IPAC CANADA PRACTICE RECOMMENDATIONS

Environmental Cleaning and Disinfection for Emergency Medical Vehicles and Equipment

DEVELOPED BY:

IPAC-Canada's

Prehospital Care Working Group

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Prehospital care (PHC) is often the first point of contact with the healthcare system for ill and injured patients (see glossary). Information about their medical conditions and any microorganisms with which they are infected or colonized are not immediately known.

The principles of Routine Practices[1,2] apply to all settings, including PHC, and are based on the premise that all Individuals' secretions, excretions, body fluids and their environment may contain harmful microorganisms. These preventive practices must be followed by healthcare providers in the PHC setting, regardless of whether an illness is "known", to protect patients and themselves from infection.[8]

As per Routine Practices, emergency vehicle surfaces and equipment contaminated with blood and/or body fluids, or have been in contact with non-intact skin, mucous membranes or the contaminated hands of the healthcare provider, require cleaning and disinfection prior to use with another individual.

Routine Practices include but are not limited to:

a) Hand hygiene
b) Personal risk assessment
c) Use of personal protective equipment (PPE) when indicated
d) Standardized cleaning and disinfection protocols[3-5]

This document aims to provide guidance for the disinfection of environmental surfaces and equipment in PHC vehicles following off-loading of patients, thus rendering the surfaces safe for responding to subsequent calls within a practical period of time.

Infection Prevention and Control Practice Recommendations for Cleaning and Disinfecting Emergency Vehicles and Equipment

1. PHC services should contact an Infection Prevention and Control Professional to assist with assessment of practices and/or purchases that involve prevention and control of infections.

2. PHC services shall have clear, evidence-based policies and procedures detailing the indications for cleaning and disinfection of emergency vehicles and equipment, paying particular attention to frequency, processes, and materials.[6] Policies and procedures, directives, and/or standard operating guidelines shall incorporate all appropriate components of Routine Practices and include a protocol for cleaning of blood spills.

3. Routine cleaning and surface disinfection with, at minimum, a healthcare/hospital grade disinfectant with a Drug Identification Number (DIN), shall occur following the use of vehicles and equipment, paying particular attention to frequently touched surfaces and horizontal surfaces, while adhering to the manufacturer's instructions for use (e.g., recommended wet contact time specified on the cleaning and disinfection product label). See Appendix A for further guidance on product selection.

   This recommendation pertains to transports that require delivery of PHC, if they are visibly contaminated with blood and/ or body fluids, or if they have had direct or indirect contact with non-intact skin or mucous membranes. This also pertains to vehicles and equipment that were used to provide PHC but were not used for patient transport to a healthcare facility, for example, when returning a patient to their home.

4. Handle and dispose of biomedical waste according to jurisdictional regulations including appropriate use of PPE.[7]

5. Ensure all sharps are discarded immediately after use in an approved sharps container located at point-of-use.

6. Remove used linens/blankets for laundering. Avoid shaking or over-handling of linens. PPE should always be worn when handling contaminated linens.

7. Adhere to protocols to prevent recontamination of freshly cleaned/disinfected surfaces:
   a. Cleaning should proceed from cleanest to dirtiest areas. These areas may vary depending on the type of call and the degree of contamination in the treatment area.
   b. Clean/disinfect all reusable equipment used during the call according to the Spaulding Classification (see Glossary) for medical devices and patient care equipment.

8. The PHC provider responsible for operating the vehicle should remove and discard any unnecessary PPE (for diseases transmitted by the airborne route, unknown and severe acute respiratory infection or by directive, respiratory PPE may continue to be required) and perform hand hygiene prior to entering the cab to avoid inadvertent contamination of this area.

9. If the vehicle is heavily contaminated, it should be taken out of service and manually deep cleaned
   Deep Cleaning includes the following:
   Driver's compartment
      1. Remove all equipment from the front of the vehicle
      2. Clean and vacuum floor
      3. Clean and disinfect all interior surfaces, including walls, doors, radio equipment, dash, and windows

   Patient compartment
      1. Remove stretchers, clean and disinfect including mattress and belts; check for wear or damage

2. Remove wall suction, clean and disinfect area
3. Remove contents of cupboards and shelves; clean and disinfect all surfaces
4. Clean, disinfect, and dry all hard surface items before returning to cupboard or shelf; inspect for damage and expiration dates; repair/replace as needed
5. HEPA-filter vacuum, clean and disinfect floor
6. Clean and disinfect chairs, bench seats, seat belts
7. Clean and disinfect all interior surfaces, including ceiling and walls
8. Remove scuff marks
9. Check interior lighting
10. Empty, clean and disinfect waste containers
11. Clean interior windows

Equipment storage compartment

1. Remove all equipment and sweep out compartment
2. Clean and disinfect compartment and restock

Consideration of Newer Technologies

- New technologies may be useful as part of a comprehensive cleaning and disinfection program, as an adjunct to manual cleaning and disinfection procedures, for example when used as a final step to a deep clean procedure but are not recommended following each patient contact/transport.

- It is important to thoroughly review each product under consideration for use with an Infection Prevention and Control Professional and/or an Environmental Services Professional.

