

**Ministry of Health and
Long-Term Care**

Emergency Health
Services Branch
5700 Yonge Street, 6th Floor
Toronto ON M2M 4K5
Tel.: 416-327-7909
Fax: 416-327-7879
Toll Free: 800-461-6431

**Ministère de la Santé et des
Soins de longue durée**

Direction des services de
santé d'urgence
5700 rue Yonge, 6^e étage
Toronto ON M2M 4K5
Tél.: 416-327-7909
Télééc.: 416-327-7879
Appels sans frais: 800-461-6431



March 30, 2007

MEMORANDUM TO: Municipal EMS Directors and Managers
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FROM: Malcolm Bates
Director
Emergency Health Services Branch

RE: **Infection Prevention and Control
Best Practices Manual for Land Ambulance Paramedics**

Paramedics play a significant role in identifying situations where communicable disease may exist and in implementing measures aimed at reducing the risk of unknowingly transmitting communicable diseases to others by adhering to infection prevention and control best practices.

Attached you will find a copy of an Infection Prevention and Control Best Practices Manual for Land Ambulance Paramedics. This manual has been developed as a resource to provide ambulance service operators and paramedics with the most recent information on communicable diseases, the modes of transmission of communicable diseases and current best practices aimed at preventing the transmission of communicable diseases.

The attached manual will be printed and forwarded to you in sufficient quantities so that you can provide every paramedic in your service with a copy. Additionally, this document will be available on the www.ambulance-transition.com web site shortly.

If you require additional information, please contact Ms. Cathy Francis, Manager of Education and Patient Care Standards at (416) 327-7843.

A handwritten signature in black ink that reads "M. Bates".

Malcolm Bates

**Infection Prevention and Control
Best Practices Manual for Land Paramedics**

- c: D. Brown, Senior Manager, Operations and Quality Management
T. Campeau, Manager, Land Ambulance Programs
Senior Field Managers/Field Managers, EHSB
C. Francis, Manager, Education and Patient Care Standards
R. Nishman, Manager, Air Ambulance
J. Van Pelt, Manager, Investigations, Certifications and Regulatory Compliance
Dr. M. Welsford, Chair, MAC
R. Burgess, Chair, OBHG
Regional Training Coordinators
Paramedic Program Coordinators

Encl.

Infection Prevention and Control

Best Practices Manual for Land Ambulance Paramedics

March 2007

Version 1.0

Emergency Health Services Branch
Ministry of Health and Long-Term Care

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Introduction

The Community and Hospital Infection Control Association (CHICA) reports as many as 250,000 cases of nosocomial infections (infections that originate in hospitals and hospital-like settings) in Canada yearly. These infections result in as many as 8,000-12,000 deaths per year. Recently the media have reported on the impact of a variety of communicable diseases on hospitals and other health care facilities (e.g. MRSA and *C.difficile*). Paramedics are often the first point of contact for patients entering the health care system. As such, paramedics have a significant role in the recognition of situations where communicable disease exists and in reducing the risk of unknowingly transmitting communicable diseases to others by adhering to infection prevention and control best practices.

The use of infection prevention and control best practices by paramedics may:

- decrease the instances of transmitting communicable diseases to other patients;
- decrease the length of stay in hospital for patients;
- decrease the use of valuable hospital resources;
- reduce patient morbidity and mortality;
- reduce the risk of transmitting communicable disease to family members and the public;
- reduce the risk of self-inoculation of communicable diseases;
- protect hospitals and other health care facilities from outbreaks of communicable diseases.

This manual has been developed as a resource to provide paramedics with a review of information on communicable diseases and the modes of transmission, as well as an update on the current best practices to prevent the transmission of communicable diseases.

Infection

Infection is defined by the Association for Professionals in Infection Control and Epidemiology (APIC) as an invasion and multiplication of microorganisms in or on body tissue causing cellular damage through the production of toxins, multiplication or competition with host metabolism.¹

Infectious agents capable of causing disease include:

- bacteria;
- viruses;
- fungi and moulds;
- parasites;
- prions.

Emergency service workers, including paramedics, may in the course of their duties be exposed to communicable diseases including blood-borne diseases, such as hepatitis B and acquired immune deficiency syndrome (AIDS) and diseases spread through the respiratory system, such as meningococcal disease and tuberculosis.

The risk of spread of all these diseases can be reduced through the consistent use of infection prevention and control practices for all activities.

To reduce the risk of acquiring or transmitting communicable diseases, paramedics should be familiar with:

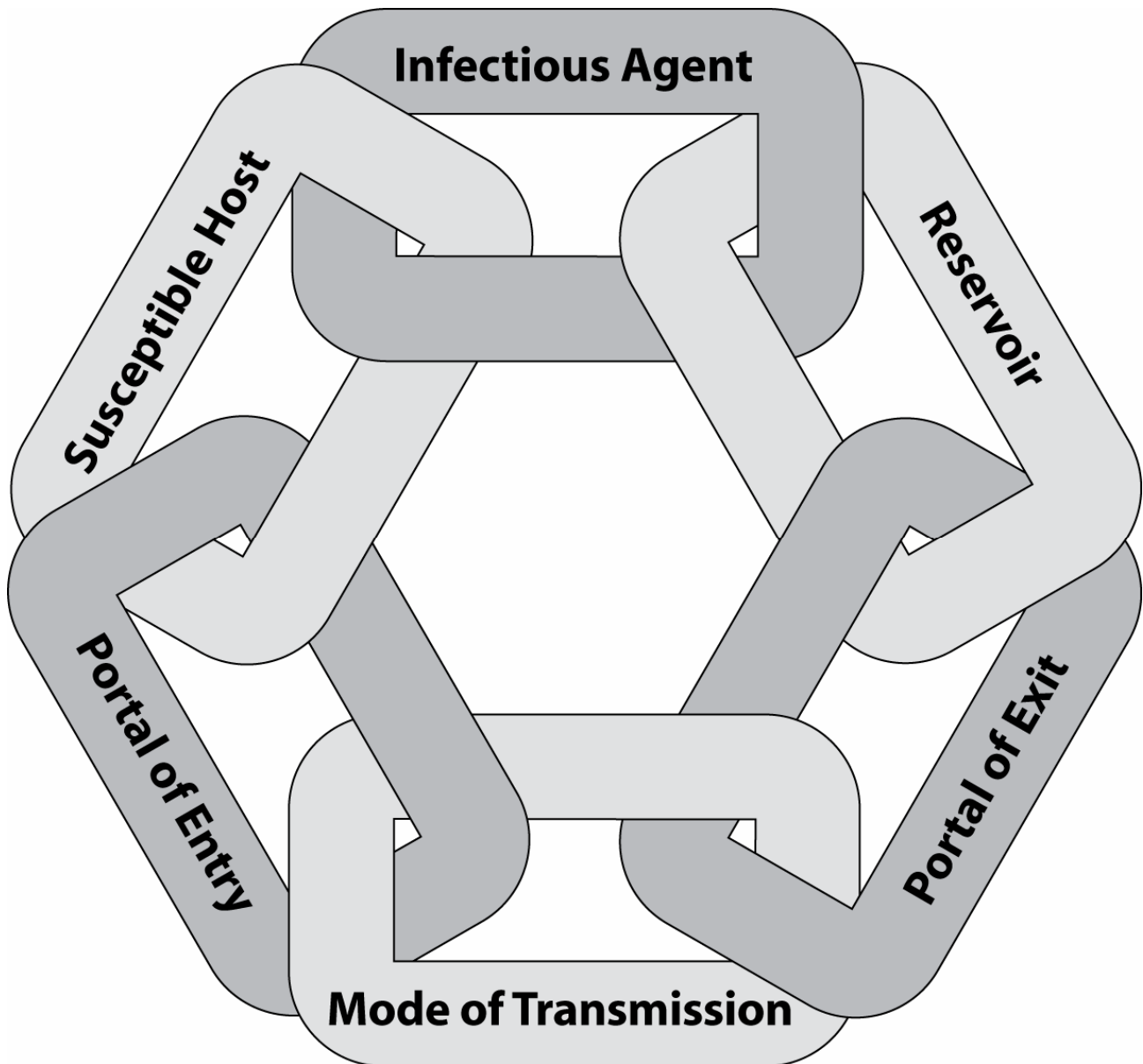
- modes of disease transmission;
- signs and symptoms of communicable diseases;
- exposure risk factors;
- Routine Practices and Additional Precautions.

