

PREVENTING INFECTIONS
How to Protect Your Patients and Yourself in the Hospital Environment

An Infection Prevention and Control “primer” for students
and residents/fellows at McGill University Teaching Hospitals

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1. INTRODUCTION

“Infection Control Precautions” is a two-tiered system of practices aimed at reducing the risk of transmission of microorganisms from both recognized and unrecognized sources of infection in the hospital. It is based on two fundamental principles.

- The first maintains that any patient may be the carrier of an infection that may be transmitted from blood or body fluids, secretions, excretions, mucous membranes and non-intact skin (biological substances). This is the first and most important principle for the successful prevention of hospital-acquired infections. Consequently, basic “Routine Practices” are to be used in the care of all patients, regardless of their diagnoses or presumed infection status, and are determined by the patient care tasks to be performed.
- The second principle maintains that certain infections cannot be contained by Routine Practices alone and warrant additional measures, based on specific routes of transmission and expected levels of contamination of the environment. For these infections, “Additional Precautions” (Contact, Droplet or Airborne) are instituted.

As we strive to create a safer environment by limiting the transmission of infections, it is important not to lose sight of some of the patients’ needs: to feel secure, to be informed, to participate in their care, to be treated with dignity. To this end, patients must be given explanations as to why and when protective equipment is used, why they may have to be separated from other patients, and how they can help protect themselves and/or others from hospital-acquired infections.

2. RATIONALE

- It is impossible to identify all persons harboring blood borne viruses (Hepatitis B & C, HIV), enteric pathogens (e.g. *C. difficile*, rotavirus, noroviruses, Hepatitis A), respiratory pathogens (influenza, respiratory syncytial virus, tuberculosis), multiresistant organisms (MRSA, VRE) or other potential pathogens. Many patients are asymptomatic carriers; other infections are communicable before the appearance of clinical signs and symptoms or after these have resolved.
- Where Additional Precautions are indicated, these must be instituted immediately, based on clinical findings as waiting for laboratory confirmation of infection allows transmission to occur.

3. GOALS

- To prevent the transmission of infection between patients.
- To prevent transmission of infection to and from Health Care Workers (HCW).
- To prevent acquisition of infection associated with invasive procedures.
- To respect the confidentiality of the patient and maintain his/her dignity at all times.

4. POLICIES

- 4.1. HCW are expected to perform hand hygiene before and after direct contact with any patient.

- 4.2. The blood, body fluids, secretions, excretions, mucous membranes and non-intact skin of all patients are considered to be potentially infectious.
- 4.3. HCW are expected to use the appropriate barrier precautions when there is the risk of exposure to blood, body fluids, secretions, excretions, mucous membranes and non-intact skin.
- 4.4. Each department or unit assesses its need for Personal Protective Equipment (gloves, masks, gowns, etc) and ensures that these are readily available to the personnel.
- 4.5. Room allocation (Patient Placement):
 - The treating physician, nurses, and/or infection control personnel determine the need for single room allocation in situations whereby patients pose risk to contaminate their environment because of their diagnosis, poor hygienic habits or inability to cooperate with infection control requirements.
 - The treating physician, nurses, and/or infection control personnel will determine the situations which require Additional Precautions.
- 4.6. Additional Precautions (Contact, Droplet, Airborne) cards are placed outside the patient's room in such a way as to be readily visible by anyone entering the room.
 - For Contact or Droplet Precautions, the cards are placed on the wall adjacent to the door frame of the patient's room. This makes them visible to anyone entering the room even when door is kept open.
 - For Airborne Precautions, the card is placed directly on the door, which is to be kept closed at all times. This acts as a reminder to everyone that door must not be left open.
- 4.7. In keeping with the "right to confidentiality", the patient's diagnosis is NEVER to be written on the Additional Precautions card.
- 4.8. An Additional Precautions card must also be attached to the chart.
- 4.9. An Additional Precautions transport card must be attached to the transport slip whenever a patient on Additional Precautions is transported from one unit/department of the hospital to another.
- 4.10. All patient specimens are to be treated in the same safe manner, regardless of patient diagnosis or precautions. However, special enhanced precautions may be required for rare highly lethal diseases such as "Viral Hemorrhagic Fevers" (e.g. Ebola, Marburg, Lassa).

5. ROUTINE PRACTICES

Routine Practices (referred to as Standard Precautions in the US) are used in the care of all patients at all times, determined by the health care task to be performed. These include hand hygiene, cleaning and disinfection of patient care equipment between patients, use of protective barriers (gloves, mask, eye protection, gown), and safe handling of used sharp items / specimens / biological spills / soiled equipment / soiled linen / biohazardous waste.

