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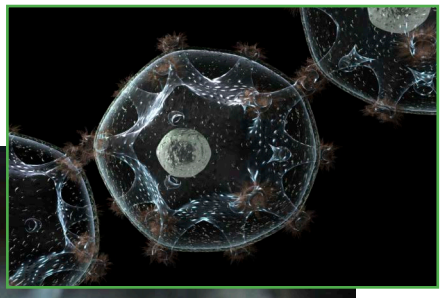
INFECTION PREVENTION & CONTROL

CLINICAL BEST PRACTICE GUIDELINE



COLLEGE OF RESPIRATORY THERAPISTS OF ONTARIO

CLINICAL BEST PRACTICE GUIDELINE

COLLEGE OF RESPIRATORY THERAPISTS OF ONTARIO (CRTO) PUBLICATIONS CONTAIN PRACTICE PARAMETERS AND STANDARDS SHOULD BE CONSIDERED BY ALL ONTARIO RESPIRATORY THERAPISTS IN THE CARE OF THEIR PATIENTS/CLIENTS AND IN THE PRACTICE OF THE PROFESSION. CRTO PUBLICATIONS ARE DEVELOPED IN CONSULTATION WITH PROFESSIONAL PRACTICE LEADERS AND DESCRIBE CURRENT PROFESSIONAL EXPECTATIONS. IT IS IMPORTANT TO NOTE THAT THESE CRTO PUBLICATIONS MAY BE USED BY THE CRTO OR OTHER BODIES IN DETERMINING WHETHER APPROPRIATE STANDARDS OF PRACTICE AND PROFESSIONAL RESPONSIBILITIES HAVE BEEN MAINTAINED.

RESOURCES AND REFERENCES ARE HYPERLINKED TO THE INTERNET FOR CONVENIENCE AND REFERENCED TO ENCOURAGE EXPLORATION OF INFORMATION RELATED TO INDIVIDUAL AREAS OF PRACTICE AND/OR INTERESTS. BOLDED TERMS ARE DEFINED IN THE GLOSSARY.

It is important to note if an employer's policies are more restrictive than the CRTO's expectations, the RT must abide by the employer's policies. Where an employer's policies are more permissive than the expectations of the CRTO, the RT must adhere to the expectations of the CRTO.

The CRTO will update and revise this document every five years, or earlier, if necessary. The words and phrases in bold lettering can be cross referenced in the Glossary at the end of the document.

ACKNOWLEDGEMENTS

This Clinical Best Practice Guideline (CBPG) was first developed in 2008 by a working group of the CRTO's Patient Relations Committee (PRC) comprised of practising Respiratory Therapists (RTs). The Infection Control Working Group for the first version of this CBPG was also assisted by Dr. Mary Vearncombe, Dr. Allison McGeer and the Infection Control Team at Mount Sinai Hospital.

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ACKNOWLEDGEMENTS (CONTINUED)

The CRTO is committed to ensuring that our standards and guidelines reflect the most current, evidence-based and best practices. Since the first version, the practice guideline has been revised three times. The CRTO would like to thank the following Professional Practice Committee and working group members for their participation and expertise that led to the updates to this CBPG.

INFECTION PREVENTION AND CONTROL CBPG REVIEW 2011

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CONTENTS

INTRODUCTION

As regulated health professional, Respiratory Therapists (RTs) are accountable for providing safe, competent, and ethical care to the public in accordance with the standards of the profession. This document has been developed in order to assist RTs in learning how to achieve quality infection prevention and control practices. The SARS epidemic in 2003, the H1N1 Pandemic in 2009, and the MERS and Ebola 2014/2015 outbreaks, 2019 Covid pandemic as well as the likelihood of another pandemic influenza - suggest it is vital for RTs to remain informed and up to date on current infection prevention and control best practices.

In addition to the public and the CRTO, RTs are accountable to their employer. Employers may have additional policies and procedures related to infection prevention and control. If an employer's policies and procedures are more restrictive than the CRTO's description of the standard of practice, Members should abide by their employer's policies and procedures. Where the employer's policies and procedures are more permissive than the standard of practice described by the CRTO, Members should adhere to the standard of practice described by the CRTO.

GUIDING PRINCIPLES
OF INFECTION, PREVENTION AND CONTROL

RTs are accountable for…

- Knowing how infections are transmitted (i.e., The 6 Links in the Chain of Transmission)
- Adhering to the current infection prevention and control guidelines for their practice setting (e.g., employer policies - OHA Communicable Diseases Surveillance Protocols, Ontario Public Health, MOH Emergency Planning and Preparedness)
- Advocating for best practices in infection prevention and control in their workplace
- Educating and modelling infection prevention and control practices for others
- Monitoring changes to infection control practices and updating their practice accordingly (e.g. MOH Health Bulletins)
- Knowing their Immunization Status and keeping their immunisation records up to date
- Ensure that there are processes in place to obtain an accurate travel history from patients/clients

Infection Control interventions are directed at:

- Controlling or eliminating agent at source of transmission
- Protecting portals of entry
- Increasing host's defenses

GUIDING PRINCIPLES (CONTINUED)

The principles necessary to prevent transmission of microorganisms from patient to patient, patient to healthcare worker (HCW) and HCW to patient, across the continuum of care include:

- Consistent use of Routine Practices, including a Risk Assessment that takes into consideration the client/patient/resident infection status, the characteristics of the client/patient/resident and the type of care activities to be performed
- Application of Additional Precautions, where indicated
- Hand Hygiene and proper cough etiquette
- Adhering to the principles of good occupational health and hygiene practices and reporting facility outbreaks, where appropriate
- Ensuring appropriate immunizations are obtained
- Avoiding consuming food or beverages in patient care areas (RPAP, 2012, p. 48)
- Staying home from work when ill with symptoms of fever, chills, cough, malaise and/or nausea, vomiting or diarrhea

DID YOU KNOW?

Institutional outbreaks involving staff have been reported, particularly with hepatitis A, cryptosporidiosis and norovirus. Health Care-Associated Infections | Public Health Ontario

DID YOU KNOW?

