for sterilization must be used. Fabric can be used as long as it is “specifically designed for sterilization”. Hinged instruments should be processed “opened” and unlocked. Hinged instruments (e.g., pliers / scissors / forceps) should be immersed in a rust inhibitor prior to sterilization. A chemical indicator (e.g., chemical indicator tape) should be placed on the outside and inside of every instrument package. SOHCP and other personnel should refer to the manufacturer's instructions regarding use and correct placement of chemical indicators.

IMS cassettes or organizing trays containing sterilized instruments must remain in packaging material designed to maintain sterility during storage. Packaging materials must be specifically designed for the type of sterilization process utilized in that practice.

### **Sterilization**

Heat-tolerant dental instruments are sterilized in an oral health care facility using:



- Steam under pressure (autoclaving)
- Dry heat
- Unsaturated chemical vapour (with adequate ventilation)

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

Items must be arranged in the sterilizer in such a way as to permit free circulation of the sterilizing agent (i.e., steam, dry heat or chemical vapor). The manufacturer's instructions for loading the sterilizer regarding capacity and arrangements of the instruments or packs within the sterilizer chamber must be followed. **Instrument packs must be allowed to dry** inside the sterilizer chamber before removing and handling, in order to avoid wicking of moisture and, potentially, microorganisms from hands or gloves.

The ability of equipment to attain physical parameters required to achieve sterilization must be monitored by mechanical, chemical, and biological indicators. The sterilizer manufacturer should be consulted regarding selection and use of chemical and biological indicators (see IPC-04-04).

“Liquid chemical sterilants/disinfectants” should not be used to sterilize critical or semi-critical instruments in dentistry. Their effectiveness cannot be verified with biological monitors.

Low-temperature sterilization using ethylene oxide gas (ETO) is used extensively in larger health-care facilities, such as hospitals. Heat and moisture-sensitive patient-care items may be sterilized with ETO without damaging effects. The extended sterilization times (typically, 10 to 48 hours), as well as the hazardous vapours produced, make this method impractical for private-practice dental care settings. As well, handpieces cannot be effectively sterilized using ETO due to the decreased penetration of ETO gas through small lumens. Other types of low-temperature sterilization methods (e.g., hydrogen peroxide gas plasma) exist; however, these methods are not yet practical for oral health care facility.

**Flash Sterilization** is a process whereby items are sterilized unwrapped in porous trays. The time may range from 3-10 minutes according to the manufacturer's recommendations. This presents a compromise due to the fact that the sterility of the unwrapped instruments is defeated upon removal from the sterilizer. Instruments processed by flash sterilization must be used immediately upon removal from the sterilizer.

## **IPC-04-03 – Processing Semi-Critical Items**

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

Semi-critical items that are heat-tolerant must be sterilized by heat in order to prevent cross-contamination and infection spread in the dental setting. All steps for the sterilization of critical items should be followed for semi-critical items.

Semi-critical patient care items that are heat sensitive and cannot be sterilized must receive high-level disinfection. Manufacturer instructions regarding dilution, immersion time, temperature and safety precautions must be followed carefully. All steps involved in critical instrument handling, transportation, decontamination and storage should be followed for semi-critical item processing, with the exception that high-level disinfection is utilized instead of heat sterilizer processing.

High-level disinfection destroys all microorganisms, but not necessarily high numbers of bacterial spores. High-level disinfection can be achieved by using a washer-disinfector, or by liquid immersion in a high-level disinfectant (e.g., glutaraldehyde, glutaraldehyde with phenol or high-concentration hydrogen peroxide; see IPC-07-02).

Following high-level disinfection by liquid immersion, semi-critical items should be handled with sterilized tongs or sterile gloves, rinsed with sterile water, dried and stored in sterile or clean containers or packaging material.

Due to the toxicity of these chemicals, appropriate precautions should be taken to protect the SOHCP and other personnel, including using closed containers to limit vapour release, utility gloves and aprons, mask, goggles / safety glasses / face shields.