Because it is neither feasible nor practical to enumerate the types of barriers needed for every possible situation a health care worker may be confronted with, judgment and common sense must be exercised. The health care worker must assess the potential risk inherent to each situation or procedure to be performed and use the appropriate barriers.

5.1. Hand Hygiene

Hand hygiene is the single most important procedure for preventing the transmission of microorganisms.

Hands hygiene must be performed:

- Immediately before and immediately after patient contact
 - After contact with mucous membranes, blood, body fluids, secretions or excretions, non-intact skin
 - After touching known, suspected, or potentially contaminated objects or surfaces
 - After removing gloves
 - Remove watch and other jewelry hand / wrist jewelry before performing hand hygiene
- Keep nails trimmed; long nails (natural or artificial) impede hand hygiene and have been associated with transmission of infection.

Waterless, alcohol-based hand rinse

- Use of waterless alcohol-based hand rinses is now considered to be the optimal method to achieve hand hygiene in the healthcare setting, unless hands are visibly soiled or after contact with *C. difficile* (alcohol will not inactivate *C. difficile* spores)
- Apply alcohol-based product to hands, using a sufficient volume to cover all hand surfaces
- Rub all over hand surfaces, including the backs of the hands and between fingers, up to and including wrists
- Allow hands to air-dry

Hand Washing

Handwashing with antiseptic or plain soap should be used

- in any situation where visible soiling of the hands occurs (alcohol based hand rinses inactivate microorganisms but do not remove dirt)
- after contact with patients with diagnosed or suspected *C. difficile* diarrhea (alcohol will not inactivate *C. difficile* spores)

Technique:

- Wet hands under running water, keeping hands lower than elbows.
- Apply approximately 3-5 mL of soap to palm of hands
- Rub all surfaces vigorously for 10 to 15 seconds. (This includes the back of the hands, between the fingers, and the wrists).
- Rinse thoroughly under running water.
- Pat hands dry with paper toweling.
- If hands-free sink not available, turn tap(s) off with using the paper towel. This is an important step as it prevents recontamination of the hands.

5.2. Use of Barriers or Personal Protective Equipment (PPE)

Gloves:

- Gloves serve the following purposes:
 - Prevent gross contamination of the hands when handling blood, body fluids, secretions, excretions, mucous membranes or non-intact skin.

- Reduce the risk of hand contamination from patients or from contaminated environment when handling heavily contaminated items.
- Reduce the risk of transmission of organisms from hands to patients when performing invasive procedures or tasks that involve touching the patient's mucous membranes or non-intact skin.
- Reduce the risk of transmission of pathogens from a patient or an inanimate object to the hands and then to another patient.
- Gloves do not take the place of hand washing because:
 - Gloves may have microscopic perforations, allowing some penetration of body fluids and/or microorganisms.
 - Hands may become contaminated during glove removal.
 - Growth of microorganisms on the hands is promoted by the warm, moist environment created when wearing gloves.
- Gloves must be changed between patient contacts and hands must be washed after removing gloves.
- Gloves (clean, non-sterile) should be worn whenever it is anticipated that there will be hand contact with blood, body fluids, secretions, excretions, mucous membranes or non-intact skin. If contact with any of these is unlikely (e.g. bathing a patient with intact skin), one may decide not to use gloves.
- Sterile gloves should be worn before performing certain invasive procedures.
- Gloves should be removed immediately after use, before touching non-contaminated surfaces or other patients, and hands washed without delay.

Masks, Face shields and Goggles:

These barriers protect the mucous membranes of the mouth, nose and eyes from exposure to patients' blood or body fluids, secretions and excretions and should be used when performing procedures in which splashing or spraying with these substances onto the face may occur (e.g. during suctioning).

- Options for protection of the eyes, nose and mouth include a surgical or procedure mask plus goggles, a mask with attached face shields, or a total face shield.
- A mask should be used only once and changed when wet or soiled
- Disposable eye protection should be discarded after removal; reusable equipment should be disinfected before being used again

Gowns and Aprons

- Gowns are worn to prevent contamination of clothing as well as to protect non-covered skin from exposure to blood, body fluids, excretions, secretions or from heavily contaminated items in the patient's immediate environment.
- Water-resistant gowns should be worn if there is a risk of exposure to large quantities of blood or body fluids (e.g., during trauma). Water-resistant aprons may also be used to protect clothing from contamination with large amounts of biological fluids.
- Gowns and aprons should be removed promptly when contaminated with blood or body fluids and discarded in the appropriate receptacles.

5.3. Safe Handling and Disposal of used Needles and Sharp Items

Safe handling of needles and sharps is the single most important practice in preventing accidental exposure of health care workers to blood borne pathogens (e.g. Hepatitis B & C, HIV).