Staff who consume food or beverages in care areas (client/patient/resident environment, nursing station, charting areas) are at increased risk for acquiring serious foodborne gastrointestinal infections.

Organizational Accountabilities:

All health care settings should establish a clear expectation that staff do not come into work when ill with symptoms that are of an infectious origin and support this expectation with appropriate attendance management policies. Staff carrying on activities in a health care setting who develop an infectious illness may be subject to some work restrictions.

IMMUNIZATIONS

Appropriate vaccine use protects the health care provider, colleagues and the patient/client (Immunization (Vaccines) | Public Health Ontario).

Examples of vaccines that may be necessary to protect RTs and their patient/clients:

- annual influenza
- Covid - 19
- measles, mumps, rubella (MMR)
- varicella
- pertussis
- hepatitis A, B
- tetanus/diphtheria

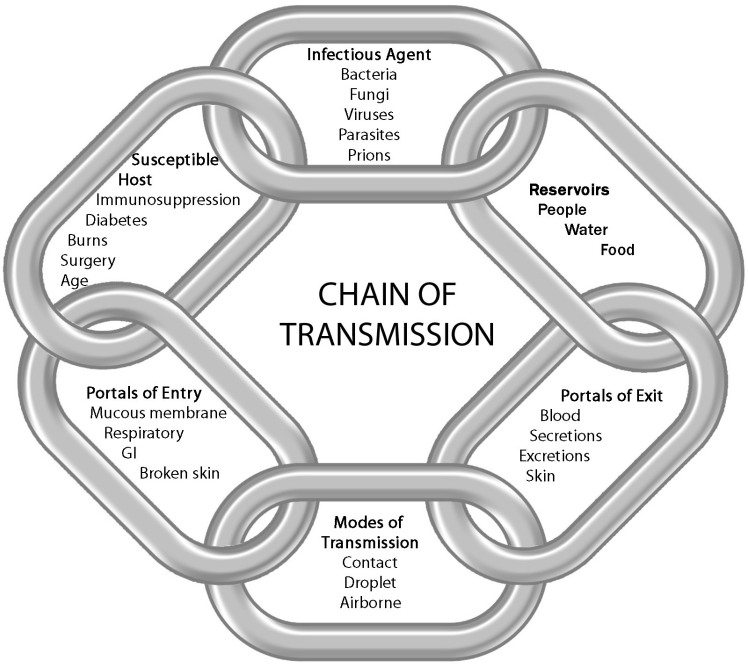
RESOURCES

Immunize Canada has an app to assist in recording vaccines information and accessing immunization schedules.

Professional Accountabilities:

Health care workers (HCW), including hospital employees, other staff who work or study in hospitals (e.g., students in health care disciplines, contract workers, volunteers) and other health care personnel (e.g., those working in clinical laboratories, nursing homes, home care agencies and community settings) are at risk of exposure to communicable diseases because of their cont act with patients/clients (diagnosed or undiagnosed) or their environment. There is also a risk that HCW could transmit an undiagnosed vaccine-preventable disease to others. Some health care institutions and jurisdictions are moving towards making vaccination a condition of employment for HCW. Public Health Agency of Canada

THE SIX LINKS IN THE CHAIN OF TRANSMISSION & BREAKING THE CHAIN OF TRANSMISSION



Each link in the chain represents a factor related to the spread of microorganisms. Transmission of infectious agents does not take place unless all six of the elements in the chain of transmission are present. Public Health of Ontario

The links in the Chain of Transmission can be broken through a careful Risk Assessment and consistent application of Routine and Additional Precautions, where indicated.

DID YOU KNOW?

Public Health has a set of free infection prevention and control elearning modules Infection Prevention and Control – Online Learning | Public Health Ontario

	LINKS IN THE CHAIN OF TRANSMISSION ARE:	EXAMPLES OF BREAKING THE CHAIN OF TRANSMISSION BY ASSESSING:
Infectious Agent	The micro-organisms capable of producing infection (e.g., bacteria, viruses)	The pathogenicity/virulence of the infectious agent
Reservoir	The places in which the infectious agent lives (e.g., humans, animals, water)	The patient/client's environment (e.g., shared facilities, such as multi-bed rooms)
Portal of Exit	The point where the agent leaves the reservoir (e.g., blood, secretions)	The **potential for exposure** to blood, body fluids, secretions and excretions (e.g. splashing, patient coughing considering the duration of exposure (e.g., sterile gown for central line insertions)
Modes of Transmission	**Contact** – which is divided into: • **Direct Contact** – occurs through touch • **Indirect Contact** – occurs when micro-organisms are transferred by contaminated object coming into contact with another surface	The procedure(s) to be performed (e.g., hand hygiene & PPE required) and whether Additional Precautions are required • whether there will be contact with non-intact skin or mucous membranes • the potential for handling sharp or contaminated instruments or equipment
	Droplet Transmission – occurs when large droplets exit the respiratory tract of a person when he/ she coughs or sneezes. Can also be generated by some procedures (e.g., suctioning). These droplets are projected a short distance of usually < 2m and enter the hosts eyes, nose, mouth or fall onto surfaces.	
	Airborne Transmission – occurs when airborne particles remain suspended in the air, travel on air currents and are then inhaled by others who are nearby or who may be some distance away from the source patient, in a different room or ward (depending on air currents) or in the same room that a patient has left, if there have been insufficient air exchanges.	
	Parenteral Transmission – the spread of an agent through intact skin by a sharp (e.g., needle stick injury).	
	Common Vehicle Transmission – the spread of an agent through a common contaminated source (e.g., multi-dose vials)	
	Vector Transmission – occurs when a host is bitten by an animal or insect carrying the infectious agent (e.g., mosquito transmitting West Nile virus)	
Portal of Entry	The point at which the agent enters the host (e.g., non-intact skin, respiratory or GI tract, mucous membranes)	The need for aseptic technique for invasive procedures and handling injectable products.
Susceptible Host	Any person at risk of infection (e.g., immunosuppressed patients, burn victims, elderly)	The appropriate catheter and wound care.