Further information on the above points will be presented throughout this manual.

¹ Association for Professionals in Infection Control and Epidemiology, APIC Text (2002)

The Chain of Transmission

The chain of transmission is a model that describes the components necessary for transmission of organisms. There are six links in the chain of transmission:



The Links of the Chain of Transmission

Agent

These are microorganisms capable colonizing individuals or causing disease. Agents include viruses, bacteria, fungi and moulds and parasites.

Reservoir

A reservoir is defined as the place where an infectious agent lives and reproduces in such a manner that it can be transmitted. A reservoir could be a person, animal, insect, plant soil or water (or a combination of any of these).

Portal of Exit

A portal of exit is the path by which an infectious agent leaves the reservoir. Portals of exit include:

- blood;
- respiratory tract;
- gastrointestinal tract;
- genitourinary tract;
- skin and mucous membranes;
- transplacental.

Mode of Transmission

Mode of transmission is the mechanism by which an infectious agent is transferred from its reservoir to a susceptible host. Modes of transmission include:

- contact transmission (includes direct, indirect and droplet);
- airborne;
- common vehicle;
- vector.

Modes of transmission will be described in greater detail further on in this manual.

Portal of Entry

A portal of entry is the path by which an infectious agent enters a susceptible host. Portals of entry are the same as portals of exit (see above).

Susceptible Host

A susceptible host is a person who is lacking an effective resistance to a particular agent. Patients requiring prehospital care often have chronic health problems that lead to a depressed immune system, making them susceptible hosts. Other susceptible hosts include the very young and the elderly, non-immunized persons, cancer patients, diabetics, persons on certain medications and those with underlying medical conditions which may affect their immune system.

Breaking the Chain of Transmission

The chain of transmission is broken when there is an interruption at one or more of the links. The goal of an infection prevention and control program is to break the Chain of Transmission thus preventing the spread of the agents which may cause diseases. This may be accomplished through the use of Routine Practices and Additional Precautions which are discussed in greater detail in **Section Two** of this manual.

Examples of Breaking Links to the Chain of Transmission

Agent

There are many agents and it is not reasonable to expect to eliminate them all. Routine cleaning procedures however, will reduce the number of agents in the work environment thus reducing the risk of transmitting them to others.

Reservoir

A paramedic exhibiting signs and symptoms of a communicable disease and excluding themselves from work is an example of breaking the chain at this link.

Portal of Exit

Covering portals of exit with personal protective equipment (PPE) and making sure that draining wounds and non-intact skin of the patient are covered are examples of breaking the Chain of Transmission at this link.

Mode of Transmission

This is the most likely place to interrupt the Chain of Transmission. The use of Routine Practices including hand hygiene, routine cleaning and the use of personal protective equipment are highly effective in preventing transmission of microorganisms.

Portal of Entry

Personal protective equipment can be used to cover the portals of entry (mucous membranes, respiratory tract). Ensure that any non-intact skin is covered appropriately.

Susceptible Host

Paramedics must be aware there are many patients treated in prehospital care who have depressed immune systems, making them susceptible hosts. Steps must be taken to protect the susceptible host. Diligent use of Routine Practices may prevent transmission of agents to these patients.

Paramedics can reduce the risk of becoming a susceptible host by taking a number of measures to protect themselves. These measures include immunization, adequate nutrition, preservation of normal skin flora and intact skin, regular exercise, adequate rest and a reduction of stress levels.

Modes of Disease Transmission

The Chain of Transmission includes Modes of Transmission as one of the links. The mode of transmission is the mechanism by which an agent is spread from the reservoir to the portal of entry of the susceptible host. Interruption of the Chain of Transmission at this link is the most effective method to prevent the transmission of microorganisms.

The modes of transmission for infectious agents are through four primary methods: contact, airborne, common vehicle and vectorborne transmission.

Contact Transmission

Types of contact transmission include direct contact, indirect contact and droplet transmission.

- **Direct transmission** occurs when there is direct contact between an infected or colonized individual and a susceptible host. Transmission may occur, depending upon the type of infectious agent, through biting, kissing, touching or sexual contact.
- **Indirect transmission** occurs when there is passive transfer of an infectious agent to a susceptible host through a contaminated intermediate object. This may result if contaminated hands are not washed between patient contacts and as a result, patient care equipment or other objects become contaminated. When contaminated equipment or other objects in the environment come into contact with a susceptible host, transmission may occur.

Examples of disease transmitted by direct and indirect contact transmission include human immunodeficiency virus (HIV), hepatitis, methicillin resistant staphococcus aureus (MRSA), vancomycin-resistant enterococcus (VRE), *C.difficile* and Norwalk virus.

- **Droplet transmission** is a form of contact transmission requiring special consideration. Droplet transmission refers to large droplets ($\geq 5 \mu\text{m}$), generated from the respiratory tract of a patient when he/she coughs or sneezes or during procedures such as intubation or suctioning. These droplets are propelled up to one metre and may be deposited on the mucous membranes (direct contact) of the susceptible host. Agents expelled as droplets may settle in the immediate environment. Some of these agents can survive on surfaces for long periods of time and can be transferred indirectly (indirect contact) to a susceptible host.

Examples of diseases transmitted by droplet transmission include influenza, meningitis, severe acute respiratory syndrome (SARS), rhinovirus and respiratory syncytial virus (RSV).

Contact transmission is the most common mode of transmission in health care. It can be effectively prevented with the use of Routine Practices discussed in **Section Two** of this manual.

Airborne Transmission

Airborne transmission refers to the spread of infectious agents to susceptible hosts through the airborne route. Infectious agents are contained in droplet nuclei ($\leq 5 \mu\text{m}$) which can remain suspended in the air for long periods of time. These agents can be dispersed widely by air current and may be inhaled by a susceptible host some distance from the reservoir.

Examples of disease transmitted by airborne transmission include varicella (chicken pox), measles (rubeola) and tuberculosis.

Common Vehicle Transmission

Common vehicle transmission refers to the spread of agents by a single contaminated source to multiple hosts. This can result in explosive outbreaks. Examples of this type of transmission include contaminated food (*Salmonella*), contaminated water sources (*E. coli*), contaminated medication and contaminated IV fluids or equipment.