- **Needles must not be recapped** as this is the predominant cause of accidental needle sticks. In special circumstances (e.g., no sharps disposal container nearby), one-hand recapping may be done if this technique has been properly learned by the individual.
- Needles and sharps should always be discarded promptly in the appropriate rigid containers. It is important to remember that needles and sharps that are not safely discarded also put other employees - housekeepers, laundry and medical device reprocessing (MDR) personnel -, as well as patients, visitors, etc. at risk of accidental exposure.
- Sharps disposal containers should be located close to the point at which sharps are used, and placed where they are easily seen and reached. They should never be overfilled. Do not use a sharps container if it is more than 2/3 filled; call the appropriate department to replace the container.
- Replacement of **reusable** sharps by **single-use disposables** will aid in the reduction of injuries. If reusable sharps are used, they should be placed in rigid containers before being sent back to MDR unit. This serves to prevent the possibility of sharps injury during transit and also protects the MDR personnel from injury when unwrapping used instrument trays.

5.4. Careful Handling of used Patient-Care Equipment/Instruments

All reusable patient-care equipment that has been in direct contact with a patient should be disinfected before use with another patient.

- Items in contact only with intact skin require cleaning with a low or intermediate level disinfectant such as alcohol, a disinfectant wipe, or a hospital detergent-disinfectant.
- Items in contact with mucous membranes or non-intact skin require high level disinfection.
- Items that enter sterile body spaces or tissue require sterilization.
- Patient-care equipment contaminated with blood or body fluids should be handled in a manner that prevents unnecessary contamination of the HCW or the environment. (i.e., avoid carrying against clothing, placing on clean surfaces, etc.).
- Gloves should be worn when handling soiled equipment and instruments.
- High-level disinfection or sterilization of reusable instruments and medical equipment are generally done in the MDR unit ; however, some visibly soiled equipment or instruments contaminated with biological substances and fluids may need to be rinsed prior to transport to MDR especially if there will be a long delay in transport. Please refer to the Policies and Procedures of your specific institution.
- Equipment such as urinals, bedpans, etc. should be emptied of stool and urine before being returned to the MDR unit. This should always be done in a manner which minimizes splashing or aerosol generation.

5.5. Careful Handling of Soiled Linen

Although soiled linen is considered to be a possible source of pathogenic microorganisms, it poses a negligible risk of disease transmission. Consequently, handling of linen requires simple common sense hygienic practices.

- Soiled linen should be held away from the body to avoid contamination of the clothing of the HCW. It should also be handled as little as possible and with minimal agitation so as to prevent dispersion of microorganisms into the air and contamination of the person handling the linen.
- Laundry hampers should be brought close to the location where soiled linen is removed and should not be sorted at the bedside.
- Linen heavily soiled with blood or blood products which may leak from a cloth bag should first be placed in a regular plastic bag.
- Laundry personnel and others who handle or sort soiled linen should wear masks, gloves and protective apparel. Puncture- and cut-proof gloves are strongly recommended for laundry sorters and handlers.

5.6. Cleaning of Biological Spills

Minor blood and body fluid spills (less than 100mL) should be decontaminated immediately with 5% javex (i.e. “household bleach”) in a dilution of 1 part bleach to 10 parts water (see below).

Larger spills should be managed according to the institution’s “biohazardous spill” policy. Paper towels should be placed over the spill to control spread while waiting arrival of the personnel responsible for cleaning. In some facilities, the cleaning of biological and other spills is contracted out to special companies. If this is the case, notify the area manager, who should know how to contact them.

If cleaning a minor biological spill:

Gloves are worn to clean spills of blood and body fluids/excreta. A paper towel is placed over the spill. Diluted bleach (1:10) solution is poured gently over the paper towel and allowed to stand 5 minutes. Pre-diluted bleach solution may be available from housekeeping; please inquire. The towel is then removed and the area is rinsed and wiped dry.

5.7. Proper Handling and Transport of Specimens

- All specimens should be considered as potentially infectious and handled in a safe manner. Specimens are not to be labeled as “infected”. The only exceptions are specimens from patients with suspected or confirmed “Viral Hemorrhagic Fevers” (i.e. Ebola, Marburg, Lassa). For this group of diseases, you should consult the hospital’s laboratory manager or Infection Prevention and Control for further instructions.
- Specimen containers should be intact, properly closed and clean on the outside. Soiling on the outside of the container should be wiped with paper toweling and bleach solution (5 %, diluted 1 in 10) or with 70% alcohol.
- Requisitions should be free from blood or body fluid spills. If soiled, they must be discarded and new ones made.
- The specimen container should be placed in a sealed plastic bag.
- The requisition should be attached to the outside of the bag or into the bag’s requisition pouch.