## IPC-04-04 - Monitoring Sterilization

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

**Mechanical techniques** for monitoring sterilization include assessing cycle time, temperature, and pressure by observing the gauges or displays on the sterilizer and noting these parameters for each load. Correct readings do not ensure sterilization; however, incorrect readings may be an early indication of a problem with the sterilization cycle. New sterilizers have printouts or USB data devices for documentation.

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

If either internal or external chemical indicators indicate inadequate processing, items in the load should not be used until reprocessed.

**Biological monitors** (i.e., spore tests) verify the sterilization process directly by assessing the killing of known highly resistant microorganisms. As spores used in biological monitors are the most resistant and present in greater numbers than the common microbial contaminants found on patient-care equipment, a negative spore test signifies that other potential pathogens in the load have been killed. The date and time or cycle number should be documented and signed.

Correct functioning of sterilization cycles must be verified for each sterilizer by weekly use of biological monitors. Every load containing implantable devices and/or the standard instruments used to place implantable devices must be biologically monitored with spore-test strips. These items must be quarantined until the test results are known.

Manufacturer's directions should determine the placement and location of the biological monitors in the sterilizer. In-house biological monitoring systems, processed by the facility SOHCP, are available, and may be preferable to mail-in services, given the increased safety provided by decreasing turn-around time. If in-house testing is done, a control biological monitor from the same lot as the test indicator that is not processed through the sterilizer should be incubated with the test biological monitors. The control biological monitors should yield positive results for bacterial growth. It is prudent to have control biological monitors for every test to assure the incubator is working.

Mail-in sterilization monitoring services (e.g., from private companies or dental schools) should be used to test both the test biological monitors and the control biological monitors.

**In the event of a positive spore test**, the biological monitors test **MUST** be repeated immediately after correctly loading the sterilizer and using the same cycle that produced the failure and all records reviewed of chemical and mechanical monitoring since the last negative biological monitors test.

The sterilizer operating procedures must be **IMMEDIATELY** reviewed, including packaging, loading and spore testing, with all SOHCPs or other personnel who work with the sterilizer to determine whether operator error could be responsible. Common reasons for a positive biological monitor in the absence of mechanical failure of the sterilizer include:

- Improper packaging
- Improper loading
- Improper timing
- Improper temperature
- Improper method of sterilization in regard to the item

**The sterilizer must be immediately removed from service.** A second monitored sterilizer in the oral health care facility can be used, or a loaner from a sales or repair company obtained, to minimize facility disruption while waiting for the repeat biological monitor results. All “sterilized” packages must be reprocessed as a precaution. If the repeat biological monitor test is negative and chemical and mechanical monitoring indicates adequate processing, the sterilizer may be put back into service.

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

Results of biological monitoring should be recorded and retained.

In the event of a sterilizer failure, a facility should be reasonably aware of what sort of instruments have gone through the sterilizer in the past few days/weeks, and whether or not those instrument packs have been used. Reviewing the day sheets of those days would provide information on who was treated, and decisions can be made from there.

The sterilizer in question should immediately be pulled from service, the dental service people should be called, instrument packs should be (re-)sterilized in a sterilizer known to be functioning properly and the Medical Health Officer for the Regional Health Authority should be consulted for recommendations.

## **IPC-04-05 - Processing Non-Critical Items**

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

Non-critical patient care items should be cleaned, or, if contaminated, cleaned and then disinfected with an intermediate-level disinfectant. Cleaning and disinfection of some non-critical items may be difficult or may damage the surfaces. In those instances, the use of disposable barriers to protect these surfaces may be a preferred alternative. (See IPC-05-03)

# ENVIRONMENTAL INFECTION CONTROL

## IPC-05-01 - General Considerations

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

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

Environmental surfaces can be divided into:

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

An important first step in disinfecting any surface is cleaning. Cleaning removes debris such as organic matter, salts and soils that are adherent to a surface. This debris may interfere with microbial inactivation by a disinfectant. When using disinfectants, label directions must be precisely followed. Strict attention must be given to proper use of the product with regard to method of application and duration of application. (Disinfection does not occur if the surface does not stay wet for the prescribed length of time)

## **IPC-05-02 - Clinical Contact Surfaces**

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

- Light handles,
- Switches,
- Radiograph equipment,
- Chairside computer keyboards and monitors,
- Reusable containers of dental materials,
- Drawer handles,
- Faucet handles,
- Countertops,
- Pens and other writing utensils,
- Telephones,
- Doorknobs.