Vectorborne Transmission

Vectorborne transmission refers to the spread of agents by means of an infected insect or animal (vector). Examples include the transmission of West Nile virus by mosquitoes and transmission of rabies by an infected animal. Vectorborne transmission does not occur between paramedics and their patients.

Immunization

Immunization is an important element in the prevention and control of infectious diseases. Vaccination stimulates the production of antibodies against specific diseases without the person ever experiencing the actual disease itself. When the person is exposed to the agent for that particular disease, the antibodies cause the body's own immune system to attack the agent and neutralize it, preventing the person from acquiring the disease (immunity). Vaccines are a safe and reliable way of protecting a person from many communicable diseases.

Paramedics who are immunized against specific communicable diseases are much less likely to contract and become ill with the disease. This in turn prevents the transmission of the disease from a paramedic to their patients, who may not have been immunized against the disease or whose immune systems are incapable of adequately protecting them from the disease.

Regulation 257/00 Part III 6.(1) made under the Ambulance Act states:

“An emergency medical attendant and paramedic employed, or engaged as a volunteer, in a land ambulance service shall,

- (h) hold a valid certificate signed by a physician that states that the person is immunized against diseases listed in Table 1 to the document entitled “Ambulance Service Communicable Disease Standards”, published by the Ministry, as that document may be amended from time to time, or that such immunization is contraindicated”;

The Ambulance Service Communicable Disease Standards are available online at www.ambulance-transition.com .

It is highly recommended that paramedics receive annual vaccination against influenza. Health Canada states in a document titled *Statement on Influenza Vaccination for the 2006-2007 Season*; “NACI (National Advisory Committee on Immunization) considers the provision of influenza vaccination for HCWs (Health Care Workers) involved in direct patient care to be an essential component of the standard of care for influenza protection for the protection of their patients. HCWs who have direct patient contact should consider it their responsibility to provide the highest standard of care, which includes undergoing annual influenza vaccination”. For more information on ways to limit the spread of influenza, paramedics should review the most current version of Training Bulletin Issue Number 101 - Influenza Educational Review, available online at www.ambulance-transition.com .

Other vaccines for diseases such as pneumococcal and meningitis are available. These vaccines are not included on the required or recommended lists for health care workers, however paramedics may wish to discuss the risks and benefits of these vaccines with their family physicians.

Patient Assessment

The risk of communicable disease is often not perceived as an environmental hazard in the same way weapons, hydro wires and leaking fuel but it should be considered as a risk nevertheless. For this reason, paramedics need to exercise caution when proceeding to a patient's side before the risk of communicable disease can be determined. The initial patient assessment is a valuable tool which allows a paramedic an opportunity to identify symptoms of communicable disease and use Routine Practices when necessary to break the chain of infection. This practice can prevent the paramedic from becoming infected with and, in turn, potentially transmitting a communicable disease to others.

Assessment for the risk of communicable disease should begin with the information received from the ambulance communications centre. Close attention should be paid to certain information such as the patient with symptoms of fever, chills, cough, shortness of breath, or diarrhea. In some instances paramedics will be able to obtain information from a nurse or family member on scene which will give valuable information regarding the status of the patient. Even when performing a routine transfer, paramedics should confirm with staff a patient's symptoms of any infectious process before contact is made.

When patient contact is made, remain one (1) metre from the patient until you have ruled out the risk of communicable disease. A visual scan of the patient and a rapid patient history followed by a proper physical examination will determine if the patient has the signs and symptoms of a communicable disease. If you cannot rule out the risk of communicable disease or the patient's condition requires immediate attention, don appropriate PPE before the one meter gap to the patient is closed.

The following questions will help assess if the patient may have a communicable disease.

- Do you have new/worse cough or shortness of breath?
- Are you feeling feverish?
- Have you had the shakes or chills in the last 24 hours?
- Have you had an abnormal temperature (>38 degrees)?
- Have you taken medication for fever?

Appropriate precautions should be taken when a patient presents with any signs and symptoms or history listed on the following page. Appropriate levels of PPE will be discussed further in **Section Two** of this manual.

Respiratory Illness

Signs and symptoms of respiratory illness may include:

- Fever
- New/worsening cough
- New/worsening shortness of breath
- Headache
- Muscle aches
- Expectoring blood
- Weight loss
- Exposure history

Rash

A rash may be an indication of an illness such as scabies, meningitis or chicken pox.

Acute Diarrhea

Not all cases of diarrhea are infectious, but there are many communicable diseases capable of causing diarrhea such as *C. difficile* and the Norovirus virus. The diseases which cause diarrhea are spread by contact transmission.

Draining Wounds

Draining wounds can be the result of bacterial infections such as Group A streptococcus or viral infections such as varicella (Chicken Pox).



Section Two

Practices and Procedures

2

Routine Practices and Additional Precautions

Routine Practices and Additional Precautions are a system of health care practices introduced by Health Canada in 1999. Routine Practices and Additional Precautions merge aspects of universal precautions and body substance isolation into a new, comprehensive standard of practice. It is a system which relies on the recognition of signs and symptoms and the modes of transmission of communicable disease rather than diagnosis. Paramedics should utilize Routine Practices to assess any signs and symptoms of potential communicable disease and implement the appropriate barriers. Early recognition and appropriate actions will almost certainly reduce incidences of acquiring and transmitting organisms.

Routine practices assume all patients are potential reservoirs of organisms that may present a risk to health care providers and other patients. Routine Practices should be used for every patient contact.

The components of Routine Practices include:

- patient assessment;
- hand hygiene;
- personal protective equipment;
- sharps safety;
- patient accommodation and transport considerations;
- routine cleaning of equipment;
- environmental control - routine vehicle cleaning and disinfection.

By following the procedures of Routine Practices, paramedics can ensure all equipment and surfaces contacted during patient care are clean and disinfected for each and every patient. By doing so, the same standard of care will be maintained for each patient while reducing the spread of organisms. Routine Practices will also assist in the prevention of transmission of infectious agents to the paramedics themselves.

Additional Precautions are further methods of infection prevention and control based on the mode of transmission of the known or suspected agents. A thorough patient history can lead to the conclusion a patient may have an infectious disease. This conclusion will result in the decision to use Additional Precautions while treating and transporting the patient. For example, the febrile patient with a cough, night sweats and weight loss who is suspected of having tuberculosis would require the use of specific Airborne Precautions.

In the hospital environment there are a number of specific procedures required for additional precautions. These may include the use of negative pressure rooms, dedicated patient care equipment, separate washroom facilities and limitations on patient movement. Due to the unique nature of the prehospital care environment, some procedures applied in institutions are not practical or may need to be modified.

Routine Practices

Hand Hygiene

Hand hygiene is the most important element in breaking the Chain of Transmission.

Contaminated hands are frequently implicated as a means of transmission of health care related outbreaks in healthcare settings. The Health Canada Infection Control Guideline, *Hand Washing, Disinfection and Sterilization* states; “hand washing is the single most important procedure for preventing infection”.

There are two groups of flora on the skin of all people - resident flora and transient flora. Resident flora is the bacteria commonly found on the skin. Resident flora alters the pH of the skin and takes up space on the skin. This results in resident flora creating an inhospitable environment for transient flora. Resident flora of health care workers is rarely implicated in nosocomial infections. Transient flora represents recent contaminants found on the skin acquired from colonized or infected patients or from contaminated objects in the environment. Transient flora on the hands of health care workers is frequently implicated as the source of infections.