ROUTINE PRACTICES

Routine practices must be applied to **all patients at all times, in all settings**, regardless of diagnosis or infectious status, and are based on the premise that all clients/patients/residents are potentially infectious, even when asymptomatic, and that the same safe standards of practice should be used routinely with all clients/patients/residents to prevent exposure and to prevent the spread of microorganisms. (Routine Practices and Additional Precautions for Preventing the Transmission of Infection in Healthcare Settings)

The basics of Routine Practices include:

- Hand Hygiene
- Personal Protective Equipment (PPE)
- Control of the Environment
  - Needlesticks and Sharps Injuries Prevention & Safe Injection Practices
  - Cleaning, Disinfection & Sterilization of Medical Devices
  - Waste Disposal
- Performing a Risk Assessment
- Administrative Controls
- Additional Precautions

AEROSOL-GENERATING RESPIRATORY PROCEDURES

Care should be taken to reduce the level of aerosol generation. Risk assessment to be performed at point of care. Routine practices are sufficient for aerosol-generating medical procedures performed on patients with no signs or symptoms of suspected or confirmed tuberculosis, severe acute respiratory syndrome or respiratory infection with an emerging pathogen for which the transmission characteristics are not yet known.

For any procedure with the potential to generate respiratory droplets or aerosolization (including but not limited to the procedures listed on the next page), on patients with signs and symptoms of suspected or confirmed tuberculosis (TB), SARS or respiratory infection with an emerging respiratory pathogen, routine practices require the addition of Droplet Precautions. Proper PPE must be used by staff when within two metres of procedures generating droplets/aerosols on any client/patient/resident, with or without symptoms of an acute respiratory infection, to prevent deposition of droplets/aerosols on staff mucous membranes. Public Health lists those procedures that have an increased risk of aerosol generation and transmission, however recognizes that the degree of risk can be impacted by the patient, the operator and the setting. Aerosol generating medical procedures should be limited to those medically necessary and planned, if possible, and occur in private rooms, with the most experienced person performing the procedure

Professional Accountabilities:

These precautions may be a departure for many CRTO Members, however, lessons learned during the COVID-19 pandemic remind us that strict vigilance to appropriate infection control prevention activities are vital to ensuring a safe environment for both our patients and us. With the threat of ARIs and other emerging pathogens, it is crucial that RRTs follow the MOHLTC's recommended infection control guidelines.

AEROSOL-GENERATING RESPIRATORY PROCEDURES (CONTINUED)

There are certain procedures where there has been confirmed transmission of infectious agents via droplets or aerosols. In other cases, transmission may be possible but not yet proved. The table below illustrates which category many Aerosol-Generating Respiratory Procedures fit into.

Aerosol-Generating Respiratory Procedures with conclusive evidence of transmission	Aerosol-Generating Respiratory Procedures without conclusive evidence of transmission
Endotracheal (ETT) intubation	Nebulized therapies
Cardio-pulmonary resuscitation (CPR)	High-Frequency Oscillatory Ventilation (HFOV)
Bronchoscopy*	Tracheostomy insertion, changing and/or care
Sputum induction*	Chest physiotherapy
Non-invasive positive pressure ventilation for acute respiratory failure (i.e., CPAP, BiPAP)	Nasopharyngeal swabs and/or aspirates
High flow oxygen therapy	Chest tube or chest needle insertion
Open artificial airway suctioning (i.e., ETT, tracheostomy) Use closed suction if available.	Open suctioning (i.e., mouth or nose)
PFT's and Spirometry*	Other breaches to the integrity of a mechanical ventilation system (e.g., filter changes)
	
*** For diagnostic (but not therapeutic) bronchoscopy or sputum induction, must wear an N95 respirator, due to risk from undiagnosed TB.**	PPE should be determined by risk assessment All units and crash carts should be equipped with: • a manual resuscitation bag with hydrophobic submicron filter • in-line suction catheters • non-rebreather mask that allows filtration of exhaled gases • PPE (gloves, gowns, masks, eye protection).

As a live document, the above chart is subject to change as public health guidelines are updated and revised. RT's must perform a risk assessment to determine PPE.

HAND HYGIENE

Hand hygiene is considered the most important and effective infection prevention and control measure to prevent the spread of health care-associated infections.

There are a number of resources available to assist in the proper application of hand hygiene:

- Public Health Ontario's Just Clean Your Hands which is a hand hygiene improvement program that includes instructional videos for both acute and long-term care practice settings
- Provincial Infectious Diseases Advisory Committee (PIDAC) Best Practices for Hand Hygiene in Healthcare which is best practice guideline on hand hygiene available through Public Health Ontario
- Public Health Ontario's Hand Hygiene Fact Sheet
- Public Health Ontario's Your 4 Moments for Hand Hygiene

Professional Accountabilities:

An integral part of an effective hand hygiene program is the promotion of hand hygiene by champions and role models within the health care setting. By being role models for best practices, these champions will take personal responsibility and hold others accountable as part of a facility's internal responsibility system. Infection Prevention and Control | Public Health Ontario

THE FOUR MOMENTS FOR HAND HYGIENE

Your 4 Moments for Hand Hygiene

1	BEFORE initial patient/patient environment contact	WHEN?	Clean your hands when entering the patient's environment: • before touching patient or • before touching any object or furniture
		WHY?	To protect the patient/patient environment from harmful germs carried on your hands
2	BEFORE aseptic procedure	WHEN?	Clean your hands immediately before any aseptic procedure; for instance: changing a dressing, oral care, drawing blood, administering IV medication
		WHY?	To protect the patient against harmful germs, including the patient's own germs, entering his or her body
3	AFTER body fluid exposure risk	WHEN?	Clean your hands immediately after an exposure risk to body fluids (and after glove removal)
		WHY?	To protect yourself and the health care environment from harmful patient germs
4	AFTER patient / patient environment contact	WHEN?	Clean your hands when leaving the patient's environment: • after touching patient or • after touching any object or furniture
		WHY?	To protect yourself and the next patient from harmful patient germs

Adapted from WHO poster "Your 5 moments for Hand Hygiene," 2006.

www.ontario.ca/handhygiene

Ontario

HAND HYGIENE CONSIDERATIONS

- Ensuring skin integrity (dermatitis, cracks, cuts or abrasions can trap bacteria)
- Use of employer supplied lotions products regularly (3 times a day when cleaning hands several times per hour)
- Things that can reduce the effectiveness of hand hygiene:
  - long nails
  - nail polish
  - artificial nails and nail enhancements
  - hands and arm adornments (associated with poor hand hygiene practices and result in more tears to gloves)

DID YOU KNOW?

