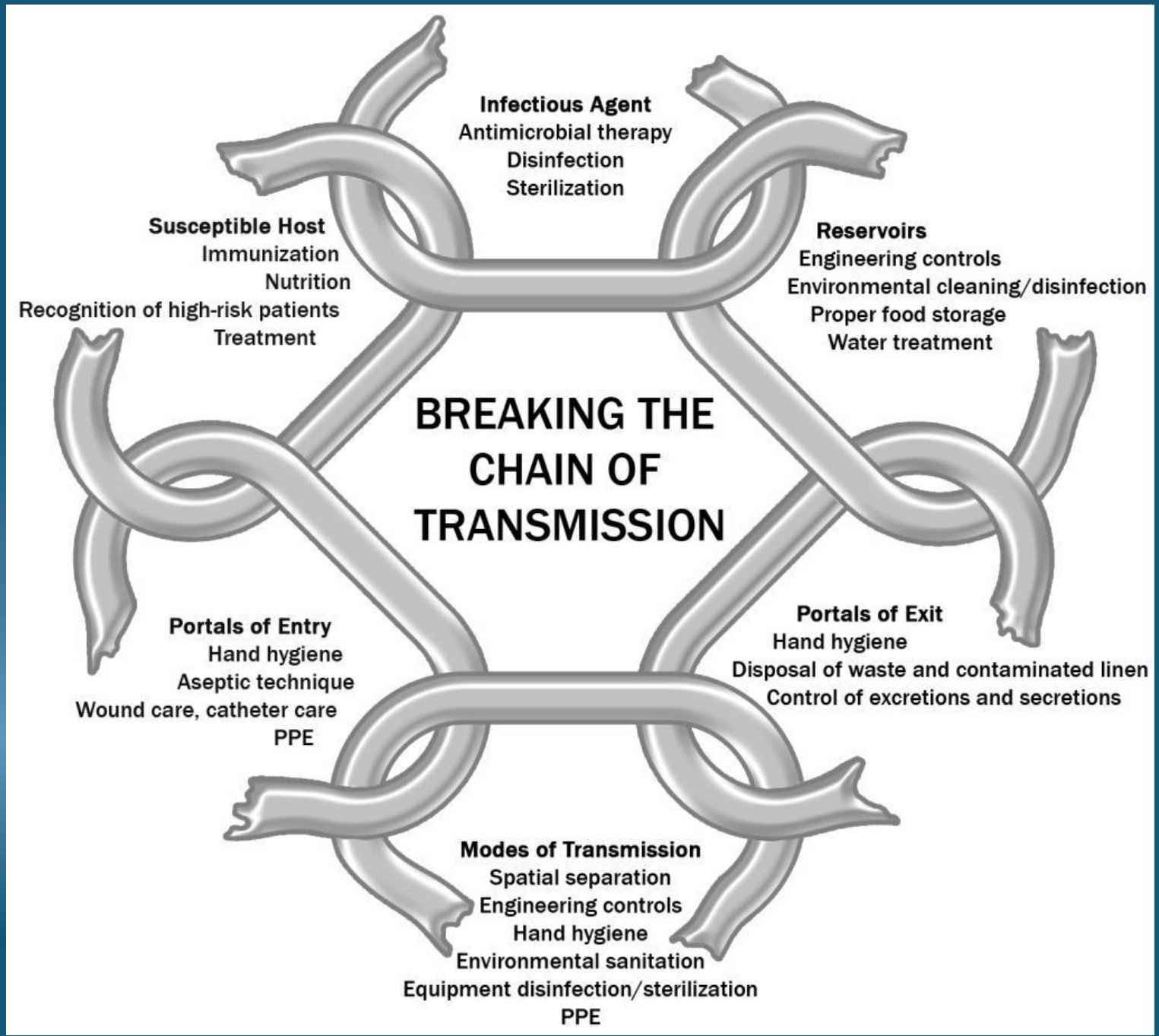
Your Health Connection

simcoe muskoka
DISTRICT HEALTH UNIT

Quick and Dirty of Cleaning and Disinfection
Designated Officer Training
January 17, 2013

Outline

- Terminology
- Spaulding Classifications
- Ideal Disinfectant?
- Environmental Cleaning
- Blood and Body Fluid Spill Cleaning and Disinfection