5.8. Biohazardous Waste Management

- Regular waste may be disposed of in ordinary waste receptacles.
- Any material contaminated with small amounts (i.e. non-dripping) of blood, body fluids, secretions or excretions may also be disposed of in ordinary waste receptacles.
- Any material dripping or completely saturated with blood, body fluids, secretions or excretions must be disposed of into biohazardous waste receptacles.
- Liquid blood, body fluids, secretions or excretions may be disposed of in the regular drain system. For these items, avoid splashing and aerosol generation, and use designated dirty utility rooms as the site of disposal.

5.9 Aseptic technique for the performance of invasive procedures

Aseptic technique refers to practices designed to prevent transfer of microorganisms from the patient's body surface or from equipment or supplies into a normally sterile body site. It is required when performing procedures that expose the patient's normally sterile body sites. Such procedures include insertion of intravascular or urinary catheters, venepuncture, lumbar puncture, placing a catheter or injecting material into the spinal canal or subdural space, endotracheal intubation, as well as injection of medications and vaccines.

Components of aseptic technique include:

- Performing hand hygiene with an alcohol-based hand rinse or antiseptic soap prior to opening supplies.
- Opening instrument trays and supplies only when ready to use to ensure a sterile field.
- Preparing the patient's skin with an antiseptic. Chlorhexidine in alcohol is preferred.
- Covering the patient with an appropriately sized sterile drape to prevent transferring microorganisms from the patient's skin or the environment to the exposed areas during the procedure.
- Use of single-use clean gloves or sterile gloves, sterile gown, mask, as indicated by the specific procedure being performed.
- Maintaining a sterile field during the procedure.
- Maximal aseptic barriers (cap, mask, long sleeved sterile surgical gown, sterile gloves, and large full-body sterile drape) should be used when inserting central venous catheters. When inserting peripheral venous or arterial lines, as a minimum, perform hand hygiene, prepare the skin with an antiseptic and wear clean disposable gloves.
- Aseptic technique should be used when withdrawing injectable medications or other sterile materials from vials or other containers. After hand hygiene, an alcohol or alcohol-antiseptic swab should be used to clean vial stoppers before piercing and to clean injection ports on intravenous lines. Only single-use sterile needles and syringes should be used. The same syringe should never be used to administer medications to more than one patient, even if the needle is changed. Single-dose medication vials or prefilled syringes should be used. If the product is only available in a multi-dose vial, syringes should be filled in a centralized medication preparation area away from the patient's room, using a separate sterile, single-use disposable needle and syringe for each withdrawal.

- Aseptic technique should be used for assembly or handling of components of intravenous delivery systems. A syringe, needle or cannula used to enter a patient's intravenous infusion bag or administration set should not be reused.
- Single patient multi-use devices (e.g., glucose sampling devices) should not be used for more than one patient.

Surgical procedures, central vascular catheters, mechanical ventilation, and urinary tract catheters are important risk factors for infection. Aseptic technique is essential in prevention of these infections, but other practices are also important, including using the least invasive procedure when possible and removing invasive devices promptly when no longer essential for care. Many hospitals have now implemented “bundles” (straightforward sets of evidence-based practices — generally three to five — that, when performed collectively and reliably, have been proven to improve patient outcomes) for prevention of these infections. Monitoring of compliance with these practices, surveillance for associated infections, and comparison of infection rates with established internal and external benchmarks are essential components of these bundles. Details are beyond the scope of this document. Further information is available at Safer Healthcare Now (Canada) <http://www.saferhealthcarenow.ca> and The Institute for Healthcare Improvement (USA) <http://www.ihl.org/IHI>.

5.10 Respiratory Etiquette

The concept of “respiratory etiquette” or source control was introduced after the outbreak of Coronavirus Severe Acute Respiratory Syndrome in 2003. This involves having the patient take some responsibility for prevention of transmission of respiratory infections in health care settings, especially in ambulatory care areas. Specifically:

- Signs are posted instructing coughing patients to cover the nose and mouth when coughing or sneezing, dispose of used tissues promptly, clean their hands after contact with respiratory secretions, wear a surgical mask if possible, and to sit one to two meters away from others.
- The institution should provide tissues, masks, waste receptacles, and hand hygiene products and, ideally, sufficient space in waiting rooms.

6. ADDITIONAL PRECAUTIONS

Additional Precautions (referred to as Transmission-based Precautions in the US) are required for patients with known or suspected infections caused by highly transmissible or epidemiologically important pathogens that cannot be contained using Routine Practices alone. There are three types of Transmission-Based Precautions:

- Contact Precautions
- Droplet Precautions
- Airborne Precautions.