It is estimated that approximately 30% of healthcare providers report symptoms or signs of dermatitis involving their hands and as many as 85% give a history of having chronic skin problems. Hand Hygiene Public Health Ontario p.16

HAND HYGIENE CONSIDERATIONS

First...

- Remove hand and arm jewellery (watch must be worn above the wrist)
- Clothing or other items that impede frequent and effective hand hygiene should be removed.

Professional Accountabilities:

If experiencing skin integrity issues, the Member is required to contact their employee Occupational Health to seek a solution (e.g., alternate skin care products)

Alcohol-Based Hand Rubs (ABHR)

E.g., gels and foams containing **70 - 90%** alcohol

- Is the preferred method of hand hygiene for hands that are not visibly soiled
- Has been shown to be less irritating to skin than soap and water and may significantly decrease dermatitis due to emollients in the product (PIDAC, 2014,p.16)
- Must be used with employer-approved products that are compatible with the gloves being used

DID YOU KNOW?

ABHR should not be used with water, as water will dilute the alcohol and reduce its effectiveness.

ABHR should not be used immediately after hand washing with soap and water as it will result in more irritation of the hands. (PIDAC 2014, p.20)

Handwashing Soaps

- Plain soap is recommended for routine hand hygiene when hands are visibly soiled
- Should be in a liquid format in a dispenser that is discarded when empty (should not be refilled)
  - Bar soaps for hand hygiene must not be used in health care facilities
- Antibacterial soap should be limited to specific settings (e.g., OR, ICU and burn units).
- It has been shown that at least 15 seconds of lathering with soap is required to remove transient flora. Public Health Ontario
- Essential components are soap, friction and lukewarm running water.

DID YOU KNOW?

According to Public Health Ontario, the best evidence suggests that antimicrobial soap is equivalent to ABHR in terms of microorganism reduction but is harsher on the hands and more time-consuming to use.

PERSONAL PROTECTIVE EQUIPMENT (PPE)

GENERAL PRINCIPLES

- PPE is used to prevent:
  - contact with non-intact skin, blood, body fluid, excretions and secretions
  - the transmission of particular organisms that may be transmitted via the air, or by contact with intact skin (see section on Additional Precautions)
- PPE is only effective in infection control and prevention when applied, used, removed and disposed of properly
- Avoid any contact between contaminated PPE and surfaces, clothing or people outside the patient care area
- Discard used PPE in the appropriate disposal bags
- Do not share PPE
- Remove PPE completely and thoroughly perform hand hygiene each time you leave a patient to attend to another patient or move to a non-patient care area.
- The use of PPE does not replace the need for proper hand hygiene, which needs to be performed both before PPE is applied and after it is removed
- It is essential to perform a risk assessment to determine the PPE needed

RESOURCES

Risk Algorithm for PPE Use

Professional Accountabilities:

Increased knowledge, hand hygiene, appropriate PPE, immunization etc., are all part of a system that provides for the safety of our patient/clients, our Members and other members of the interprofessional team

Individual components of routine practices are determined by a point-of-care risk assessment (PCRA) (i.e., one that includes an assessment of the task/care to be performed, the patient's clinical presentation, physical state of the environment and the healthcare setting).

DID YOU KNOW?

All regulated health care professionals have the authority to initiate additional precautions without a physician's order.

GLOVES

Gloves must be worn when it is anticipated that the hands will be in contact with:

- mucous membranes
- non-intact skin
- tissue
- blood
- body fluids
- secretions
- excretion
- equipment and environmental surfaces contaminated with the above

REMEMBER…

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

DO	DON'T
Perform hand hygiene before and after each glove use/change.	Do not use gloves for routine care activities e.g., taking a blood pressure in which contact is limited to intact skin, unless additional precautions are in place.
Remove gloves and clean hands between patients and before leaving the patient care area.	Do not use gloves if they are ripped or torn.
Always use the appropriate technique for removing the gloves and disposing of them.	Do not allow the outer surface of the glove to touch your skin.
Gloves should be worn for specific tasks and discarded immediately following.	
Change or remove gloves when moving from a contaminated body site to a clean body site during the same task.	

Selection of Glove

GLOVE TYPE	SITUATION AND RATIONALE
Vinyl / Clean	Provides protection for minimal exposure to blood/body fluids/infectious agents and short duration tasks.
Sterile	Used for activities that involve invasive procedures, or where contact with non-intact skin, blood, body fluids or body substances is sustained or continuous (e.g., arterial line insertion, central line insertion). **Please note:** there is increasing evidence of latex sensitivity and allergies amongst healthcare workers. To reduce this risk, latex gloves should only be used when needed and should be powder free and have low or reduced protein content.
Nitrile	Protection for heavy exposure to blood/body fluids/infectious agents and tasks of longer duration. Used when handling chemicals and chemotherapeutic agents and is the preferred replacement for vinyl gloves when a documented allergy or sensitivity is present.
Neoprene	Used as a replacement sterile latex glove when a documented allergy or sensitivity occurs. Recommended for contact with acids, bases, alcohols, etc.

REMEMBER…

Gloves protect the healthcare professional, but once contaminated they can transmit pathogens to the skin, clothes or to other patients.