Infectious Agent
Antimicrobial therapy
Disinfection
Sterilization
Susceptible Host
Immunization
Nutrition
Recognition of high-risk patients
Treatment
Reservoirs
Engineering controls
Environmental cleaning/disinfection
Proper food storage
Water treatment
BREAKING THE CHAIN OF TRANSMISSION
Portals of Entry
Hand hygiene
Aseptic technique
Wound care, catheter care
PPE
Portals of Exit
Hand hygiene
Disposal of waste and contaminated linen
Control of excretions and secretions
Modes of Transmission
Spatial separation
Engineering controls
Hand hygiene
Environmental sanitation
Equipment disinfection/sterilization
PPE

Terms

- Reprocessing
- The steps required to prepare used medical equipment/devices for reuse (e.g., cleaning, disinfection and sterilization) are referred to as reprocessing

- Decontamination (cleaning)
- PIDAC (2010) describes decontamination (cleaning) as the physical removal of foreign material (e.g., dust, soil) and organic material (e.g., blood, secretions, excretions, microorganisms) from a surface. Cleaning physically removes rather than kills microorganisms and is accomplished with water, detergents and mechanical action.

Equipment and Environment

- There are many pieces of equipment used in the pre-hospital environment. The following is a partial list of equipment that may need cleaning and disinfection after a call:

- Handcuffs
- Cardiac Monitor and Leads
- Airway Roll
- Portable Suction Unit
- Stethoscope
- Pulse Oximeter
- Laryngoscope Handle
- Glucometer
- Scissors
- Oxygen Tank
- Oxygen Regulator
- Pen
- Pen Light
- End Tidal CO2
- Protective Eyewear
- Stair Chair
- Blood Pressure Cuff
- Hatch Gloves
- Portable Radio
- Spinal Board
- GPS Unit
- Stretcher and Stretcher Straps
- Bunker Gear
- Vehicle Surfaces
- Radio
- Mobile Data Units
- Cervical Collars

Disinfection

- Disinfection is required for items where merely cleaning them will not render it safe for its intended use. There are three levels of disinfection used in health care.
  - Low
  - High
  - Sterilization

Spaulding Classification System

- Involves dividing instruments and items for patient care into three categories according to the degree of risk of infection associated with their use
- This aids in delineating the level of disinfection or sterilization required. The three categories are:
  - Non-critical
  - Semi-critical
  - Critical

Spaulding Classification System

- Non-critical items
  - Come in contact with intact skin but not mucous membranes
  - Handcuffs, blood pressure cuffs or pulse oximeters
  - Items that contact intact skin require low-level disinfection only
- Semi-critical
  - Come in contact with mucous membranes or non-intact skin
  - Laryngoscope blades and suction catheters
  - These items require high-level disinfection to render them safe for use
  - In the pre-hospital environment, these items are single-use only and are not reprocessed

Spaulding Classification System

- Critical items
  - Enter sterile tissue or the vascular system and therefore present a high risk of infection if contaminated with any microorganisms, including bacterial spores
  - Items, such as IV catheters, laryngoscope tubes, needles for injection, and suction catheter covers for deep suctioning
  - Sterilized by the manufacturer, kept in their intact sterile packaging before use, and disposed of immediately after they have been used
- Packaging should always be inspected before opening. The packaging must be clean, dry and intact and the item must be used before its expiration date

Disinfectants

- Low level disinfection
  - Low-level disinfection inactivates vegetative bacteria, most viruses and most fungi
  - In the pre-hospital environment, the majority of reusable items needed for client care will require low-level disinfection only
- High-level disinfection
  - High-level disinfection is expected to destroy all microorganisms except bacterial spores
  - In the pre-hospital environment, the majority of items that require high-level disinfection, such as laryngoscopes and suction catheters, are single-use only and should be disposed of after every call

Disinfectants

- Sterilization
  - Sterilization is the destruction of all microorganisms, including bacterial spores
  - The only items required to be sterile in the pre-hospital environment are used by paramedics during patient care
  - All sterile items are considered single-use only and must be disposed of after use