Routine hand hygiene significantly reduces the number of transient flora on the hand and, in turn, reduces the occurrence of nosocomial infections.

Proper hand hygiene includes the use of alcohol-based hand rubs, hand washing and skin care. Paramedics should perform hand hygiene frequently. Moisturizers will help prevent skin from becoming excessively dry and cracked. Care must be taken to ensure non-intact skin, especially on the hands, as a result of cuts, scrapes, or dermatitis is adequately covered while performing patient care. Healthy intact skin is an effective barrier to infection.

Routine hand hygiene can prevent potential infections from spreading. Hand hygiene can also prevent the contamination of patient care equipment and the environment. The application of an alcohol-based hand rub or soap and water, combined with the creation of friction while rubbing the hands is the best way paramedics can protect the patient, themselves, their families, and their colleagues from communicable diseases.

Best practices for performing hand hygiene include:

- at the beginning and end of shift;
- before and after patient contact;
- during and after PPE removal;
- before invasive procedures;
- after cleaning/disinfecting equipment and the vehicle;
- before leaving the emergency department;
- before and after handling food;
- before and after smoking;
- after using the bathroom, or other personal body functions (sneezing, coughing);
- any time hands are visibly soiled.

When hands are visibly soiled, paramedics should ideally wash them with soap and water. If hand washing facilities are not available, visible soiling should be removed using a moistened towel/towelette followed by the use of an alcohol-based hand rub.

Types of Hand Hygiene

Alcohol-Based Hand Rub

Use of an alcohol-based hand rub is the most effective type of hand hygiene. To be effective, alcohol-based hand rubs should contain 60-90% alcohol (isopropanol or ethanol). Alcohol-based hand rubs work by denaturing proteins and killing microorganisms present on the skin. Recommendations on hand hygiene by Health Canada and the Centre for Disease Control advise that alcohol-based hand rubs are extremely effective in preventing the transfer of health-care associated infectious agents. Alcohol-based hand rubs reduce bacterial counts on hands more than washing hands with soaps or detergents containing other anti-microbial substances. Alcohol-based hand rubs should not be used when hands are visibly soiled. These rubs are not effective when cleaning soiled hands. Visible soiling should be removed using a moistened towel/towelette prior to using the rub. Recommended procedures for using an alcohol-based hand rub are shown on page 19.

Soap and Water

Washing with soap and water is an effective method to remove microorganisms from the hands. Soap suspends easily removable organisms from the skin and allows them to be rinsed off. Recommended procedures for hand washing with soap and water are shown beginning on page 16.

Paramedics should consider the following points regarding hand hygiene:

- Remove all hand and wrist jewelry. Hand and wrist jewelry should not be worn when providing care to patients. Organisms may accumulate under rings, watches, etc.
- Do not wear artificial nails or nail enhancements. Organisms can accumulate under the artificial nails or enhancements.
- Use warm water. Too cold or too hot will compromise the integrity of the skin.
- Use adequate amounts of hand rub or soap.
- Rub hands vigorously to create friction.
- When using soap, wash for at least 15 seconds ensuring all parts of the hands and wrists are covered. Rinse well with water.
- Refrain from habits such as nail biting.
- Avoid hand contact with mucous membranes and conjunctiva.

Proper Hand Washing Techniques

1.



2.



Ensure jewelry is removed and disinfected.

3.



4.



5.



6.



Proper Hand Washing Techniques (continued)

7.



8.



9.



10.



11.



12.



Proper Hand Washing Techniques (continued)

13.



14.



15.



16.



Disinfecting with Alcohol-based Hand Rubs

1.



2.



Ensure jewelry is removed and disinfected.

3.



4.



5.



6.



Disinfecting with Alcohol-based Hand Rubs (continued)

7.



8.



9.



10.



11.



12.



Personal Protective Equipment (PPE)

As required by the *Provincial Equipment Standards for Ontario Ambulance Services, version 1.1*, the following personal protective equipment must be carried on an ambulance.

- masks (sub-micron particulate respirator masks and surgical masks);
- gloves;
- eye protection (protective glasses, goggles, face shields);
- gowns/disposable coveralls.

PPE should never be worn in the driver's compartment of a vehicle as this practice may cause surfaces and equipment contained in the driver's compartment to become contaminated.

Masks

In the general health care setting, fluid resistant surgical masks are considered adequate to prevent transmission of respiratory infections spread predominantly by large droplets. This type of mask may be used in cases where airborne respiratory infection is not suspected. However, in the prehospital setting it is often difficult for paramedics to determine whether a patient who has respiratory signs and symptoms has an airborne or respiratory droplet disease and decide between airborne or droplet precautions. As paramedics frequently carry out procedures with the potential for aerosolization and the prehospital setting is an uncontrolled environment where other particulate hazards or materials may be present, a sub-micron respiratory mask may be indicated for use.

Sub-micron Particulate Respirator Mask

In cases of airborne respiratory infection, such as tuberculosis or measles, standard surgical masks do not afford paramedics the necessary level of protection provided by a sub-micron particulate mask because they filter less than 50% of airborne particles that are 1-5 microns in size. Standard surgical masks also do not provide an adequate facial seal necessary to prevent infection.

Sub-micron particulate filtration masks used by paramedics must comply with the Particulate Respirator Mask minimum requirements as listed in the *Provincial Equipment Standards for Ontario Ambulance Services, version 1.1*. This will ensure that the mask is designed to filter a minimum of 95% of airborne particles in a size range of 0.1 to >10 microns and provide a better facial seal.

Sub-micron particulate respirator masks must be qualitatively fit tested to ensure maximum mask effectiveness. Once testing is complete, paramedics should be aware of the size of the mask required for adequate protection from airborne particles. Fit testing should be conducted:

- Annually;
- Anytime a paramedic experiences a significant weight gain or loss;
- If reconstructive or cosmetic surgery of the facial area has been performed;
- If major dental work that may alter the facial shape has been performed;
- If significant scarring of the facial seal area has occurred.

It is essential that a "seal check" is done each time a sub-micron particulate respirator is put on.

Sub-micron Particulate Respirator Mask (continued)

Sub-micron particulate respirator masks should be donned using the following procedure:

- Cup the respirator in the hand with fingers at the nosepiece and the straps hanging freely below the hand.
- Position the respirator under the chin with the nosepiece up.
- Hold the respirator in place on the face and pull the top strap over the head so it rests high on the back of the head.
- Continue to hold the respirator in place and pull the bottom strap over the head positioning it around the neck.
- Untwist the straps and position the respirator so it fits low on the nose.
- Using both hands, mould the nosepiece to the shape of the bridge of the nose by pushing inwards down both sides of the nosepiece. Always use both hands as using one hand may result in an improper fit.

Place both hands over the respirator and exhale sharply. If air leaks out, then readjust the nosepiece and/or the straps. Exhale sharply again, if air leaks, re-adjust until there is no leak. Breathe in deeply. The respirator should pull gently towards the face. If it does not, re-adjust the straps and nose piece. If re-adjustment does not eliminate the leak, discard the respirator and choose another mask.