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

- Clinical surfaces typically need to be cleaned and disinfected with an intermediate-level disinfectant.  
OR
- Barrier protection

### **Surface cleaning and disinfection**

All clinical contact surfaces that have been contaminated or may have been contaminated must be cleaned and disinfected between patients and at the end of the workday using an intermediate-level disinfectant. SOHCP or other personnel should wear appropriate PPE while cleaning and disinfecting clinical contact surfaces. Disinfection may be accomplished by the 'spray-wipe-spray' method, 'wipe-spray-wipe' method or 'wipe-discard-wipe' method; contact time varies according to the manufacturers' instructions. The method of application must keep the surface wet for the prescribed length of time as described on the label by the manufacturer to be optimum.

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

### **Barrier protection**

Clinical contact surfaces and equipment can be protected from contamination using barrier protection, particularly if they are difficult to pre-clean prior to disinfection. If barriers are used, SOHCP or other personnel should ensure that they are appropriately secured. Barrier protection

is particularly effective for those clinical contact surfaces that are difficult to clean and disinfect due to surface topography or material chemical incompatibilities. Barrier protection materials include:

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

Barriers become contaminated during patient care. Barriers should be carefully removed and discarded between patients using gloves. Following removal of the barrier, the clinical contact surface should be examined to ensure it did not become inadvertently contaminated. If contaminated the surface should be cleaned and disinfected with an intermediate-level disinfectant.

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



## **IPC-05-03 - Housekeeping Surfaces**

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

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

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

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

Whenever a housekeeping surface is known or is suspected to be contaminated with blood, saliva, other bodily fluids or water containing any bodily fluid the contaminated housekeeping surfaces should be dealt with promptly by cleaning and surface disinfection. Blood spills or splashes, saliva or other bodily fluids should be contained and managed as quickly as possible to reduce the risk of contact by patients and SOHCP. The SOHCP or other personnel responsible to clean the spill should be pre-assigned so that a delay does not occur. The SOHCP/personnel should wear appropriate PPE. Visible organic material should be removed with absorbent material (e.g., disposable paper towels discarded in a leak-proof container). Non-porous surfaces should be cleaned and then disinfected with a intermediate-level disinfectant. However, if such products are unavailable, a 1:100 dilution of sodium hypochlorite (e.g., approximately 60ml. [ $\frac{1}{4}$  cup] of 5.25% household chlorine bleach in 4 litres [1 gallon] of water) is an inexpensive and effective disinfecting agent.

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

Mechanical rooms should also be kept extremely clean and outside air supply systems should be considered.

## IPC-05-04 - Waste Management

General waste from oral health care settings is no more infective than residential waste. The oral health care facility is responsible for the waste until it is safely removed from the premises. Medical waste of concern requires special storage, handling, neutralization and disposal, according to provincial and municipal regulations. Such waste includes:

- Solid waste soaked or saturated with blood or saliva (e.g., gauze so saturated with blood following surgery that it is freely dripping blood or could easily release liquid blood if compressed)
- Surgically removed hard or soft tissue (not including extracted teeth; see IPC-06-07)
- Contaminated sharp items (e.g., needles, scalpel blades, burs, wires)

Any item that may have come in contact with blood, saliva, other bodily fluids or water or other liquid that contains bodily fluids is not likely to be infective, and treating all such waste as infective is not practical or necessary.

Non-sharp medical waste should be placed in a leak-resistant sturdy bag. Local regulations may require that this bag is labelled as “bio-hazardous” waste. The exterior of the bag should not be contaminated prior to disposal. If the exterior of the bag is contaminated or punctured, the bag should be placed in a second sturdy bag, similarly labeled, if required. All bags should be securely closed for transportation and disposal. Approved biohazard puncture resistant containers should be located at the point of use (i.e., in the operatory) for immediate disposal of scalpel blades, needles, syringes and unused sterile sharps. Fill the container to the fill line only.