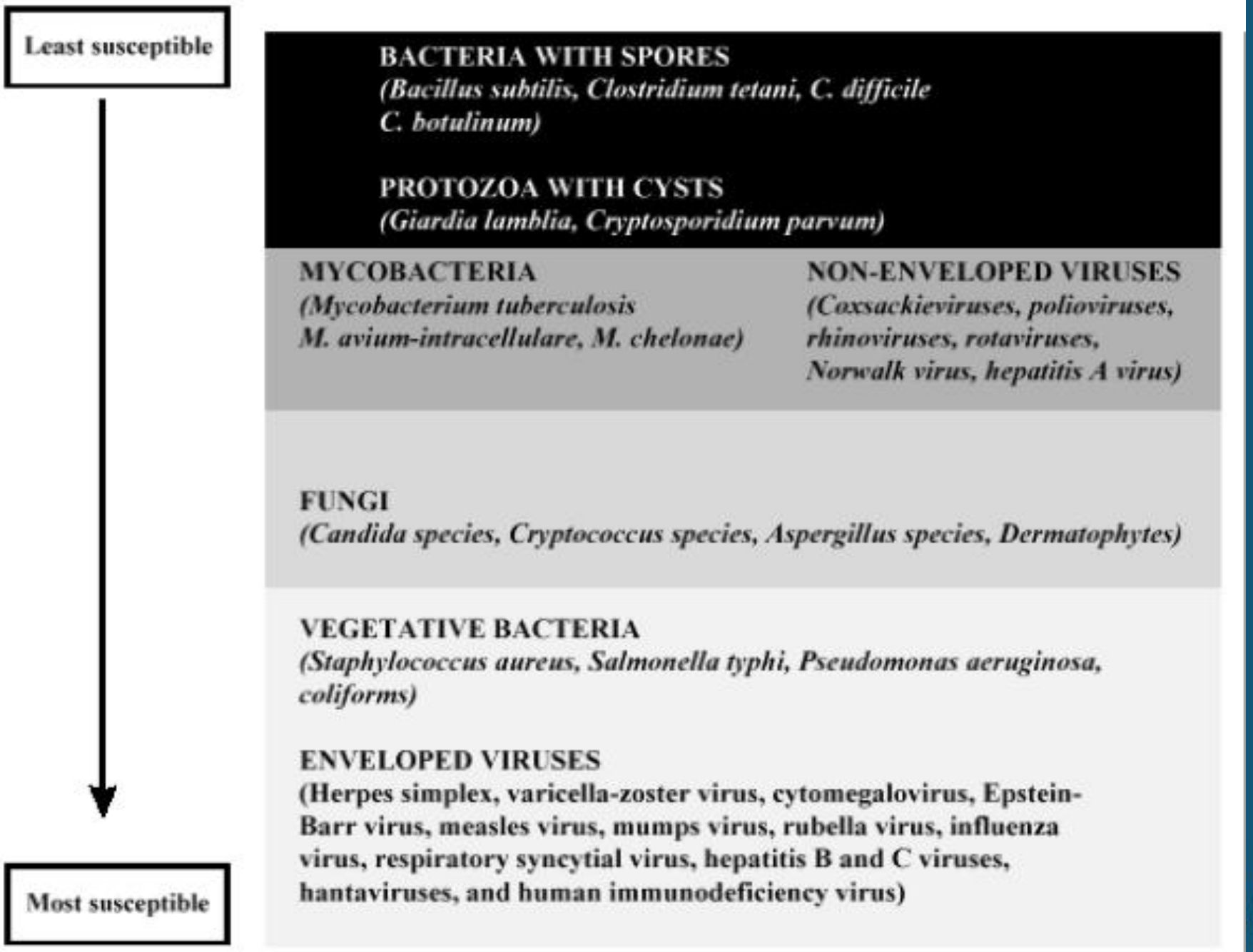

Least susceptible
BACTERIA WITH SPORES
(Bacillus subtilis, Clostridium tetani, C. difficile
C. botulinum)
PROTOZOA WITH CYSTS
(Giardia lamblia, Cryptosporidium parvum)
MYCOBACTERIA
(Mycobacterium tuberculosis
M. avium-intracellulare, M. chelonae)
NON-ENVELOPED VIRUSES
(Coxsackieviruses, polioviruses,
rhinoviruses, rotaviruses,
Norwalk virus, hepatitis A virus)
FUNGI
(Candida species, Cryptococcus species, Aspergillus species, Dermatophytes)
VEGETATIVE BACTERIA
(Staphylococcus aureus, Salmonella typhi, Pseudomonas aeruginosa,
coliforms)
ENVELOPED VIRUSES
(Herpes simplex, varicella-zoster virus, cytomegalovirus, Epstein-
Barr virus, measles virus, mumps virus, rubella virus, influenza
virus, respiratory syncytial virus, hepatitis B and C viruses,
hantaviruses, and human immunodeficiency virus)
Most susceptible