All masks should be:

- used and changed according to manufacturer's recommendations;
- removed carefully, using the straps so as not to self-contaminate;
- discarded in an appropriate receptacle immediately following removal. Used masks should not be worn around the neck or on top of the head as this practice may cause self-contamination;
- discarded if crushed, wet or contaminated by blood or patient secretions.

Indications for Use

Paramedics should don an appropriate type of mask under the following circumstances:

- when caring for a patient with new onset cough or respiratory symptoms;
- when treating and transporting a person with a known/suspected communicable disease transmitted by droplet or airborne routes;
- when blood or body fluid splash is likely or expected;
- when performing procedures such as intubation or suctioning that could result in aerosolization;
- when cleaning the vehicle and equipment following transport of patient with a known or suspected communicable disease transmitted by airborne or respiratory droplet route.

Gloves

Paramedics should don a clean pair of gloves at the point of patient contact for every patient. Paramedics should ensure that a sufficient quantity of appropriately fitting gloves is available at all times. Proper fitting gloves make it easier for paramedics to perform patient care tasks and increase the effectiveness of the gloves. Gloves that are either too big or too small for the wearer are more prone to accidental tearing. **Gloves are to be used as an additional measure, not as a substitute for proper hand hygiene.** In addition:

- gloves must cover the sleeve cuffs when a gown is worn;
- gloves should be changed between patient care activities and procedures with the same patient after contact with materials that may contain high concentrations of microorganisms such as after open suctioning of an endotracheal tube;
- used gloves should be placed in an appropriate receptacle immediately after being removed to prevent the possible transmission of a communicable disease to others or self-contamination;
- hand hygiene must be performed immediately after removing gloves, before touching one's nose, mouth or eyes, or touching another person;
- gloves should never be worn in the cab of an ambulance to prevent contamination of surfaces and equipment.

Indications for Use:

Paramedics should don gloves under the following circumstances:

- when there is the possibility of blood/body fluid contact;
- when contacting mucous membranes or non-intact skin;
- when there is non-intact skin on the hands;
- when performing procedures requiring aseptic technique such as: IV insertion, or intubation;
- when treating/transporting a patient with a known/suspected communicable disease transmitted by contact routes;
- when performing invasive procedures such as I.V. or airway management;
- when cleaning the vehicle and equipment following patient transport.

Hand hygiene should never be performed with gloves on because soap and alcohol-based sanitizers break down the integrity of the gloves, reducing their effectiveness. Do not write or transcribe notes on gloves because this practice may also break down the integrity of the gloves. As well, used gloves containing notes brought to the documentation room in order to complete paperwork can result in transferring infectious agents to the area where paperwork is completed.

Eye Protection

Eye protection is an important component of PPE should be part of Routine Practices. Eye protection should be utilized to prevent the exposure of the conjunctiva of the eyes to microorganisms. Paramedics should consider the following points with respect to eye protection:

- prescription eyeglasses do not provide adequate protection against splashes and sprays. Paramedics should utilize appropriate eye protection specifically designed to be worn over prescription eyeglasses.
- appropriate eye protection that does not impair vision and thereby interfere with patient care should be chosen.
- to prevent self-contamination, paramedics should not touch their eyes or face during care of a patient.
- eye protection should be removed carefully to prevent self-contamination.
- following the removal of eye protection, appropriate hand hygiene should be performed.

Indications for Use

- when a patient is coughing;
- when a patient is febrile without a known source;
- when treating and transporting a person with a known/suspected communicable disease transmitted by respiratory droplet or airborne routes;
- when a blood or body fluid splash is likely or expected;
- when performing procedures such as intubation or suctioning that could result in splashing or aerosolization;
- when cleaning gross amounts of blood/body fluid.

Protective face shields may also be provided on the ambulance. A face shield provides additional protection to the mucous membranes and conjunctiva. Face shields can be worn for additional protection when performing airway management procedures such as intubation, suctioning, airway insertion, surgical airway and positive pressure ventilation and/or when there is the danger of exposure to blood/body fluid splash.

Discard the disposable face shields following use. Reusable protective eyewear must be cleaned and disinfected following use. More information on cleaning and disinfecting equipment will be presented further in this manual.

Gowns/Disposable Coveralls

Long-sleeved gowns and/or disposable coveralls are provided on ambulances for use during patient care. These types of garments are used to prevent the forearms and uniforms of paramedics from becoming contaminated with blood/body fluids.

Indication for Use

- When a blood or body fluid splash is likely or expected (e.g. delivering a baby, uncontrolled hemorrhage).

Paramedics should consider the following points with respect to gowns/disposable coveralls:

- gowns should completely cover the user, front and back;
- gowns/disposable coveralls must be removed and discarded immediately following patient care responsibilities;
- gowns/disposable coveralls should not be worn in the driver's compartment of the ambulance.

Donning and Removal of Personal Protective Equipment (PPE)

Proper donning of PPE is essential to avoid the possibility of acquiring and/or transmitting communicable diseases. Proper removal of PPE is essential to prevent self-inoculation from potentially contaminated PPE items as they are being removed.

Donning PPE

1. If it is determined that gowns/disposable coveralls are required, they should be donned first. Gowns should be put on with the opening at the back. The waistband and the neckband of the gown should be tied securely. If coveralls are used, they are put on and the zipper is pulled up.
2. Don an appropriate type of mask.
3. Don appropriate eye protection (protective eyewear, goggles).
4. Finally, put on a new pair of gloves. If wearing a gown/disposable coveralls, ensure that the sleeves of the gown/disposable coveralls are tucked into the cuffs of the gloves wherever possible.

Sequence for Donning Personal Protective Equipment

1. Gown/Coveralls
2. Mask
3. Eye Protection
4. Gloves

Removing PPE

1. If wearing a gown/disposable coveralls, unfasten or break the neck/waistband ties of the gown or unzip the coveralls while still wearing gloves.
2. **Remove gloves utilizing the following procedure:**
 - Using the left hand, pinch the right glove near the top, avoid allowing the glove's outer surface to contact the skin.
 - Pull downward on the cuff of the right hand glove allowing the glove to turn inside out as it comes off. Keep the right hand glove in the palm of the left hand.
 - Insert two fingers of the un-gloved hand under the edge of the left glove. Avoid touching the glove's outer surface.
 - Pull downward so the glove turns inside out as it comes off and continue pulling so the right glove is enclosed in the left glove.
 - Discard the gloves in an appropriate receptacle.

Removing PPE (continued)

3. Remove Gown/disposable coveralls:

- Grasp the outside of the gown with one hand on each shoulder and pull the gown down over the arms, turning it inside out as it comes off. If wearing disposable coveralls, pull them off the shoulders and over the arms, turning it inside out as it comes off. Step out of the legs, again allowing them to come off inside out.
- Holding the gown/disposable coveralls away from the body, completely roll it inside out. Handle as little as possible and discard into an appropriate disposal receptacle.
- Perform hand hygiene using proper techniques. Hand hygiene is performed at this point to prevent self-inoculation of the mucous membranes, conjunctiva, hair and uniforms while removing protective eyewear/goggles and masks with potentially contaminated hands.

4. Remove face protection (if worn) and eye protection:

- If a face shield was worn, remove the face shield by holding the bottom of the shield with one hand and with the other hand pull the strap over the head. Pull the shield away from the face and discard in an appropriate disposal receptacle.
- Remove protective eyewear using two hands. Each hand is placed on the corner of the eyewear and pulled away from the face. Goggles are removed by placing one hand on the front of the goggles using the other hand to pull the strap over the head. Protective eyewear is reusable unless specifically directed otherwise and needs to be cleaned while cleaning the other equipment.