These strategies may be used individually or in combination, depending on whether the pathogen is transmitted via a single or multiple routes of transmission. **In all cases, Routine Practices also apply.**

Appendix A shows the Additional Precautions usually recommended for the more common infectious conditions. Most hospitals will have similar tables available in infection control manuals, electronic patient care protocols, or electronic patient databases. HCW should become familiar with the policies used in the institution in which they are located, as minor variations may occur.

Admission screening for clinical manifestations of infection is essential in identifying patients for whom Additional Precautions are required. Additional Precautions must be initiated as soon as indicated by the clinical condition (diagnosis, signs or symptoms, laboratory information or assessment of risk factors). It is important not to wait for laboratory confirmation before initiating precautions. These may adjusted once a specific etiology is identified or an infectious cause ruled out.

Patient and family teaching

Patients and their families should be provided with sufficient information to enable them to understand the nature of the infection, the reasons for the precautions, and how to prevent transmission to family and visitors during the hospital stay.

Accommodation: Shared rooms

- Ideally, patients requiring Additional Precautions should be placed in single rooms. In practice, some will be housed in shared rooms.
- A patient requiring Additional Precautions who shares a room with other patients should be confined to his / her bed area. There should be no direct contact between the infectious patient and other patients in the room. The patient, the roommates, and their visitors must be able to comply with the precautions required and should not have direct contact with other patients or items in another patient's immediate environment.
- All articles, including equipment, recreational items, toys, personal items, must be for the exclusive use of the patient on precautions and must not be shared with room-mates.

6.1. Contact Precautions

This strategy involves the use of barrier precautions aimed at reducing the transmission of pathogens that are spread either by direct contact with an infected person or by indirect contact (touching contaminated environmental surfaces or patient-care material).

Contact Precautions are required if:

- The organism has a low infective dose (i.e. highly infectious)
- The organism may be readily transmitted from the patient's intact skin
- There is potential for widespread contamination of the environment

Common indications for Contact Precautions include diarrhea (suspected or known infectious origin), extensive draining skin or wound infections or abscesses if drainage cannot be

contained by dressings, colonization or infection with MRSA, VRE. In addition, Contact Precautions are used for all children with suspected or known viral respiratory tract infections.

Room allocation (Patient Placement)

- A single room is preferred.
- Patients infected with the same microorganism may be cohorted (placed in same room) providing that they do not otherwise pose a risk to each other (not infected with any other transmissible disease; minimal possibility of reinfection with the same organism or with a new strain).
- Under certain circumstances, a patient on Contact Precautions may be placed in a multiple bedded room with uninfected patients provided that at least a one meter physical separation can be maintained between patients and that barrier precautions can easily be adhered to by all patients, staff and visitors entering the room.

Personal Protective Equipment (PPE) required

- Gloves should be worn when entering the room.
- Gloves should be removed and hand hygiene performed before leaving the room (or the patient's designated bed space in a shared room), A gown should be worn if there will be direct contact of clothing or forearms with the patient or with frequently touched environmental surfaces or items which may be contaminated. The gown should be removed before leaving the room.
- After hand hygiene has been performed, care should be taken not to touch potentially contaminated surfaces before leaving the patient's room. If this occurs, hand hygiene should be performed again.

Patient Transport

Transport of the patient outside the room should take place only when absolutely necessary.

When transport is unavoidable:

- The appropriate precautions must be taken to ensure that the risk of transmission of infection to other patients, or contamination of environmental surfaces, are minimized. This means that all skin lesions are thoroughly covered during transport and incontinent patients are appropriately diapered.
- Personnel in the receiving department should be notified that Contact Precautions are required. At the time a test, procedure or consultation is booked, personnel in the receiving department should be notified that the patient is on Contact Precautions, to allow time for any special preparation that may be needed.
- Tests, procedures and consultations should be performed with minimal delay in order to ensure the patient's prompt return to his/her room. Long waits in corridors or waiting rooms allow transmission to occur.

Patient-Care Equipment

- Whenever possible, patient care equipment (thermometer, blood pressure machine, stethoscope, IV pole) should be dedicated to the use of that patient and left in the room.
- Equipment must be cleaned and disinfected before reuse with another patient.
- In shared rooms, patients must not share toys and personnel effects.
- The patient chart should not be taken into the room

- Dishes and eating utensils do not require special treatment. Disposable dishes and utensils are not required.
- All horizontal and frequently touched surfaces should be cleaned daily and when soiled.
- Keep the laundry hamper in room and handle laundry as usual.