- Although newer technologies such as hydrogen peroxide vapor, ozone gas, super-oxidized water, ultraviolet (UV) technology, and electrostatic sprayers do have applications in health care;[8-13] it is important to consider other factors before procuring such technology. It is important to remember that surfaces require manual cleaning prior to any disinfection process and new technology does not eradicate this important step.

- Completion of fogging processes can vary from one to five hours and UV light technology has a shorter disinfection time; however, the evidence is unclear for the elimination of fungi and spores. Turnaround times should be considered when utilizing new technologies.
- There is some evidence that certain types of fogging may be less effective on vertical surfaces than on horizontal surfaces. There is evidence that UV lights do not work in shadowed areas, so the machine may have to be moved to ensure full coverage. The optimal methodology for both technologies is still under investigation.
- The costs associated with the use of additional technology may be prohibitive when considering which indications for use would reasonably occur in the PHC setting. There may also be occupational health and safety considerations associated with some technologies.

Documentation:

Deep cleaning and disinfection conducted as per service requirements should be documented by the staff who completed the process.

Auditing:

Regular audits of compliance with hand hygiene, routine practices, and additional precautions (including PPE, cleaning and disinfection) should be conducted as per organizational policy. A Prehospital Care Audit Tool to assess all IPAC aspects in a PHC setting can be found at: http://www.ipac-canada.org/AuditToolkit/toolkithome.php

Glossary:

Detergent: A cleaning agent that increases the ability of water to penetrate organic material and breakdown greases and dirt. Detergents are needed to allow effective cleaning to take place. Use only detergents that are compatible with instruments being cleaned. Follow the detergent manufacturer's instructions for concentration, temperature, and recommended contact time.

Disinfectant: A product that is used on surfaces or medical equipment/devices which results in disinfection of the equipment/device. Disinfectants are not to be used for skin antiseptics. Some products combine a cleaner/detergent with a disinfectant.

Disinfection: The inactivation of disease-producing microorganisms. Disinfection does not destroy bacterial spores. Medical equipment/devices must be cleaned thoroughly before effective disinfection can take place.

> *Low-level disinfection***:** level of disinfection required when processing noncritical items or some environmental surfaces. Low level disinfectants 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 mycobacteria or bacterial spores. Low level disinfectants-detergents are used to clean environmental surfaces.
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> *Intermediate-level disinfection:* level of disinfection required for some semicritical items. Intermediate level disinfectants kill vegetative bacteria, most viruses and most fungi but not bacterial spores.
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> *High-level disinfection:* level of disinfection required when processing semicritical items. High level disinfection processes destroy vegetative bacteria, mycobacteria, 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 disinfectants are classified and licenced as medical devices in Canada. See Medical Devices Active Licence Listing (MDALL): Reference tool for licensed medical devices in Canada by Health Canada, accessible at https://health-products.canada.ca/mdall-limh/index-eng.jsp

Drug Identification Number (DIN): In Canada, low level disinfectants are regulated as drugs under the *Food and Drugs Act* and Regulations. Disinfectant manufacturers shall obtain a drug identification number (DIN) from Health Canada prior to marketing, which ensures that labelling and supporting data have been provided and that it has undergone and passed a review of its formulation, labelling and instructions for use.[8]

Hospital Disinfectant: A low-level disinfectant that has a drug identification number (DIN) from Health Canada indicating its approval for use in Canadian health care settings. Hospital disinfectants were previously referred to as "hospital-grade disinfectants."

Manufacturer's instructions for use (MIFU): The written instructions for use provided by the manufacturer or distributor of a product that contain the necessary information for the safe and effective use of the product.[12]

Patient: Includes any individual (resident, client, etc.) receiving health care services.

Personal Protective Equipment (PPE): Specialized clothing or equipment used by workers to provide a barrier or shield to prevent potential exposure to infectious micro-organisms, and exposure to chemicals or physical hazards used or present during decontamination, sterilization, or provision of care. Note: PPE includes and is not limited to gowns, gloves, masks, facial protection (e.g., masks, eye protection, face shields, or masks with visor attachments), respirators, and hair covering.[1-3]

Personal Risk Assessment: An evaluation of the interaction of the health care provider, the client/patient/resident and the client/patient/resident environment to assess and analyze the potential for exposure to infectious disease.

Routine Clean: The physical removal of foreign material (e.g., dust, soil) and organic material (e.g., blood, secretions, excretions, microorganisms). Cleaning physically removes rather than kills microorganisms. It is accomplished with water, detergents, and mechanical action. It is necessary to maintain a specific measure of cleanliness and must be effective and consistent to reduce the transmission of microorganisms.