GOWNS

Gowns are worn in order to protect the health care professional's arms, exposed body areas, and clothing from contact with blood, body fluids, and other potentially infectious material.

DO	DON'T
Discard immediately after each patient encounter.	Do not reuse gowns.
Gowns should fully cover the torso to mid-thigh, fit close to the body, tie in the back and have long sleeves that fit snugly at the wrists.	Do not go from patient to patient wearing the same gown.

Selection of Gowns

GOWN TYPE	SITUATION AND RATIONALE
Cotton/linen, reusable or disposable, long-sleeved isolation gowns.	Use if contamination is anticipated and in contact/droplet precautions.
Fluid resistant isolation gown or plastic apron over isolation gown.	Use if contamination of uniform or clothing from significant volumes of blood or body fluids is likely or anticipated.
Fluid impervious gowns (e.g., Gortex®)	Use if extended contact or large volume exposure (e.g. large volume blood loss during resuscitation of motor vehicle accident victim or surgical assist).

FACIAL PROTECTION

Facial protection may include a mask or respirator in conjunction with eye protection, or a face shield that covers eyes, nose and mouth. Facial protection is to be used if it is anticipated that a procedure or care activity is likely to generate splashes or sprays of blood, body fluids, secretions or excretions, or within two metres of a coughing client/patient/resident (RPAP, 2012, p. 13).

Masks provide a barrier that protects the mucous membranes of the mouth and nose which are portals for infection. Droplets can carry microbes and other infectious agents and a surgical mask helps protect you from inhaling respiratory pathogens transmitted by the droplet route.

Eye protection used in addition to a mask to protect the mucous membranes of the eyes when:

- it is anticipated that a procedure or care activity is likely to generate splashes or sprays of blood, body fluids, secretions or excretions; and/or
- providing care within two metres of a coughing client/patient/resident.

Eye protection includes:

- safety glasses
- safety goggles
- face shields
- visors attached to masks

DID YOU KNOW?

Personal eyeglasses and contact lenses are NOT adequate eye protection; they may not provide sufficient protection above, below, or around the eyes.

MASKS

DO	DON'T
Mask should securely cover the nose and mouth	Do not touch mask while wearing it.
Change mask if it becomes wet.	Do not allow mask to hang or dangle around the neck.
Remove mask correctly immediately after completion of task and discard into an appropriate waste receptacle.	Do not re-use disposable masks.
Clean hands after removing the mask.	Do not fold the mask or put it in a pocket for later use.

Selection of Masks

MASK TYPE	SITUATION AND RATIONALE
Procedure mask	Protection for minimal exposure to infectious droplets. Used for short duration tasks and those that do not involve exposure to blood/body fluids.
Fluid Resistant Mask	Protection for heavy exposure to infectious droplets or blood/body fluids.
Surgical Mask	Protection for exposure to infectious droplets or blood/body fluids and for longer duration tasks.

DID YOU KNOW?

Some studies have demonstrated that protection with a surgical mask against influenza appears to be similar to the N95 respirator. However, this should not be generalized to settings where there is a high risk for aerosolization (such as intubation or bronchoscopy), where use of an N95 respirator is required. (Loeb et al., 2009)

RESPIRATORS

N95 respirators prevent inhalation of small particles that may contain infectious agents transmitted via the airborne route and must:

- filter particles one micron in size
- have a 95% filter efficiency
- provide a tight facial seal with less than 10% leak.

A fit-tested N95 respirator covering the nose and mouth respirators should be worn when:

- entering the client/patient/resident's room or transporting patient/clients who are on Airborne Precautions (e.g., Active TB)
- performing aerosol-generating procedures such as sputum induction and bronchoscopy.

Non-immune staff is required to enter the room of a client/patient/resident with measles or varicella.

N95

DO	DON'T
Undergo regular fit testing as part of an approved fit-testing program.	NEVER put an N95 respirator on a patient/client (patient/clients should wear a surgical/procedure mask when outside their room)
Performing a seal check each time an N95 respirator is used.	Do not use N95 respirator if seal check fails.
Remove the N95 respirator correctly and discard on removal into an appropriate receptacle.	Do not use N95 respirator if wet or soiled.

Fit Testing for N95 Respirators

Fit Testing involves the evaluation of the fit of a specific respirator on an individual with respects to:

- make;
- model; and
- size

This procedure is to be done as required by health systems guidelines and directives, and whenever there is a change in respirator face piece or the user's physical condition which could affect the respirator fit (e.g. significant weight change, facial structure change due to injury or major dental work).

Professional Accountabilities:

Members are required to know what size and manufacturer of N95 respirator is appropriate for them and adhere to their employer's requirement for mask fit testing.

Performing a Seal Check for an N95 Respirator

A Seal Check (also referred to as a 'fit-check') must be performed each time an N95 respirator is worn to ensure adequate respiratory protection.

Positive Pressure Seal Check:	Negative Pressure Seal Check:
1. Apply mask as per instructions	1. Apply mask as per instructions
2. Cover exhalation valve or cup hands around the sides of the mask	2. Cover exhalation valve or cup hands around the sides of the mask
3. Exhale gently into the mask – you should feel no leaks around the mask edge and the mask should rise/lift gently from your face	3. Gently inhale for 5 seconds – the mask should collapse slightly onto your face without any inward leakage of air around the edges of the mask

SCENARIO:

You are unable to pass a seal check with an N95 mask prior to entering an airborne isolation room.

WHAT DO YOU DO?

You should notify your supervisor that you cannot provide care and ensure that you are mask fit tested as soon as possible.

EYE PROTECTION

DO	DON'T
Eye protection must be removed immediately after the task for which it was used and discarded into waste or placed in an appropriate receptacle for cleaning. Change mask if it becomes wet.	Prescription eye glasses are not acceptable as eye protection.
Reusable eye protection must be sent to a central area for reprocessing after use.	