6.2. Droplet Precautions

This strategy consists of the use of barrier precautions directed at blocking the transmission of pathogens spread by the droplet route. In this mode of transmission the pathogen is transported by large-particle droplets which may land on the mucous membranes of the eyes, nose or mouth of a susceptible host. Droplets are generated when coughing, talking or sneezing and when subjected to procedures such as suctioning or bronchoscopy. Droplets generally travel only short distances (up to 1 meter), but in some patients with forceful coughing, the droplets may travel as far as 2 meters. Infections spread by this route include, but are not restricted to, pertussis, meningococcus, and rubella. In addition, Droplet Precautions are used for all children with suspected or known viral respiratory tract infections.

Room allocation (Patient Placement)

- A single room is preferred. Negative pressure is not required.
- Patients infected with the same microorganism may be cohorted (placed in same room) providing that they do not otherwise pose a risk to each other (not infected with any other transmissible disease; minimal possibility of reinfection with the same organism or with a new strain).
- Under certain circumstances, a patient on Droplet Precautions may be placed in a multiple bedded room with uninfected patients provided that a one meter physical separation can be maintained between patients and that barrier precautions can easily be adhered to by all patients, staff and visitors entering the room.

Personal Protective Equipment (PPE) required

- A surgical or procedure mask is required by HCW coming within one meter of the patient.
- For care of rubella or mumps, a mask is not required if the HCW is immune
- Eye protection (goggles or face shields) may be indicated when caring for patients with suspected or confirmed acute respiratory viral infection if the HCW is within one meter of a coughing patient.

Patient Transport

Transport of the patient outside the room should take place only when absolutely necessary.

When transport is unavoidable:

- Personnel in the receiving department should be notified that Droplet Precautions are required. At the time a test, procedure or consultation is booked, personnel in the receiving department should be notified that the patient is on Droplet Precautions, to allow time for any special preparation that may be needed.
- The patient should wear a surgical or procedure mask during transport
- Tests, procedures and consultations should be performed with minimal delay in order to ensure the patient's prompt return to his/her room. Long waits in corridors or waiting rooms allow transmission to occur.

Patient-Care Equipment

- Equipment must be cleaned and disinfected before reuse with another patient.
- Keep the laundry hamper in room and handle laundry as usual.

6.3. Airborne Precautions

This strategy is designed to prevent the spread of microorganisms transmitted by small droplet nuclei (less than 5 microns in size) which remain suspended in the air and can be transported long distances by air currents, and should be used for patients with known or suspected airborne infections. Control of air flow is required. Tuberculosis, measles and varicella are thought to be transmitted by this route.

Room Allocation (Patient Placement)

- The patient is placed in a negative-pressure room (the institution should have a list of available negative pressure rooms).
- In the event that a negative-pressure room is not available, a portable negative-pressure device may be used as a temporary measure.
- Otherwise the patient should be transferred to an institution with a negative pressure room available.
- The door and windows are kept closed at all times to maintain the negative pressure and to minimize dispersion of pathogens outside the room.
- The number of persons entering the room should be limited to those essential for care.

Personal Protective Equipment (PPE) required

- High-efficiency particulate masks ("N95") are used to protect the individual from inhalation of air-borne microorganisms and are designed to provide a tight facial seal. Each HCW should be fit-tested to determine the appropriate type, size and shape of "N95" mask, and be able to do a fit-check each time the mask is applied. These masks should be worn at all times when inside the room of a patient with an airborne infection to which the HCW is not immune. These masks are used primarily for care of patients with transmissible tuberculosis.
- For measles or varicella, a mask is not required for persons who are known to be immune. Persons susceptible to the infection should not care for the patient unless it is absolutely necessary, in which care an "N95" mask should be worn.
- "N95" masks should be readily available outside the door of the patient's room. Individuals should wear the mask for which they were satisfactorily fit-tested and should perform a fit-test before entering the room..
- The patient should be taught to cover his mouth and nose with a tissue when coughing or sneezing.

Patient Transport

Transport of the patient outside the room should take place only when absolutely necessary. Tests and procedures should preferentially be done within the patient's room at all times. When transport is unavoidable:

- Personnel in the receiving department should be notified that Airborne Precautions are required. At the time a test, procedure or consultation is booked, personnel in the receiving department should be notified that the patient is on Airborne Precautions, to allow time for any special preparation that may be needed.
- A surgical or procedure mask should be worn by the patient, if feasible, while outside of a negative pressure room to minimize dissemination of microorganisms into the atmosphere. If a mask cannot be worn, the mouth and nose should be covered with a tissue.
- The test, procedure or consultations should be performed in a negative pressure room if possible. Personnel should wear an “N95” mask, unless the patient has measles or varicella and personnel are immune.
- Unless urgent, the test, procedure or consultation should be reserved for the last of the day, to allow sufficient air exchanges to clear the air in the receiving area before the room is used for another patient. If the patient has measles or varicella, the room may continue to be used providing the subsequent patients and all personnel are immune to the illness.
- Tests, procedures and consultations should be performed with minimal delay in order to ensure the patient’s prompt return to his/her room. The patient must not wait in a corridor or waiting room.