Oral health care facilities should dispose of general and medical waste daily to avoid accumulation. Every oral health care facility should have a plan for management of medical waste that complies with local provincial and municipal regulations to ensure health and environmental safety.

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

## IPC-05-05 - Dental Unit Waterlines

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

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

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

1. Waterline heaters should not be used in a dental unit or in dental equipment, as these heaters encourage waterline microorganism growth.
2. All waterlines should be purged at the beginning of each workday by flushing the lines thoroughly with water for at least 2-3 minutes. This purging should be done with handpieces, air/water syringe tips and ultrasonic tips not attached to the waterlines.
3. Facilities may wish to purge water lines dry when the units will not be used over a holiday to prevent biofilms forming in stagnant water.
4. Handpieces utilizing water coolant should be run for 20-30 seconds after patient care, in order to purge all potentially contaminated air and water. A sterilized handpiece can then be attached, following regular clinical contact surface management (see IPC-05-03).
5. Sterile water or sterile saline must be used when irrigating open vascular sites and whenever bone is cut during invasive surgical procedures. Conventional dental units do not reliably deliver sterile solutions, even when equipped with independent water reservoirs, due to the formation of biofilm along the water pathway. Delivery systems, such as bulb syringe or sterile, single-use disposable products along the entire system must be used to deliver sterile irrigation solutions.
6. When closed water systems are used, SOHCP and other personnel should be careful not to touch the tubing with the fingers or gloved hand when changing the water coolant bottle, as this easily contaminates the entire system.
7. A variety of products are available that effectively prevent contamination and maintain clean dental unit waterlines in closed water systems. They often come in tablet form to add to the water or as solutions to treat the system once the system has been purged of water.
8. Manufacturers' instructions of the dental units and dental equipment must be followed for daily and weekly maintenance whenever closed water systems or other special water delivery systems are utilized.
9. The U of S College of Dentistry's Sterilizer & Water Monitoring provides testing of dental unit waterlines at a nominal cost.

## **IPC-05-06 - Boil Water Advisories**

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

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

- Public water must not be delivered to the patient through the dental unit, ultrasonic scaler or other devices or equipment.
- Use alternative water sources through closed delivery systems.
- Postpone treatment delivery, if necessary.
- Patients must not rinse their mouths with tap water; bottled or distilled water should be used instead.
- Tap water must not be used for hand hygiene. Antimicrobial products that do not require water, such as alcohol-based hand-rubs, should be used for hand hygiene. If the hands have been known or suspected to be contaminated, hands should be washed using bottled or distilled water and an antimicrobial soap.
- When the boil water advisory is cancelled, follow guidance provided by the local water utility regarding adequate flushing of all incoming public water system lines, including any taps or other waterlines in the oral health care facility. If no guidance is provided, flush all waterlines for 1-5 minutes prior to using for patient care. The dental unit waterlines in all dental units and equipment must be disinfected according to the manufacturer's instructions prior to use.

## **SPECIAL CONSIDERATIONS**

### **IPC-06-01 - Dental Handpieces and Other Devices**

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

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

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

Any dental device connected to the dental air/water system that enters the patient's mouth must be run to discharge water and air for a minimum of 20-30 seconds after each patient use. This procedure is intended to physically flush out any patient material that might have entered the turbine and air and waterlines.

Dental handpieces and other intraoral devices attached to air or waterlines must be sterilized after patient care use. Manufacturers' instructions for cleaning, lubrication and sterilization should be followed closely to ensure both the effectiveness of the process and the longevity of handpieces.

Components of dental devices and equipment that are permanently attached to dental unit waterlines should be treated as clinical contact surfaces (see IPC-05-03). Such components (e.g., electric handpiece motors, handles for ultrasonic devices or dental unit attachments of saliva ejectors, high-volume evacuators, and air/water syringes) should be cleaned and disinfected with an intermediate-level disinfectant prior to use on the next patient or covered with barriers that are changed after each use (see IPC-05-03).