Selection of Eye Protection

EYE PROTECTION TYPE	SITUATION AND RATIONALE
Goggles	Provides protection for exposure to infectious droplets or blood/body fluids. However, visibility is often poor.
Face Shield	Protection for exposure to infectious droplets or blood/body fluids. Provide good visibility.
Visor attached to Mask	Protection for minimal exposure to infectious droplets or blood/body fluids.

Organizational Expectations

Organizations have a responsibility to have systems in place with established procedures that enable compliance with Hand Hygiene, Routine Practices and Additional Precautions. Both the employer and the employee have duties under the *Occupational Health and Safety Act* 15:

> "An employer shall ensure that the equipment, materials and protective devices as prescribed are provided' [S. 25(1)(a)] and 'the equipment, materials and protective devices provided by the employer are maintained in good condition" [S. 25(1)(b)];
>
> "A worker shall use or wear the equipment, protective devices or clothing that his employer requires to be used or worn' [S. 28(1)(b)] and 'a worker shall report to his or her employer or supervisor the absence of or defect in any equipment or protective device of which the worker is aware and which may endanger himself, herself or another worker" [S. 28(1)(c)].

CONTROL OF THE ENVIRONMENT

These include:

- appropriate placement and bed spacing, such as single room and private toileting facilities for clients/patients/residents who soil the environment
- cleaning of equipment that is used for/on more than one client/patient/resident between uses
- cleaning of the health care environment, including safe handling of soiled linen and waste (e.g., sharps) to prevent exposure and transmission to others,
- engineering controls, such as: well-maintained heating, ventilation and air conditioning (HVAC) systems with sufficient air changes per hour, barriers, such as the use of Plexiglass® screens or curtains, point-of-care sharps containers and alcohol-based hand rub dispensers and adequate dedicated hand wash sinks

NEEDLESTICK & SHARPS INJURIES

PREVENTION & SAFE INJECTION PRACTICES

Needlestick and Sharps (e.g., scalpels, lancets) Injuries can occur at every stage of the use, disassembly, or disposal of sharps, and are a component of the Chain of Transmission (i.e., Parenteral Transmission). Improved equipment design, effective disposal systems and safe handling practices are all part of a Sharps Injury Prevention Program (SIPP). Safe injection practices help prevent the transmission of infections (e.g., Hepatitis B and C).

RESOURCES

Canadian Centre for Occupational Health & Safety

Elements of SIPP

Organizations have a responsibility

- **Improved equipment design** [i.e., Safety Engineered Medical Sharps (SEMS)]
- **Effective Disposal Systems**
  Sharps containers should always meet or exceed the Canadian Standards Association (CSA) standards. (Z316.6-07 “Evaluation of single-use and reusable medical sharps containers for biohazardous and cytotoxic waste”.)
- **Safe Handling Practices**
  - Used needles should be discarded immediately after use and not recapped
  - The contents of the sharps container must not exceed the fill line
- **Safe Injection Practices**
  - Use of a new needle and syringe with each injection of a patient/client
  - Using medication vials for one patient/client only

DID YOU KNOW?

Whenever possible, multidose medication vials are not to be used.

CLEANING, DISINFECTION & STERILIZATION

OF MEDICAL DEVICES

Effective cleaning, disinfection and sterilization is an essential part of breaking the chain of transmission of infectious pathogens. Reusable medical equipment must be cleanable and be able to be disinfected or sterilized as appropriate for the equipment.

Cleaning
General removal of debris physical removal of dirt with running water and detergent action. Should be done for all items prior to disinfection/ sterilization.

Sterilization
Killing of all disease causing organisms. For items that penetrate sterile tissue
(e.g., surgical equipment)

High-level Disinfection
For items that come in contact with patients non-intact skin and/ or mucous membranes but does not penetrate them. HLD kills vegetative bacteria, fungi, lipid and non-lipid-viruses and mycobacteria.
(E.g. laryngoscope blade)

Low-level Disinfection
Removal of most of the organisms present on the surface that can cause infection. For equipment that does not touch mucous membranes and only touches intact skin (e.g., blood pressure cuff)

RESOURCES

Reprocessing Decision Chart (publichealthontario.ca)

THE SPAULDING CLASSIFICATION

Deciding whether an item needs to be cleaned, disinfected, or sterilized depends on the type of item involved and how it is used. The Spaulding Classification medical equipment/devices into three categories, based on the potential risk of infection involved in their use.

CLASSIFICATION	DEFINITION	LEVEL OF PROCESSING/ REPROCESSING	EXAMPLES
Non-critical equipment/device	Equipment/device that touches only intact skin and not mucous membranes, or does not directly touch the client/patient/resident	Cleaning followed by low-level disinfection (in some cases, cleaning alone is acceptable)	• ECG machines • Oximeters • Stethoscopes
Semi-critical equipment/device	Equipment/device that comes in contact with non-intact skin or mucous membranes but does not penetrate them	Cleaning followed by high-level disinfection (as a minimum). Sterilization is preferred	• Anaesthesia equipment • Most respiratory therapy equipment
Critical equipment/device	Equipment/device that enters sterile tissues, including the vascular system	Cleaning followed by sterilization	• Surgical instruments • Biopsy instruments

WASTE DISPOSAL

Biomedical waste is contaminated, infectious waste that requires careful disposal, and includes:

- human anatomical waste
- human cultures or specimens (excluding urine and faeces)
- human blood and blood products

Waste should be segregated into either a plastic bag or rigid container with a non-removable lid according to the categories listed in the table below.