Table 1: Spaulding's Classification of Medical Equipment/Devices and Required Level of Processing/Reprocessing

Classification	Definition	Level of Processing/Reprocessing	Examples
Critical Equipment/ Device	Equipment/device that enters sterile tissues, including the vascular system	Cleaning followed by Sterilization	▪ Surgical instruments ▪ Biopsy instruments ▪ Foot care equipment
Semicritical Equipment/ Device	Equipment/device that comes in contact with non-intact skin or mucous membranes but do not penetrate them	Cleaning followed by High-Level Disinfection (as a minimum) Sterilization is preferred	▪ Respiratory therapy equipment ▪ Anaesthesia equipment ▪ Tonomoter
Noncritical Equipment/ Device	Equipment/device that touches only intact skin and not mucous membranes, or does not directly touch the client/patient/resident	Cleaning followed by Low-Level Disinfection (in some cases, cleaning alone is acceptable)	▪ ECG machines ▪ Oximeters ▪ Bedpans, urinals, commodes

MANUFACTURERS' RECOMMENDATIONS FOR PRODUCT, CONCENTRATION AND EXPOSURE TIME MUST BE FOLLOWED			
Level of Processing/Reprocessing	**Classification of Equipment/ Device**	**Examples of Equipment/Devices**	**Products****
<u>Cleaning</u> Physical removal of soil, dust or foreign material. Chemical, thermal or mechanical aids may be used. Cleaning usually involves soap and water, detergents or enzymatic cleaners. Thorough cleaning is required before disinfection or sterilization may take place.	All reusable equipment/devices	▪ All reusable equipment/devices ▪ Oxygen tanks and cylinders	**** concentration and contact time are dependant on manufacturer's instructions** ▪ Quaternary ammonium compounds (QUATs) ▪ Enzymatic cleaners ▪ Soap and water ▪ Detergents ▪ 0.5% Accelerated hydrogen peroxide
<u>Low-Level Disinfection</u> Level of disinfection required when processing noncritical equipment/devices or some environmental surfaces. Low-level disinfectants kill most vegetative bacteria and some fungi as well as enveloped (lipid) viruses. Low-level disinfectants do not kill mycobacteria or bacterial spores.	Noncritical equipment/devices	▪ Environmental surfaces touched by staff during procedures involving parenteral or mucous membrane contact (e.g. dental lamps, dialysis machines) ▪ Bedpans, urinals, commodes ▪ Stethoscopes ▪ Blood pressure cuffs ▪ Oximeters ▪ Glucose meters ▪ Electronic thermometers ▪ Hydrotherapy tanks ▪ Client/patient/resident lift slings ▪ ECG machines/leads/cups etc. ▪ Sonography (ultrasound) equipment/probes that only contact intact skin ▪ Bladder scanners ▪ Baby scales ▪ Cardiopulmonary training mannequins ▪ Environmental surfaces (e.g. IV poles, wheelchairs, beds, call bells) ▪ Fingernail care equipment that is single-client/patient/resident use	**** concentration and contact time are dependant on manufacturer's instructions** ▪ 3% Hydrogen peroxide (10 minutes) ▪ 60-95% Alcohol (10 minutes) ▪ Hypochlorite (1000 ppm) ▪ 0.5% Accelerated hydrogen peroxide (5 minutes) ▪ Quaternary ammonium compounds (QUATs) (10 minutes) ▪ Iodophors ▪ Phenolics ** (should not be used in nurseries)