## **IPC-06-02 - Saliva Ejectors**

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

SOHCP should be careful not to allow patients to seal their mouths over the saliva ejector tip. Engineering controls exist with specially designed saliva ejector tips that do not allow a negative pressure to form around the tip of the saliva ejector.

Suction lines must at minimum be rinsed with water between patients to remove loosely adherent debris and microorganisms and to reduce the likelihood of infectious material backflow. The procedure is to aspirate water or appropriate cleaning or disinfecting solution in the lines with air to produce turbulent flow in the lines. Suction lines should be cleaned daily with an enzymatic cleaner.

## **IPC-06-03 - Dental Radiology**

Cross-contamination of radiographic equipment and environmental surfaces with blood or saliva is possible. Each oral health care facility should develop their own protocol relative to their equipment.

Gloves and other PPE should be worn when taking radiographs and handling contaminated film packets. Heat-tolerant versions of intraoral radiograph accessories are available and these semi-critical items (e.g., film-holding and positioning devices) should be heat sterilized between patient uses.

Radiography equipment (e.g., radiograph tube head and control panel) that has come into contact with SOHCP's gloved hands or contaminated film packets should be cleaned and then disinfected after each patient use OR should be protected with surface barriers that are changed after each patient use.

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

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

Care should be taken to avoid contamination of the developing equipment. Protective barriers could be used. Any surfaces that become contaminated should be cleaned and disinfected using an intermediate-level disinfectant.

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

## **IPC-06-04 - Single-Use or Disposable Devices**

A single-use device is designed to be used on one patient and then discarded, not re-processed for use on another patient (e.g., cleaned, disinfected or sterilized). Examples of single-use or disposable devices include syringe needles, burs, endo files, prophylaxis cups and brushes and certain orthodontic brackets.

I.V. sedation medications should be considered single use.

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



## **IPC-06-05 - Pre-procedural Mouth Rinses**

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

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

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

## **IPC-06-06 - Handling of Biopsy Specimens**

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

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

## **IPC-06-07 - Handling of Extracted Teeth**

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

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

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

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

## **IPC-06-08 - Dental Laboratory Asepsis**

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

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

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

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

Dental laboratory staff should wear appropriate PPE (mask, gloves and protective eyewear) until cleaning and disinfection is completed (see IPC-03-01).

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

Heat-tolerant items used in the mouth (e.g., metal impression trays or face bow forks) should be cleaned and heat sterilized before being used on another patient. Items that do not normally contact the patient, prosthetic device or appliance, but frequently become contaminated and cannot withstand heat sterilization (e.g., articulators, case pans or lathes) should be cleaned and disinfected between patients, according to the manufacturer's instructions. Pressure pots and water baths should be cleaned and disinfected between patients. Environmental surfaces

should be barrier-protected or cleaned and disinfected in the same manner as in the dental treatment area (see IPC-05-01).

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

Appliances and prostheses delivered to the patient should be free of contamination. If the dental laboratory staff provides the disinfection, an intermediate-level disinfectant should be used and the item placed in a tamper-evident container before returning the item to the oral health care facility. If such documentation is not provided, the oral health care facility should provide final disinfection procedures.

## **IPC-06-09 - Laser / Electrosurgery Plumes and Surgical Smoke**

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

Lasers transfer electromagnetic energy into tissues, resulting in the release of a heated plume that includes particles, gases (e.g., hydrogen cyanide, benzene, and formaldehyde), tissue debris, viruses and offensive odors.

SOHCP should use work practice and engineering controls to avoid inhaling or otherwise coming in contact with laser and electrosurgical plumes and surgical smoke. These practices include using:

- Standard Precautions (e.g., high-filtration surgical masks and possibly full face shields)
- Central room suction units with in-line filters to collect particulate matter from minimal plumes
- Dedicated mechanical smoke exhaust systems with a high-efficiency filter to remove substantial amounts of laser plume particles

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

## IPC-06-10 - Patients Infected with *M. tuberculosis*

Patients infected with *M. tuberculosis* (TB) occasionally seek routine and urgent dental treatment. SOHCP or the community served by the dental facility are at risk for exposure to TB.