5. Remove mask:

- Grasp the straps of the mask.
- Pull the top and bottom strap over the head.
- While holding the straps, remove the mask away from the face and discard in an appropriate disposal receptacle.
- Perform hand hygiene using proper hand hygiene techniques.

Note: Hand hygiene indicated in the above PPE removal procedure is a minimum. If paramedics believe that their hands have become contaminated during any stage of PPE removal, they should perform hand hygiene before proceeding further.

Sequence for Removing Personal Protective Equipment

1. Gloves
2. Gown/Coveralls
3. Perform Hand Hygiene
4. Eye Protection
5. Mask
6. Perform Hand Hygiene

Sharps Safety

The Association of Professionals in Infection Control (APIC) and the National Institute of Safety and Health (NIOSH) document, *Preventing Needle-stick Injuries in Health Care Settings* states the most frequent cause of blood-borne infection in healthcare settings is a needle-stick injury. There are an estimated 600,000 to 800,000 needle-stick injuries to health care workers each year in United States hospitals alone. The exact number is not known because many of these injuries go unreported. The consequences of a sharps injury include the possibility of infection and psychological trauma suffered due to months of waiting for the results of blood tests.

Any healthcare worker handling sharp devices is at risk of occupational exposure to blood-borne infectious agents. The risk of transmission of infection is extremely low, however, it is imperative to have a sharps safety system for handling all sharps (e.g. IV catheters, scalpels, needles, auto-injectors) in order to prevent sharps injuries.

Safe handling of sharps includes:

- communication with other personnel (e.g. “sharps out”, “sharps clear”);
- immediate disposal of sharps in an appropriate sharps container;
- never leaving sharps to be disposed by other personnel;
- never carrying uncapped sharps in pockets;
- never passing exposed sharps from person to person;
- remaining clear of the person utilizing the sharp;
- not re-capping needles;
- never purposely bending or breaking a needle;
- using needle-less systems, safety IV catheters and needles where possible;
- disposal of sharps containers in an appropriate biohazard container when the full line is reached.

All needle-stick injuries need to be reported to an immediate supervisor and Designated Officer and be assessed at the emergency department to determine the risk of infection and the need for post exposure prophylaxis.

Patient Accommodation and Transport Considerations

Hospitals use private rooms and negative pressure rooms while treating a patient with a communicable disease. Due to space and equipment limitations, paramedics cannot isolate patients with suspected communicable diseases in the same manner as a hospital. As a result, the back of the ambulance becomes the ‘isolation area’ when transporting a patient with a communicable disease.

The following procedures are recommended when treating and transporting a patient in an ambulance with a suspected communicable disease transmitted via the airborne route:

- Turn on the exhaust fan in the patient compartment to circulate air out of the back of the ambulance.
- Only essential emergency personnel should travel in the ambulance.
- Friends or family members should only ride in the ambulance when they are required for patient care needs (i.e. consent of a minor, patient history, interpreter).
- Ensure all people traveling in the ambulance, including emergency personnel, friends and family, are wearing appropriate PPE.
- Notify the hospital as soon as possible so appropriate accommodations can be made prior to the arrival of the patient.

Routine Equipment Cleaning and Disinfection

Cleaning and disinfection are two distinct and separate processes.

1. Cleaning

The process of removing all visible and invisible contamination from a surface using soap, detergent or enzymes. The physical action of cleaning is more important than the cleaning product used. Cleaning includes removal of blood, body fluids and other biological material from a surface. Cleaning must always be performed from the clean area to the dirty area.

2. Disinfection

A process which kills many microorganisms on a surface with the exception of bacterial spores. There are three levels of disinfection: low level disinfection, intermediate level disinfection and high level disinfection. When disinfecting, selecting the proper level of disinfection and the corresponding disinfectant product is essential.

The Health Canada Infection Control Guideline titled; *Infection Control Guidelines - Handwashing, Cleaning, Disinfection and Sterilization in Health Care*, states; “Cleaning is essential prior to disinfection or sterilization. An item that has not been cleaned cannot be assuredly disinfected or sterilized”. **Cleaning must always be done before disinfection.** Visible contamination and soiling can shield microorganisms from the action of disinfectants. Some disinfectants, such as glutaraldehyde, will fix organic material to equipment. This makes it very difficult to remove materials and renders disinfection useless.

Paramedics must always remember to follow the manufacturer’s recommendations when using cleaning and disinfecting products to ensure best results. Failure to follow the recommended procedures could result in the desired level of disinfection not being achieved.

The level of disinfection required for re-usable equipment is determined by the degree of contact it will have with a patient and where this contact is likely to occur. In 1968, E. H. Spaulding developed a classification system for medical devices so clear and logical it is still used today. Three groups of medical devices were identified.

1. Critical Items

These are items entering a patient’s sterile body cavity or the vascular system and carry a high risk of infection to the patient. This category includes surgical instruments, catheters, needles and implants. **Critical medical devices require sterilization** before use. Sterilization will remove all microorganisms from the item. There are no re-usable critical items used on ambulances that require sterilization. All sterile equipment used by paramedics is single-use and is sterilized by the manufacturer.

Routine Equipment Cleaning and Disinfection (continued)

2. Semi-Critical Items

These are items contacting a patient's mucous membranes or non-intact skin and carry a moderate risk of infection. This category includes items such as bag-valve-masks, Magill forceps and laryngoscope blades. **Semi-critical items require high level disinfection** before re-use. High level disinfection is a process which destroys all microorganisms with the exception of bacterial spores.

3. Non-Critical Items

These are devices/surfaces, which come into contact with a patient's intact skin but not with mucous membranes and carry a low risk of infection. This category includes such things as B/P cuffs, stethoscopes, laryngoscope handles, cardiac monitors, stretchers and compartment surfaces. **Non-critical items require low level disinfection.** Low level disinfection is a process which kills most bacteria, some viruses and fungi (although not bacterial spores).

Further information on equipment and surface disinfection including recommended products and procedures is available in the Health Canada Infection Control Guideline titled; "*Infection Control Guidelines – Hand Washing, Cleaning, Disinfection and Sterilization in Health Care*". This document is available for download from the Health Canada website at www.hc-sc.gc.ca.

Environmental Control - Routine Vehicle Cleaning and Disinfection

An important aspect of Routine Practices is the cleaning and disinfection of ambulances and equipment following all patient transports. As well, it is recommended that regular “deep” cleaning of vehicles be completed. Paramedics should follow local ambulance service policies with respect to the intervals at which “deep” cleaning of vehicles should be completed and cleaning and disinfection procedures. When cleaning and disinfecting, emphasis is placed on the patient care area of the ambulance and the areas a patient and paramedic contacts.

As a minimum, paramedics should wear gloves (utility gloves where provided) when performing general cleaning/disinfection procedures. Gloves, appropriate masks and eye protection should be used when cleaning the ambulance following a call resulting in the management and/or transport of a patient with suspected disease transmitted by airborne or respiratory droplets. Gloves, masks, eye protection and gowns/coveralls should also be worn when cleaning if there is any possibility of a splash with blood or body fluids. **Hand hygiene must be performed following all cleaning and disinfection procedures.**

Waste Disposal

Bio-hazardous waste, (dressings, bandages, contaminated sheets that are saturated with blood, etc.) are to be placed in an appropriate receptacle, clearly marked as **“BIO-HAZARDOUS MATERIAL”**.