MANUFACTURERS' RECOMMENDATIONS FOR PRODUCT, CONCENTRATION AND EXPOSURE TIME MUST BE FOLLOWED			
Level of Processing/Reprocessing	**Classification of Equipment/ Device**	**Examples of Equipment/Devices**	**Products****
High-Level Disinfection The level of disinfection required when processing semicritical equipment/devices. High-level disinfection processes destroy vegetative bacteria, mycobacteria, fungi and enveloped (lipid) and non-enveloped (non-lipid) viruses, but not necessarily bacterial spores.	Semicritical equipment/devices	▪ Flexible endoscopes that do not enter sterile cavities or tissues ▪ Laryngoscopes ▪ Bronchosopes, cystoscopes (sterilization is preferred) ▪ Respiratory therapy equipment ▪ Nebulizer cups ▪ Anaesthesia equipment ▪ Endotrachial tubes ▪ Specula (nasal, anal, vaginal – disposable equipment is strongly recommended) ▪ Tonometer foot plate ▪ Ear syringe nozzles ▪ Sonography (ultrasound) equipment/probes that come into contact with mucous membranes or non-intact skin (e.g. transrectal probes) ▪ Pessary and diaphragm fitting rings ▪ Cervical caps ▪ Breast pump accessories ▪ Glass thermometers ▪ CPR face masks ▪ Alligator forceps ▪ Cryosurgery tips ▪ Ear cleaning equipment, ear curettes, otoscope tips ▪ Fingernail care equipment used on multiple clients/patients/residents	**** concentration and contact time are dependant on manufacturer's instructions** ▪ 2% Glutaraldehyde (20 minutes at 20°C) ▪ 6% Hydrogen peroxide (30 minutes) ▪ 0.55% Ortho-phthalaldehyde (OPA) (10 minutes at 20°C) ▪ Pasteurization (30 minutes at 71°C) ▪ 7% Accelerated hydrogen peroxide (20 minutes) ▪ 0.2% Peracetic acid (30-45 minutes)

MANUFACTURERS' RECOMMENDATIONS FOR PRODUCT, CONCENTRATION AND EXPOSURE TIME MUST BE FOLLOWED			
Level of Processing/Reprocessing	**Classification of Equipment/ Device**	**Examples of Equipment/Devices**	**Products****
Sterilization The level of reprocessing required when processing critical equipment/devices. Sterilization results in the destruction of all forms of microbial life including bacteria, viruses, spores and fungi.	Critical equipment/devices	▪ Surgical instruments ▪ Foot care equipment ▪ Implantable equipment/devices ▪ Endoscopes that enter sterile cavities and spaces (e.g., arthroscopes, laparoscopes) ▪ Bronchosopes , cystoscopes (sterilization preferred) ▪ Biopsy forceps, brushes and biopsy equipment associated with endoscopy (disposable equipment is strongly recommended)	**** concentration and contact time are dependant on manufacturer's instructions** ▪ Steam autoclave ▪ 100% Ethylene oxide ▪ Dry heat ▪ Hydrogen peroxide gas plasma (75 minutes at 50°C)
		▪ Colposcopy equipment ▪ Electrocautery tips ▪ Endocervical curettes ▪ Fish hook cutters ▪ Transfer forceps ▪ Eye equipment, including soft contact lenses ▪ Dental equipment including high speed dental hand pieces	▪ 2.5-3.5% Glutaraldehyde (10 hours at 20°C) ▪ 0.2% Peracetic acid (12 minutes at 50-56°C) ▪ 6-25% Hydrogen peroxide liquid (6 hours) ▪ 7% Accelerated hydrogen peroxide (6 hours at 20°C)

Ideal Disinfectant?

- Broad-spectrum germicidal efficacy – it kills what you need it to
- Contact times – need rapid and realistic contact times
- Organic matter – product remains active in the presence of organic matter
  - Allows for 1-step cleaning-disinfection
  - Follow label directions (e.g., pre-cleaning is required or heavily soiled surface requires cleaning prior to disinfection, etc.)
- Cleaning ability – products need good cleaning properties

Ideal Disinfectant?