APPENDIX A

INFECTIONS & CONDITIONS REQUIRING ADDITIONAL PRECAUTIONS

A = AIRBORNE PRECAUTIONS

C = CONTACT PRECAUTIONS

D = DROPLET PRECAUTIONS

Infection / condition	Type of Additional Precautions	Duration of Additional Precautions	Comments
Abscess, draining, major (no dressing or dressing cannot contain drainage)	C	Duration of drainage	
Bronchiolitis (child)	C+D	Duration of illness	Also for adults if on an immunodeficiency unit.
Burns, major infection (no dressing or dressing cannot contain drainage)	C	Duration of drainage	
Cellulitis, draining: see abscess	C	Duration of illness	
Cellulitis, periorbital or other with intact skin (suspected <i>H. influenza</i> type b in child < 5 years old)	D	Until 24 hours of appropriate antibiotic received	If <i>H. influenza</i> type b, chemoprophylaxis may be indicated for close contacts
Chickenpox (varicella) - suspected or confirmed	A + C	Until all lesions are crusted	Susceptible persons should not enter room or care for patient. Masks are not necessary for personnel known to be immune.
Chickenpox contact (non-immune with significant exposure, including newborn of a mother with varicella onset < 5 days before delivery)	A	From 8 days after first contact through 21 days after last contact (28 days if given VZIG)	Varicella vaccine may be protective if given within 72 hours of first exposure. Immunoprophylaxis with VZIG is indicated for high risk contacts and should be given within 96 hr of last exposure.
<i>Clostridium difficile</i> diarrhea	C	Until 72 hours without diarrhea	Prompt and rapid diagnosis and therapy and isolation necessary for control of transmission.
Colds (child)	C+D	Duration of illness	Also for adults if on an immunodeficiency unit
Conjunctivitis acute viral	C	Duration of illness	
Croup (child)	C+D	Duration of illness	Also for adults if on an immunodeficiency unit
Diarrhea	C	Until stools normal for 72 hours or non-infectious cause established	

Infection / condition	Type of Additional Precautions	Duration of Additional Precautions	Comments
Diphtheria pharyngeal or respiratory	D	Until off antibiotics and 2 cultures, taken 24 hours apart, are negative	Chemoprophylaxis (and possibly immunoprophylaxis) required for close contacts
Enteroviral infection - suspected or confirmed including hand, foot and mouth disease, aseptic meningitis, pleurodynia (child)	C	Duration of illness or until alternative diagnosis established	For adults: routine precautions.
Epiglottitis (suspected <i>Haemophilus influenzae b</i> infection)	D	Until 24 hours after start of appropriate antibiotic therapy.	Chemoprophylaxis may be indicated for exposed contacts
<i>Haemophilus influenzae b</i> invasive infection	D	Until 24 hours after start of appropriate antibiotic therapy.	Chemoprophylaxis may be indicated for exposed contacts
Hemorrhagic fevers (i.e. Lassa, Ebola, Marburg)	C+D	Duration if illness	Report promptly to IPC personnel and/or ID physician
Hepatitis A, E (or unknown etiology until hepatitis A, E ruled out)	C	Until 1 week after onset of jaundice.	Immunoprophylaxis may be indicated for close contacts.
Herpes simplex extensive or disseminated mucocutaneous disease	C	Duration of illness or until all lesions crusted	
Influenza - suspected or confirmed	C+D	Duration of illness	
Lice (pediculosis) - head or body or pubic	C	Until 24 hours after start of appropriate treatment.	Change and wash bedding and clothing and clean headgear, combs, hair ornaments of patient
Measles - suspected or confirmed	A	Until 4 days after onset of rash (duration of illness for immunocompromised patient.	Susceptible persons should not enter room or care for patient. Masks are not necessary for personnel known to be immune
Measles contact (non-immune with significant exposure)	A	From 5 days after first contact through 21 days after last contact.	Immunoprophylaxis is indicated for susceptible contacts Measles vaccine protective if given within 72 hours of first exposure. Immunoglobulin is required for immunocompromised contacts or if >72 hours after first exposure
Meningitis – bacterial	D	Until 24 hours after start of appropriate antibiotic therapy.	Chemoprophylaxis may be indicated for close contacts of <i>H. influenzae</i> type B or <i>N. meningitidis</i> meningitis
Meningitis - suspected enteroviral (child)	C	Duration of illness	
Meningococcal disease	D	Until 24 hours after start of appropriate therapy.	Chemoprophylaxis may be indicated for close contacts
MRSA (methicillin-resistant <i>Staphylococcus aureus</i>)	C	Until deemed unnecessary by IPC personnel	Place in MRSA cohort unit (if it exists in Hospital) as soon as possible, unless medically contraindicated.