While taking patients' initial medical histories and at periodic updates, SOHCP should routinely ask all patients whether they have a history of TB disease or symptoms indicative of TB. Patients with a medical history or symptoms indicative of undiagnosed active TB should be referred promptly for medical evaluation to determine possible infectious risk. These patients should not remain in the oral care facility any longer than required to evaluate their dental condition and arrange a medical referral. While in the oral health care facility, the patient should be isolated from other patients and SOHCP, should wear a surgical mask when not being evaluated and should be instructed to cover their mouth and nose when coughing or sneezing. Elective oral treatment should be deferred until a physician confirms that a patient does not have infectious TB, or if the patient is diagnosed with active TB disease, until confirmed the patient is no longer infectious; typically, 48 hours following institution of anti-tuberculous therapy.

Surgical masks typically used in the oral health-care setting do not prevent inhalation of *M. tuberculosis* droplet nuclei due to their small diameter, and therefore, Standard Precautions are not sufficient to prevent transmission of this organism.

SOHCP treating patients infected with *M. tuberculosis* should understand the pathogenesis of the development of TB to help determine how to manage such patients.

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

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

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

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

- **Administrative controls:** Administrative goals of a TB infection-control program include detection of a person with active TB disease and prompt isolation from susceptible persons to reduce the risk of transmission. Although SOHCP and other personnel are not responsible for diagnosis and treatment of TB, they should be trained to recognize signs and symptoms to help with prompt detection. Because potential for transmission of *M. tuberculosis* exists in outpatient settings, dental practices should develop a TB control program appropriate for their level of risk. SOHCP who have contact with patients should have a baseline TST, preferably by using a two-step test at the beginning of employment. The facility's level of contact with patients at risk of TB risk will determine the need for routine follow-up TST.
- **Environmental controls:** If urgent oral care is provided for a patient who has, or is suspected of having active TB disease, the care should be provided in a facility (e.g., hospital) that provides airborne infection isolation (i.e., using such engineering controls as TB isolation rooms, negatively pressured relative to the corridors, with air either exhausted to the outside or HEPA-filtered if recirculation is necessary).
- **Personal respiratory protection:** Standard surgical facemasks do not protect against TB transmission. SOHCP treating patients with active TB should use respiratory protection (e.g., fit-tested, disposable N-95 respirators).



## **IPC-06-11 - Creutzfeldt-Jakob Disease and Other Prion Diseases**

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

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

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

CJD and vCJD are transmissible diseases, but not through the air or casual contact. Virtually all known cases of iatrogenic CJD have resulted from exposure to infected central nervous tissue (e.g., brain and dura mater), pituitary or eye tissue. Animal models and experimental designs indicate a theoretical risk of transmitting prion diseases through perioral neural tissue exposures.

SOHCP should include medical history questions regarding dura mater transplantation, and familial history of CJD and vCJD. Dental instruments and devices touching pulpal tissue (e.g., endodontic broaches and files, access opening burs) must be discarded in sharps containers after each patient use.

## **IPC-06-12 - On-going Infection Prevention and Control Evaluation**

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

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

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

- Periodic observational assessments,
- Checklists to document procedures,
- Routine review of occupational exposures to blood-borne pathogens.