- Safety profile – products should be non-toxic and have low irritancy and allergenic properties
  - MSDS – use proper concentrations and dilutions
  - Wear appropriate PPE
- Environmental sustainability – green products
- Odours – scent free products are preferable. VOCs create the smells and may lead to air quality issues
- Compatibility – look for wide material compatibility

Low Level Disinfectant

Selection Criteria for Low Level Disinfectants Product Name: _____ Manufacturer: _____	CRITERIA MET	
	Yes	No
Product has a DIN number from Health Canada http://www.hc-sc.gc.ca/dhpmps/prodpharma/databasdon/index-eng.php		
Product has a Material Safety Data Sheet (MSDS)		
The product label must clearly indicate the following: • the product name • its intended use • active ingredient(s) • specific directions for use including the specific types of surfaces/instruments to be disinfected • dilution procedure • the mode of application • contact time • cleaning and rinsing procedures		
Meets low level disinfectant criteria: Bacteriocidal – effective against vegetative bacteria (e.g. S. aureus, salmonella, Pseudomonas) Virucidal – effective against targeted enveloped viruses (e.g. HIV, Influenza, Hepatitis B & C)		
Product has good air quality		
Information regarding the type, concentration and testing of the active chemical properties of the product is provided		
The product is compatible with BOTH the equipment/surface's manufacturer's instruction and the existing cleaning products being used for the equipment/surface		
Disposal as per manufacturer / municipality		

*Occupational Health and Safety factors should also be considered when selecting cleaning /disinfectant products

Adapted from Infection Prevention and Control Practice Guidelines: For Primary Care Settings in North Simcoe Muskoka 2012

Environmental Cleaning

Environmental Cleaning

- Surface cleaning requires the removal of any visible contaminants, including blood and/or body fluids from an object or area by staff wearing the appropriate PPE
  - Routine cleaning is essential.
- Appropriate PPE consists of gloves, and potentially facial protection (mask and eye protection or face shield) as well as a gown if splash or spray is possible or expected
- Cleaning must be followed by disinfection of the area or equipment to make it safe for further use. Commercial spill kits may be practical in the emergency services setting.

Cleaning Instructions

- Cleaning is achieved with water, detergents, or combination cleaning/disinfection products. Detergents are sufficient for most surface cleaning. For proper cleaning:
- Using friction, clean equipment with soap and water or supplied cleaning/disinfection product to remove any soiling, dirt, dust, blood or body fluids from the surface of the equipment
- Do not spray cleaning fluid directly onto an item, such as bunker gear, as it may cause aerosolization and/or splash/spray of blood/body fluid

Cleaning Instructions

- Spray onto a cloth and then wipe item to be cleaned
- Rinse off soap (if used) and allow to dry
- Allow sufficient wet contact time to kill pathogens as per manufacturer's instructions

Infection Control FACTS

Procedure for cleaning up blood or bodily fluids on hard surfaces

Blood, vomit and feces may contain germs that can cause serious infections. People who clean blood and other bodily fluids should reduce the risk of infection to themselves and others by following these procedures:

Procedure for Blood Spills/Vomit/Feces

1. Wear appropriate personal protective equipment, such as disposable gloves when cleaning up a spill. If the possibility of splashing exists, protective eyewear and a gown should be worn. Eye glasses are not considered to be protective eyewear.
2. Dispose with care, any broken glass or sharps into a puncture-proof container. If available, disposal of sharps into an approved sharps container for biomedical waste is preferred.
3. Clean the spill area with paper towel to remove most of the spill. Disinfectants cannot work properly if the surface has blood or other bodily fluids on it. Cloth towels should not be used unless they are to be thrown out.
4. Discard the paper towel soaked with the blood, vomit, feces or fluid in a plastic-lined garbage bin.
5. Care must be taken to avoid splashing or spraying during the clean up process.
6. Clean the affected area with soap and water then disinfect with a 1:10 bleach solution for 10 minutes or an appropriate disinfectant with proven effectiveness against non-enveloped viruses (eg. Poliovirus, Norovirus, Rotavirus, Feline Calicivirus). Refer to the manufacturer's label to ensure the disinfectant is left on the contaminated surface for the correct contact time. With bleach, this would mean the surface stays wet for at least 10 minutes.
7. Ventilate the room well when using a bleach solution. Make sure it is not mixed with other cleaning agents.
8. Wipe the treated area with paper towels soaked in tap water. Allow the area to dry.
9. Discard contaminated paper towels, gloves and other disposable equipment in a plastic lined garbage bin. Immediately tie and place with regular trash. Take care not to contaminate other surfaces during this process. Change gloves if needed.
10. Practice hand hygiene, either with soap and water or an alcohol-based hand rub of at least 60% concentration, for 15 seconds after gloves are removed. If the hands are visibly soiled, then soap and water should be used over a hand rub.
11. If an injury occurs during the cleaning process, such as a skin puncture with a blood-contaminated sharp object, seek medical attention immediately. Any occurrence that takes place in a workplace should be reported to the occupational health and safety representative.