Infection / condition	Type of Additional Precautions	Duration of Additional Precautions	Comments
Mumps	D	Until 5 days after onset of swelling.	Susceptible persons should not enter room or care for patient. Masks are not necessary for personnel known to be immune.
Mumps contact (non-immune with significant exposure)	D	From 10 days after first contact through 26 days after last contact	Susceptible contacts should receive mumps vaccine, unless contraindicated.
Parvovirus B19 - chronic infection in immunocompromised patient - aplastic crises in patient with hemoglobinopathy	D	- Duration of hospitalization - 7 days for aplastic crises	Patients who present with Fifth Disease are no longer infectious and need only Routine Precautions
Pertussis (whooping cough)	D	Until 5 days after start of appropriate treatment.	Close contacts may require chemo- or immunoprophylaxis
Pharyngitis (child)	C+D	Duration of illness (Until 24 hours after start of appropriate antibiotic therapy if Group A Streptococcus).	D for Group A Streptococcal pharyngitis
Pneumonia	C+D	Duration of illness (Until 24 hours after start of appropriate antibiotic therapy if Group A Streptococcus).	D for Group A Streptococcal pneumonia
Rubella (German measles)	D	Until 7 days after onset of rash.	Susceptible persons should not enter room or care for patient. Masks are not necessary for personnel known to be immune.
Congenital rubella syndrome (child)	D+C	Until 3 months of age and nasopharyngeal and urine cultures negative	
Rubella contact (non-immune with significant exposure)	D	From 7 days after first contact through 21 days after last contact	Susceptible contacts should receive rubella vaccine unless contraindicated Masks are not necessary for personnel known to be immune
Scabies	C	Until 24 hours after start of appropriate treatment.	Change and wash bedding and clothing of patient.
Shingles See zoster			
Skin infection -extensive desquamating infection, furuncles, impetigo which cannot be covered by dressings	C	Until lesions resolved or can be covered by dressings	
Streptococcus group A - invasive or toxin-mediated disease	D+ C	Until 24 hours of appropriate antibiotic received	Close contacts may require chemoprophylaxis
Tuberculosis – (pulmonary) suspected or confirmed contagious tuberculosis)	A	Until declared “non-infectious” by IPC personnel	If pulmonary TB is in the differential diagnosis, then patient must be placed in airborne precautions.
Varicella See chickenpox			

Infection / condition	Type of Additional Precautions	Duration of Additional Precautions	Comments
VRE (vancomycin-resistant enterococci)	C	Until deemed unnecessary by IPC personnel	Place in VRE cohort unit (if it exists in Hospital) as soon as possible, unless medically contraindicated.
Viral respiratory infection (e.g. Adenovirus, Coronavirus, Human metapneumovirus, Parainfluenza virus, RSV, Rhinovirus, etc.) (child)	C+D	Duration of illness	Also for adults if on an immunodeficiency unit
Whooping Cough (See Pertussis)			
Wound infection – major (no dressing or dressing does not adequately contain drainage)	C	Duration of illness	
Zoster (Shingles) localized that cannot be covered; any immunocompromised patient; multi-dermatomal or disseminated	A +C	Until all lesions are crusted	See Chickenpox

Please note:

Should a patient present with an infection or condition which poses a concern or uncertainty, please contact the Infection Prevention and Control (IPC) personnel and/or the Nursing Supervisor for instructions and directions as to the appropriate infection control precautions.

REFERENCES:

- Public Health Agency of Canada, Steering Committee on Infection Control Guidelines. Routine practices and additional precautions for preventing the transmission of infection in health care. Revision of isolation and precaution techniques. CCDR 1999;25S4:1-142. (currently being revised)
- Siegel JD, Rhinehart E, Jackson M, Chiarello L, and the Healthcare Infection Control Practices Advisory Committee, 2007 Guideline for Isolation Precautions: Preventing Transmission of Infectious Agents in Healthcare Settings, June 2007 <http://www.cdc.gov/ncidod/dhqp/pdf/isolation2007.pdf>
- Centers for Disease Control and Prevention. Guidelines for environmental infection control in health-care facilities: recommendations of CDC and the Healthcare Infection Control Practices Advisory Committee (HICPAC). MMWR 2003;52 (No.RR-10):7.

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