Routine Practices: Infection prevention and control (IPAC) practices to be used with **all** clients during **all** care, to prevent and control transmission of microorganisms in **all** health care settings. Routine Practices shall be incorporated into the culture of each health care setting and into the daily practice of each health care provider to protect both the client and health care provider.[1-3]

Spaulding Classification: A strategy developed by Dr. Earle H. Spaulding for reprocessing contaminated medical devices which classifies devices as critical, semi-critical, or noncritical based on how they are used on a patient. Three different levels of disinfection are applied based on this risk scheme:

> *Noncritical items:* those that either touch only intact skin but not mucous membranes or do not directly touch the patient. Reprocessing of noncritical items involves cleaning and/or low-level disinfection.
>
> *Semi-critical items:* devices that come in contact with nonintact skin or mucous membranes but ordinarily do not penetrate them. Reprocessing semi-critical items involves meticulous cleaning followed by high-level disinfection. Depending on the type of item and its intended use, intermediate-level disinfection may be acceptable.
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> *Critical items:* instruments and devices that enter sterile tissues, including the vascular system. Critical items present a high risk of infection if the item is contaminated with any microorganisms, including bacterial spores. Reprocessing critical items involves meticulous cleaning followed by sterilization.[14]

Sterilization: The level of reprocessing required for critical medical equipment/devices and preferred for semi-critical items. Sterilization results in the destruction of all forms of microbial life including bacteria, viruses, spores and fungi. Equipment/devices shall be cleaned thoroughly before effective sterilization can take place.

As per the Canadian Standard Association (CSA):
"SHALL" is used to express a requirement, i.e., a provision that the user is obliged to satisfy in order to comply with the standard;
"SHOULD" is used to express a recommendation or that which is advised but not required; and
"MAY" is used to express an option or that which is permissible within the limits of the standard, an advisory or optional statement.

Appendix A

Selection of Cleaning and Disinfection Products

Cleaning is the physical removal of foreign material (e.g., dust, soil) and organic material (e.g., blood, secretions, excretions, microorganisms). Cleaning physically removes rather than kills microorganisms. It is accomplished with water, detergents and mechanical action.[2]

Disinfection is the inactivation of disease-producing microorganisms. Disinfection does not destroy bacterial spores.[2] Medical equipment/devices must be cleaned thoroughly before effective disinfection can take place. Cleaning, followed by disinfection, will kill the majority of pathogenic microorganisms on a surface, however only sterilization will kill all microorganisms on an object. Sterilization is used for critical re-usable medical and some semi-critical reusable devices.

Any disinfecting product being considered for purchase must have a drug identification number or DIN, meaning that it is approved for use in Canada.

There are products available that both clean and disinfect which may be appropriate for your service. It is important to check with your product supplier.

There are several principles that must be adhered to when choosing cleaning and disinfecting products for your prehospital care service.

What do you want to clean and disinfect?
All items used by more than one healthcare provider and/or used on multiple patients require cleaning between each use. However not every item requires the same level of disinfection. Certain items, such as McGill forceps, require cleaning and high-level disinfection (sterilization is preferred) at a minimum between uses.[14] Other items, such as blood-pressure cuffs, may require cleaning and low-level disinfection only. Each reusable item requiring cleaning and disinfection must be evaluated according to Spaulding's classification system, and have the appropriate cleaner and disinfectant applied accordingly.

What pathogens do you want to kill?
The choice of a cleaning and disinfectant product must be justified by the pathogenic organism that you want to kill. The pathogen must be able to both survive on a surface, and then be able to move off that surface to put others at risk. It is important to ensure that the product is effective against pathogens that put your healthcare provider and individuals under your care at risk such as antibiotic-resistant organisms e.g., Methicillin-resistant *Staphylococcus aureus* (MRSA), Norovirus, *Clostridium difficile* and influenza.

How long do you have to wait for the surface to be disinfected?
Each disinfectant product has a different 'wet contact time' required to properly kill pathogens. Some products, such as those based on quaternary ammonium compounds (QUATs), may require wet contact times of at least 10 minutes, which may be hard to achieve under busy working conditions.

Since disinfection cannot happen unless the surface has been cleaned, the time it takes to properly remove all visible contaminants from the surface must also be added to the wet contact time when evaluating the product.

Product safety
Every cleaning and disinfecting product must also be evaluated for both its environmental safety as well as the potential harm it could cause to the user. Besides evaluating the risks to the worker's health or the

environment, you should also consider how long it would take to use the product safely. For example, a highly toxic product may clean or disinfect quickly, but the time it takes for the worker to put on proper Personal Protective Equipment (PPE) and prepare the product for use may significantly reduce its benefits.

Compatibility

Cleaning and disinfection products must be compatible with the material on which it will be used. Damage and corrosion to equipment parts may occur rapidly if the cleaner and disinfectants chosen are incompatible.

As well, not all disinfectants are compatible with all cleaning products. If you already have a cleaning product in place and are adding a new disinfectant or changing your old one, it is important to ensure the cleaning product won't adversely react with the new disinfectant.

Every prehospital care service will have its own unique challenges when choosing appropriate cleaning and disinfecting products. It is recommended that any potential purchase be first discussed with your affiliated Infection Prevention and Control Professional. If your service does not have infection prevention and control expertise, you may refer to your local acute care hospitals, your local health unit, your Provincial/Regional Infection Prevention and Control Support team (if available), the IPAC Canada Prehospital care interest group, or local IPAC Canada chapter (refer to this website for IPAC Canada-related links: http://www.ipac-canada.org).

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