Mixing a 1:10 Bleach Solution
100 mL bleach: 900 mL of water (1 cup of bleach: 9 cups of water). Contact time on surface is 10 minutes

For more information call the
Communicable Disease Team at ext. 8809

simcoe muskoka DISTRICT HEALTH UNIT
Tel: 721-7520
Toll free: 1-877-721-7520
www.simcoemuskokahealth.org
Your Health Connection

Uniforms and Laundry

- PIDAC Best Practices for Environmental Cleaning for Prevention and Control of Infections in All Health Care Settings (2009) states that:
  - soiled linen, including uniforms, is rarely implicated in the transmission of communicable diseases
  - all linen, including uniforms, should be handled using the same precautions regardless of the source or setting
- Attention to safe handling of contaminated uniforms and good hygiene practice will help prevent disease transmission

Policy/Procedure/Schedule/Checklist

- Regular schedules for daily cleaning are required
- Client contact areas must be cleaned between each client and responsibility for cleaning must be clearly assigned
- ESWs need to be given sufficient time for cleaning of vehicles and equipment between each call for service
- There should also be schedules for taking vehicles out of service for deep cleaning on a regular basis

- Audit

BOX 24: Sample Procedure for Cleaning an Ambulance

Routine Clean Following Each Transport:

- Place biomedical waste (e.g., dressings, bandages, contaminated sheets that are saturated with blood) in a clearly marked biohazardous waste receptacle
- Carefully dispose of sharps that are found during cleaning in appropriate sharps container
- Remove used linens/ blankets for laundering
- Clean and disinfect/ sterilize equipment used during the call
- Clean and disinfect the cab and patient compartment as required
- If the vehicle is heavily contaminated it will be taken out of service and deep cleaned
- Restock vehicle as required

Deep Clean as Required and When Scheduled:

Driver's Compartment

- Remove all equipment from the front of the vehicle
- Clean and vacuum floor
- Clean and disinfect all interior surfaces, including walls, doors, radio equipment, dash and windows

Patient Compartment

- Remove stretchers, clean and disinfect including mattress and belts; check for wear or damage
- Remove wall suction, clean and disinfect
- Remove contents of cupboards and shelves; clean and disinfect all surfaces
- Clean, disinfect and dry all hard surface items before returning to cupboard or shelf; inspect for damage and expiration dates; repair/ replace as needed
- Sweep, vacuum, clean and disinfect floor
- Clean and disinfect chairs, bench seats, seat belts
- Clean and disinfect all interior surfaces, including ceiling and walls
- Remove scuff marks
- Check interior lighting
- Empty, clean and disinfect waste containers
- Clean interior windows

Equipment Storage Compartment

- Remove all equipment and sweep out compartment
- Clean and disinfect compartment and restock

Adapted from: Ministry of Health and Long-Term Care, Emergency Health Services Branch's *Infection Prevention and Control Best Practices Manual for Land Ambulance Paramedics*, Version 1.0 (March 2007); Greater Sudbury Emergency Medical Services *Vehicle and Equipment Policy and Procedure Manual*, Section 4 (revised August 2006); and Algoma Emergency Medical Services, Standardized Vehicle Deep Clean Procedure.

Summary - Cleaning, Disinfection, Sterilization

- Decontamination (cleaning) and disinfection is required for all reusable equipment after every call
- Disinfection cannot occur unless an item has been properly and thoroughly cleaned beforehand
- Cleaning and disinfectant products must be used as per manufacturer's instructions
- Soiled linens and uniforms must be handled properly to minimize the risk of disease transmission

References

- Region of Peel Designated Officers' Working Group. Designated Officers' Manual for Infection Prevention: Reducing the Risk for Front-Line Staff. November 2010
- PIDAC Cleaning, Disinfection and Sterilization. February 2010.
- PIDAC Environmental Cleaning for Prevention and Control of Infections. May 2012