Never attempt to force additional waste into a receptacle by trying to compact the material. This could result in damage to the container. This practice could also result in injury or self-inoculation from contaminated objects. Bio-hazardous materials must be disposed of according to Ministry of Environment regulations and local ambulance service policy. **Bio-hazardous waste must never be left at a scene.**

Sharps should be disposed of immediately in an appropriate sharps container as described in the previous section on Sharps Safety. However, paramedics need to be aware of the potential for sharps to be inadvertently left in the vehicle and/or be mixed in with “waste” left after a call. Extreme caution should be exercised whenever equipment/vehicle cleaning is being completed to prevent potential injuries. If sharps are found during cleaning, they must be disposed of immediately in an appropriate manner.

Additional Precautions

Additional Precautions used in conjunction with Routine Practices are necessary for certain clinical presentations to reduce the likelihood of disease transmission. Additional precautions are based on the mode of transmission and are necessary for infections spread by contact, droplet and airborne routes.

Additional Precautions for the prehospital environment include:

Contact Precautions

Contact precautions are used when treating and transporting a patient who has a communicable disease transmitted by contact transmission such as methicillin resistant staphylococcus (MRSA). In the prehospital setting, paramedics usually care for a patient before a definitive diagnosis has been made.

Paramedics must be cautious about rushing to the patient's side to provide care. Time should be taken to assess for symptoms of a communicable disease. Use family members and bystanders to determine any signs and symptoms which can lead to the conclusion there may be a communicable disease. Perform a visual scan of the patient to recognize if there is any blood, body fluids or non-intact skin.

In addition to Routine Practices use the following Contact Precautions:

- Gloves should be worn for all patient care activities and removed immediately when patient contact is complete.
- Gowns should be worn when there will be contact of forearms or uniform with the patient and when contact with blood/body fluids is possible. Remove and discard immediately when patient contact is complete.
- Masks and eye protection should be worn whenever splash with blood/body fluids is possible.
- Single patient transport only.

Airborne and Droplet Precautions

In the prehospital care environment, the same precautions used for airborne precautions may be used for droplet precautions. While it is appropriate in the hospital setting (where diagnostic tests are available) to differentiate between airborne or droplet transmission, EMS personnel are not expected to decide if a patient has disease spread by airborne or respiratory droplet transmission and decide between airborne or droplet precautions.

Airborne precautions are required when treating and transporting a patient who has a communicable disease transmitted by the airborne route. The decision to use airborne precautions must be made based on the presenting signs and symptoms and history of the patient. The first important step to taking respiratory precautions is the recognition of the signs and symptoms associated with communicable disease.

Airborne and Droplet Precautions (continued)

Paramedics should remain a minimum of one (1) metre from a patient while determining if the patient has a history of fever, respiratory symptoms. If a respiratory illness is suspected, paramedics must ensure they take appropriate precautions prior to moving to the patient's side. Call information can also provide information leading to the decision to use precautions upon arrival at the scene.

Airborne Precautions

In addition to routine practices use the following airborne precautions:

- Sub-micron particulate respirator worn at all times and removed when patient contact is complete.
- Eye protection should be worn at all times and removed when patient contact is complete.
- A surgical mask should be placed on the patient. If low concentration of oxygen is required place a nasal cannula under the surgical mask. If high concentration oxygen is required use a low flow, high concentration mask fitted with a sub-micron, hydrophobic filter.
- When possible following patient transport, keep the patient compartment exhaust system on for a minimum of five (5) minutes to allow for a complete air exchange in the patient compartment to remove infectious agents from the ambulance.
- Single patient transport only.

High Risk Procedures

In the course of their duties, paramedics may perform certain procedures that are considered “high risk”. These procedures are considered “high risk” when performed on patients with febrile respiratory illness as they are associated with a higher potential of exposure to microorganisms due to the generation of respiratory droplets and aerosolization of respiratory secretions.

High risk respiratory procedures include:

- intubation;
- suctioning;
- positive pressure ventilation;
- surgical airway;
- needle thoracostomy;
- nebulizing medication.

When performing any of these procedures, paramedics should follow Routine Practices and the Additional Precautions recommended for communicable diseases spread through airborne and droplet routes.

It is recommended that any patient requiring high concentration oxygen therapy who has a known or suspected febrile respiratory illness should receive the oxygen via a low flow, high concentration mask fitted with a sub-micron hydrophobic filter. Febrile patients who require low concentration oxygen therapy can receive oxygen via a nasal cannula fitted under a surgical mask. A sub-micron hydrophobic filter should be fitted between the bag-valve/ventilator and the mask or endotracheal tube in patients with suspected respiratory infections requiring positive pressure ventilation.

The MOHLTC document entitled; “Directives to All Prehospital Care Providers and Ambulance Communications Centres Regarding Management of Patients with Possible Communicable Diseases Including SARS – Outbreak Conditions” (Directive PHCO03-01- December 7, 2003) outlines the precautions to be taken when performing high risk respiratory procedures during a declared outbreak of a febrile respiratory illness. The precautions include the suspension of nebulized therapies and the use of enhanced PPE when performing other procedures. In the event of a declared outbreak, provincial directives may be amended as required.

In addition to high risk respiratory procedures, there are other situations which may have an increased risk to contact with blood and/or body fluids. These include: childbirth, hemorrhage control, major trauma and patients vomiting. Blood and body fluids are potential carriers of infectious agents and when there is the possibility of exposure to blood and body fluid paramedics should exercise caution and use appropriate contact precautions

Aseptic Technique

The Association for Professionals in Infection Control and Epidemiology (APIC) Textbook defines *Asepsis* as the absence of pathogenic microorganisms.

Aseptic Technique

Aseptic technique is the method used to prevent pathogenic organisms from being introduced into the process of providing care or performing a procedure. There are two categories of aseptic technique - sterile technique and clean technique.

Sterile Technique

This practice renders areas and objects maximally free of microorganisms. While performing procedures in the prehospital setting, it is generally impractical to achieve sterile technique. This is because a sterile field attainable in the controlled atmosphere of the operating room cannot be achieved in the imperfect environment in which prehospital care is performed.

Clean Technique

This practice reduces the number of microorganisms and/or prevents or reduces the transmission of microorganisms from one person or place to another. It is possible for paramedics to achieve the goals of clean technique with all procedures.

Clean technique can be achieved by:

- Performing proper hand hygiene to reduce the number of microorganisms on the hands of the paramedic.
- Proper patient skin preparation when performing invasive procedures (e.g. venipuncture) to reduce the number of microorganisms on the patient's skin.
- Routine cleaning of the environment and equipment to reduce microorganisms in the patient care environment.
- Wearing clean gloves when performing patient care procedures. Clean gloves should be donned just before the procedure is performed.
- Changing gloves between different procedures on the same patient.
- Wearing clean gowns/disposable coveralls to create a barrier between the paramedic and the patient.
- Avoiding contamination of sterile equipment such as IV catheters, surgical airways, obstetrical kits, burn dressings and chest needles. If contaminated before use, discard and use a new sterile piece of equipment.