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

# APPENDIX

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## IPC-07-02 - Charts: Managing Contaminated Surfaces

### Patient Care Items

Category	Description	Examples	Management
Critical Items	Penetrates soft tissue or bone	Surgical instruments, scalers, scalpel blades, burs	Heat sterilization or discarded
Semi-Critical Items	Touches intact mucous membrane or non-intact skin	Mouth mirrors, amalgam carriers, amalgam condensers, reusable impression trays	Heat sterilization, or high-level disinfection
Non-Critical Items	Contacts intact skin only	Radiograph heads/cones, blood pressure cuffs, facebows	Protect with barriers, or clean then intermediate-level disinfection if contaminated

### Environmental Surfaces

Category	Description	Examples	Management
Clinical Contact Surfaces	Direct contact with SOHCP or other personnel's hands, patient-care items or patient skin	Light handles, radiograph equipment, drawer handles, doorknobs	Protect with barriers, or clean then intermediate-level disinfection if contaminated
Housekeeping Surfaces	Inadvertent contact with SOHCP or other personnel's hands, patient-care items or dental appliances	Floors, walls, sinks	Periodic cleaning, or clean and intermediate-level disinfection if blood/saliva spills, splashes or otherwise contaminated

## Disinfectants

Category	Examples	Advantages	Disadvantages
<b>High-level disinfectant</b> (destroys vegetative bacteria, mycobacteria, fungi and enveloped / lipid and non-enveloped / non-lipid viruses; bacterial spores if long exposure time)	Glutaraldehyde 2.4-3.5%  Glutaraldehyde 1.12% with phenol 1.93%	Non-corrosive to metal Active in presence of organic material Compatible with most materials, including lensed instruments Sterilization may be possible in 6-10 hours	Extremely irritating to skin and mucous membranes Shelf life shortens when diluted (effective for 14-30 days depending on formulation) High cost Monitor concentration in reusable solutions Fixative
	Hydrogen peroxide 7.5%	Strong oxidant Fast acting Breaks down into water and oxygen	Can be corrosive to aluminum, copper, brass or zinc
	Hydrogen peroxide 1.0-7.35% with peracetic acid 0.8-0.23%	As for hydrogen peroxide, plus: Innocuous decomposition (water, oxygen, acetic acid, hydrogen peroxide) Rapid action at low temperature Active in presence of organic materials	As for hydrogen peroxide, plus: Can be corrosive Unstable when diluted
	Ortho-phthalaldehyde 0.55%	Fast acting Relatively less toxic than other high-level disinfectants Non-irritating to skin and exposed mucous membranes Little or no odour Very stable	Sensitivity reactions, including anaphylaxis Stains protein gray, including skin

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<b>Intermediate-level disinfectant</b> (destroys all vegetative bacteria, mycobacteria, most viruses and most fungi, but not bacterial spores)	Chlorine-based products (sodium hypochlorite diluted in-office, chlorine dioxide, commercial preparations with surfactants)	Low cost Fast acting Readily available	Corrosive to metals May destroy fabrics Inactivated if not well cleaned Irritating to exposed skin and mucous membranes Chlorine dioxide is poor cleaner Unstable when diluted; must be prepared daily
	Clorhexidine Gluconate (combined with alcohol)	Fast acting, residual antimicrobial activity. Effective in the presence of blood proteins. Environmentally friendly.	Must be used in a well-ventilated area (alcohol solution)
	Halogens (sodium bromide & chlorine)	Fast acting Simple to mix Minimal storage space required	Used on hard surfaces only Strong chlorine odour
	Iodophors (iodine combined with surfactant)	Rapid action Relatively less toxic and less irritating Residual action Effective cleaner and disinfectant	Stains fabrics and synthetic materials Irritating to exposed skin and mucous membranes Inactivated by alcohol and hard water Unstable when diluted; must be prepared daily
	Quaternary ammonium compounds with alcohols (“dual” or “synergized”)	Generally non-irritating Non-corrosive	Older generation had narrow spectrum Inactivated by anionic detergents and organic matter Can damage some materials
	Phenolics (“complex” or “synthetic” containing multiple phenolic	Residual, substantive action	May be absorbed through skin or by latex

	agents)	Available with detergents to be used as cleaner and disinfectant	May dissolve or discolour plastics Not to be used on food contact surfaces
<b>Low-level disinfectant</b> (destroys most vegetative bacteria and some fungi, as well as enveloped / lipid viruses, e.g. HBV, HIV)	Hydrogen peroxide 3% Iodophors Quaternary ammonium compounds (single, simple or old generation) Phenolics	As above	As above