WASTE CATEGORY	COLOUR CODE	EXAMPLES
Anatomical waste	Red	Tissues, organs, body parts
Microbiologic waste	Yellow	Diagnostic specimens, cultures, vaccines
Fluid waste	Yellow	Drainage collection units and suction container contents, blood, blood products, bloody body fluids
General waste	Green, black or clear	Dressings, sponges, PPE, empty IV bags and tubing, catheters, empty specimen containers, isolation waste from Contact, Droplet and Airborne Precautions rooms

PERFORMING A RISK ASSESSMENT

A risk assessment is essential for determining:

Risk Presented by the Task

- risk of exposure to:
  - blood and body fluids
  - mucous membranes
  - non-intact skin
  - contaminated equipment
  - splash/spray,
  - cough or sneeze

→ **ROUTINE PRACTICES**

Risk Presented by the Patient/Client

- patient/client has a known infection
- patient/client has symptoms of an undiagnosed infection

→ **ROUTINE PRACTICES + ADDITIONAL PRECAUTIONS**

Other Considerations

- Practice setting-specific factors (e.g., long-term care facility, home care)
- Government and related agencies: Ontario Ministry of Health and Long-Term Care (gov.on.ca), Public Health Ontario, Public Health Agency of Canada) health alerts, surveillance, screening and reporting of suspected illness such as:
  - Acute Respiratory Illness (ARI)
  - Influenza-Like Illness (ILI)
  - Novel Respiratory Illness (NRI)

Professional Accountabilities:

Members are expected to consider their own health status and whether they are at risk of spreading infection to others.

RESOURCES

Routine Practices Risk Assessment Algorithm for All Client/Patient/Resident Interactions . Checklist for Office Infection Prevention and Control (publichealthontario.ca)

Administrative Controls

- Policies and procedures to ensure that staff are able to deal effectively with transmission risks associated with infectious illnesses γ
- Staff education to heighten awareness of infectious diseases, their mode of transmission and prevention of transmission γ
- Healthy workplace policies that exclude staff from working when ill with a communicable disease that would put clients/patients/residents and colleagues at risk γ
- Immunization programs for staff and for clients/patients/residents where applicable
- Respiratory etiquette for both staff and clients/patients/residents γ
- Monitoring of compliance with feedback is built into the program to measure compliance with Routine Practices, including hand hygiene γ
- Sufficient staffing

ADDITIONAL PRECAUTTIONS

Additional Precautions are interventions used in addition to Routine Practices when necessary. The need for Additional Precautions is based on the mode of transmission of microorganisms (e.g., MRSA, VRE, *C. difficile*).

Categories of Additional Precautions:

1. Contact Precautions
2. Droplet Precautions
3. Airborne Precautions

Organizational Accountability:
Members are expected to consider their own health status and whether they are at risk of spreading infection to others.

Contact Precautions:

Contact transmission is the most common route of transmission of infectious agents. There are two types of contact transmission:

1. **Direct** – transmission of microorganisms via touching contaminated individual
2. **Indirect** – transmission of microorganisms via contact with contaminated objects

Droplet Precautions:

Droplet transmission occurs when droplets carrying an infectious agent exit the respiratory tract of a person. Droplets can be generated when a patient/client talks, coughs or sneezes and through some procedures performed on the respiratory tract (e.g., suctioning, bronchoscopy or nebulized therapies). **Droplets do not remain suspended in the air and usually travel less than two metres.**

Airborne Precautions

Airborne transmission occurs when airborne particles remain suspended in the air and are then inhaled by others who are nearby or who **may be some distance away from the source**.

Common organisms transmitted via the air (airborne) include:

- Mycobacterium tuberculosis
- Varicella (chickenpox/disseminated shingles)
- Rubella (measles)

Patients with a known or suspected airborne organism should be cared for in an **Airborne Infection Isolation Room (AIIR)** with the door closed. The important characteristics of an airborne room AIIR are that it be:

- single-patient
- negative pressure to the corridor/adjacent areas with audiovisual alarms
- have a minimum of 12 air exchanges/hour (either using the facilities ventilation system or by using HEPA filtration of the air in the room)
- have air flow that is designed to move air from the area of the patient's head/face away from the likely position(s) of health care workers

Even after a patient has left the room everyone entering the room must wear an N95 respirator for the time period specified in your employer's policy.

Essential Elements of Additional Precautions

- **Special Accommodation Considerations** (e.g., a single room with private toileting facilities is highly recommended)
- **Signage** (i.e., that lists the required precautions)
- **Dedicated equipment**, whenever possible
- **Appropriate PPE**
- **Additional cleaning measures**
- **Transportation considerations** (e.g., restricted patient/client movement outside of their room)
- **Effective Communication** with all members of the healthcare team (e.g., patient/client, their family members, other healthcare providers)

DID YOU KNOW?

Equipment and supplies that are required for the interaction (and cannot be left in the room) should be assembled first and brought into the room after PPE has been put on.

Additional Precautions in an Acute Care Setting

	CONTACT	DROPLET	AIRBORNE
Special accommodation considerations	Single room with dedicated toilet and patient sink – door may be open	Single room with dedicated toilet and patient sink – door may be open	AIIR Keep door closed
Signage (examples)			
Dedicated equipment	Dedicated equipment if possible	Dedicated equipment if possible	As per Routine Practices
Appropriate PPE	Gloves at all times Gown if skin or clothing will come in contact with the patient/client environment	Facial protection within 2 meters of patient/client	Only immune staff for measles, varicella (no N95 required) Don N95 fit tested respirator and do seal check prior to entry Doff N95 respirator outside patient room
Additional cleaning measures	VRE and C *diff* rooms require special cleaning (routine cleaning for all others)	Routine Cleaning	Routine Cleaning
Transportation considerations	Transport staff to wear gloves and gown for direct contact with patient/client during transport	Patient/client to wear a surgical (procedure) mask during transport Transport staff to wear the appropriate mask during transport Limit transport unless required for diagnostic or therapeutic purposes	Patient/client to wear a surgical (procedure) mask during transport Transport staff to wear an N95 during transport Limit transport unless required for diagnostic or therapeutic purposes

For more information on Additional Precautions in Complex Continuing Care, Long-Term Care, Ambulatory Settings and Home Care, please see Infection Prevention and Control for Long-Term Care Homes (publichealthontario.ca)

RESPIRATORY THERAPY

SPECIFIC INFECTION CONTROL CONSIDERATIONS

VENTILATOR-ASSOCIATED PNEUMONIA (VAP)

Ventilator-associated pneumonia (VAP) is the leading cause of death among hospital-acquired infections. Hospital mortality of ventilated patients who developed VAP is 46% compared to 32% for ventilated patients who do not develop VAP (Canadian Patient Safety Institute).