Particular care must be taken when performing invasive procedures such as IV insertion, surgical airway and needle thoracostomy. These procedures involve introducing devices into the sterile cavities and vascular system of a patient, and as a result carry a higher risk of infection for the patient if equipment is contaminated.

Sterile Supplies

There are a variety of equipment and supplies used in prehospital care which are sterile. Manufacturers sterilize these products at their factory and guarantee the product sterile unless the packages are damaged or opened prior to use. **If sterile packaging is damaged or opened prior to use, the contents of the package must be discarded.**

Sterile products must be stored in a manner that maintains the integrity of the packaging. Proper storage includes:

- Keeping cupboards and bags closed when not in use.
- Protecting packaging from moisture.
- Preventing items from extremes of temperature.
- Protecting from dirt and other contaminants.
- Protecting from exhaust fumes.

Some sterile supplies have expiry dates. **Expired products must not be used and must be discarded.** When using these products, use the oldest products first in order to avoid the product expiring before use. Rotating older stock to the front of cabinets and bags during vehicle and equipment checks will assist in making sure that it is used first.

Section 3

Reference Information

3

Glossary

Antimicrobial Soap

A soap containing an antiseptic agent.

Antiseptic

A chemical germicide or product formulated for use on skin or tissue, which destroys or inhibits growth of microorganisms. It should not be used to decontaminate inanimate objects. Examples include isopropyl alcohol, chlorhexidine gluconate, and tincture of iodine.

Bacteria

Single cell organisms of varying morphology which are capable of causing disease.

Cleaning

The process of physically removing all visible and invisible contamination from a surface using soap, detergent or enzymes. This includes the removal of blood, body fluids and other biological material from a surface. Cleaning reduces or eliminates the reservoirs of potential pathogenic organisms and should always be performed from clean area to dirty.

Communicable Disease

An illness due to a specific infectious agent or its toxic products which arises through transmission of an infectious agent or its products from an infected person, animal or inanimate reservoir to a susceptible host. Transmission can be either direct or indirect through an intermediate plant or animal host, vector or the inanimate environment.

Contamination

The presence of an infectious agent on a body surface, in clothes, bedding, toys, surgical instruments or dressings, or other inanimate articles or substances including water and food.

Critical Items

Instruments and devices which enter sterile tissues, including the vascular system. Critical items present a high risk of infection if the item is contaminated with any microorganisms. Reprocessing critical items involves meticulous cleaning followed by sterilization.

Decontamination

The process of removing disease producing microorganisms from object, thus rendering the item safe for further handling.

Direct Transmission

Direct transmission of an infectious agent occurs with the infection of a susceptible individual. Transmission may occur through biting, kissing, skin to skin contact and sexual contact.

Disinfection

The process which kills many or all pathogenic microorganisms on a surface with the exception of bacterial spores. There are three levels of disinfection; low level disinfection, intermediate level disinfection and high level disinfection. Disinfectants are used on inanimate objects. Disinfection usually involves chemicals, heat or ultraviolet light. The nature of chemical disinfection varies with the type of product used.

Droplet Nuclei

These are the small residues resulting from evaporation of fluid from droplets emitted by an infected host. They may also be created purposely by a variety of atomizing devices, or accidentally as in microbiology laboratories, abattoirs, rendering plants or autopsy rooms. They usually remain suspended in the air for long periods of time.

Epidemic

Occurrence of infectious disease in excess of the expected incidence of disease within a geographical area in a specified time period.

Flora

The bacteria and other microorganisms normally inhabiting the body.

FRI

Febrile Respiratory Illness (FRI) describes an illness occurring in a person with a body temperature greater than 38 C and a new or worsening cough or shortness of breath.

High Level Disinfection

High level disinfection processes destroy vegetative bacteria, mycobacterium, fungi and enveloped (lipid) and non-enveloped (non-lipid) viruses, but not necessarily bacterial spores. Items must be thoroughly cleaned prior to high level disinfection. High level disinfection is used on semi-critical medical devices.

Immunization

Process of protecting susceptible individuals from communicable disease by administration of a living modified agent (e.g. yellow fever), a suspension of killed organism (e.g. whooping cough), or an inactivated toxin (e.g. tetanus). Temporary passive immunization can be produced by administration of antibodies in the form of immune globulin in some conditions.

Indirect Transmission

This involves the passive transfer of infectious agents to a susceptible host through a contaminated intermediate object. This can occur when contaminated hands are not washed between patients or through the use of contaminated equipment or objects coming into contact with the susceptible host.

Infection

An invasion and multiplication of microorganisms in or on body tissue causing cellular damage through the production of toxins, multiplication or competition with host metabolism.

Infectious Disease

A clinically manifested disease of humans or animals resulting from an infection. An infectious disease spread by contact (direct or indirect) with a reservoir is a communicable disease.

Intermediate Level Disinfection

Intermediate level disinfection processes kill vegetative bacteria, most viruses and most fungi but not bacterial spores. Intermediate level disinfection is used on some non-critical medical devices.

Low Level Disinfection

Low level disinfection processes kill most vegetative bacteria and some fungi as well as enveloped (lipid) viruses (e.g., hepatitis B, C, hantavirus, and HIV). Low level disinfectants do not kill mycobacterium or bacterial spores. Low level disinfection is used on most non-critical medical devices.

Non-Critical Items

Those items which come in contact with only intact skin but not mucous membranes or do not directly contact the patient. Reprocessing of non-critical items involves cleaning and low level disinfection.

Nosocomial

Originating or taking place in a hospital or hospital-like setting.

Outbreak

A term for epidemic used with the public.

Pandemic

An epidemic affecting several countries or continents.

Prion

Proteinaceous infectious particles; different from viruses because of an apparent lack of nucleic acid. Made up of glycoprotein. Prions collect in brain tissue and they are difficult to destroy.

Qualitative Fit Testing

A process of determining whether a respirator mask provides an acceptable fit to the wearer by relying on a subjective sensation (taste, irritation, smell) of the of the respirator wearer to a particular test agent.

Quantitative Fit Testing

A process of determining whether a respirator mask provides an acceptable fit to the wearer by using sophisticated measuring instruments to precisely measure face seal leakage.

Sanitation

A process which reduces microorganisms on an inanimate object to a level below an infectious hazard (e.g., dishes and eating utensils are sanitized).

Semi-Critical Items

Devices which come in contact with non-intact skin or mucous membranes but do not penetrate them. Reprocessing semi-critical items involves meticulous cleaning followed by high level disinfection.

Sharps

Sharps are defined as any article capable of cutting or puncturing the skin by having a fine edge or point.

Sterilization

Sterilization is a process which destroys all microorganisms including bacterial spores. Items must be cleaned thoroughly before effective sterilization can take place. Sterilization is required for critical medical devices.

Vector

An organism that does not cause disease itself, but spreads disease by conveying infectious agents from a host to a susceptible individual. An example is a mosquito transmitting the West Nile virus.

Virus

Smallest and simplest infectious agents consisting of RNA or DNA.

Contributors

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Greg Bruce, Supervisor/Infection Control Practitioner
County of Simcoe Emergency Medical Services

Education and Development Division
Toronto Emergency Medical Services

Syl Kozma, Regional Instructor
GTA Region

Steve Mulholland, Regional Training Coordinator
GTA Region

Public Health Division
Ministry of Health and Long-Term Care

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