VAP Diagnostic Criteria

In a patient who has been invasively mechanically ventilated for greater than 48 hours, the diagnostic criteria for VAP are as follows:

- New, worsening or persistent infiltrate consolidation or cavitation on CXR compatible with pneumonia and 1 of:
  - White Blood Cells ≥ 12,000 or < 4,000
  - Temperature greater than 38 degrees Celsius or less than 36 degrees Celsius with no other recognized cause

And both of the following:

- New onset of purulent sputum, or change in character of sputum, or increase in respiratory secretions or increase in suctioning requirements
- Worsening gas exchange (e.g., increasing oxygen requirements, worsening PaO2/FiO2 ratio, increasing in minute ventilation)

And

- The patient is being treated with antibiotics for ventilator-associated pneumonia

Critical Care Services Ontario (criticalcareontario.ca). *Ventilator Associated Pneumonia and Central Line Infection Prevention Toolkit.* Critical Care Secretariat

VAP Bundles

VAP Bundles are a variety of evidence-based practices that, when implemented together, have the potential to result in dramatic reductions in the incidence of VAP.

Adult VAP Bundles

1. Elevate the head of the bed to 45° when possible; otherwise, attempt to maintain the head of the bed at more than 30°
2. Evaluate readiness for extubation daily
3. Use endotracheal tubes with subglottic secretion drainage
4. Conduct oral care and decontamination with chlorhexidine
5. Initiate safe enteral nutrition within 24–48 hours of ICU admission

Pediatric VAP Bundles

1. Elevate the head of the bed
2. Properly position oral or nasal gastric tubes
3. Perform oral care
4. Eliminate the routine use of instil for suctioning

RESOURCES

Measures: Ventilator-Associated Pneumonia (VAP) (patientsafetyinstitute.ca)

Aseptic Practice

When needed, adherence to **aseptic practice** is critical in protecting patients from common and serious hospital-acquired infections such as line-associated tissue and blood stream infections as well as ventilator-associated pneumonia (VAP). For more information on VAP visit *Safer Health Care Now!*

RESOURCES

Centre for Disease Control
Central Line-associated Bloodstream Infections: Resources for Patients and Healthcare Providers

CLOSED SUCTION SYSTEMS

In-line (closed) suction systems are ideal as they contribute to the reduction of environmental contamination and prevent exposure to respiratory pathogens. Most published clinical practice guidelines for the reduction in ventilator-associated pneumonia (VAP), suggest that in-line catheters do not require routine changes (Hess, 2003). **Breaking the ventilator circuit to change an in-line catheter places patients, RRTs and other health care providers at risk.** The controversy, therefore, lies in the fact that it is preferable, for infection control purposes, to only change the in-line suction catheter when needed (i.e., visibly soiled, not functioning appropriately) and not routinely breaking the circuit. However, certain manufacturers of in-line suction catheters/systems are now recommending that all in-line suction systems be changed every 24 hours.

Standards related to the practice of routine replacement of in-line suction catheters for mechanically ventilated patients appear to have discrepancies depending on the source being used to support the practice. Most in-line suction products state in their literature that the catheter requires changing every 24 hours. Public Health Agency of Canada (PHAC) does not address the specific issue of routine suction catheter changes. PIDAC suggests that facial protection is routinely required for breaches to the integrity of a mechanical ventilation system which would include changing in-line suction catheters.

POWERED AIR PURIFYING RESPIRATORS (PAPR)

A PAPR is a battery operated unit consisting of a half or full facepiece, breathing tube, battery-operated blower, and particulate filters (HEPA only). A PAPR uses a blower to pass contaminated air through a HEPA filter, which removes the contaminant and supplies purified air to a facepiece.

A PAPR may be selected when performing high-risk aerosol-generating procedures if:

- The appropriate N95 respirator does not fit or is not available
- Facial hair or facial deformity interferes with an adequate mask-to-face seal.

RESOURCES

PAPR Donning & Doffing Instructional Videos
Centre for Disease Control

DID YOU KNOW?

PAPRs do not require fit testing.

NOVEL RESPIRATORY INFECTIONS (NRI)

In the previous decade, we have seen the emergence of a number of NRIs (also called Emerging Respiratory Pathogens), such as:

- SARS
- Covid-19
- pH1N1
- H7N9 avian influenza A
- MERS-CoV

An NRI is an illness that causes respiratory symptoms (e.g., fever, cough) where the etiologic agent and/or epidemiology of the disease are not yet known.

Due to the evolving and changing climate of new strains of respiratory illnesses, this document discusses this topic as a group, rather than specific diseases. For up to date information regarding the specific recommendations, please see Best Practices for Prevention, Surveillance and Infection Control Management of Novel Respiratory Infections in All Health Care Settings (publichealthontario.ca).

FINAL COMMENTS
& RECOMMENDATIONS

The rationale for producing this Clinical Best Practice Guideline (CBPG) on Infection Prevention and Control is twofold:

1. to provide a one stop infection control resource for CRTO Members that contains RT-specific infection control guidance; and
2. to remind Ontario Respiratory Therapists of their responsibility and obligation in preventing and controlling the spread of infection in their practice settings.

CRTO Members are expected to keep informed regarding current infection control procedures and to advocate for infection control best practices in their practice environment. This CBPG is a "living document" and will evolve as the practice standards change. In addition to this practice guideline, there are new infection, prevention and control documents being published on an ongoing basis by numerous government and external agencies (e.g., Public Health Ontario)

For information on continuing education for infection control and the certification process to become a Certified Infection Control Practitioner, please see Infection Prevention and Control Canada

College of Respiratory Therapists of Ontario

Ordre des thérapeutes respiratoires de l'Ontario

This Professional Practice Guideline will be updated as new evidence emerges or as practice evolves. Comments on this guideline are welcome and should be addressed to:

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