PICNet
PROVINCIAL INFECTION CONTROL NETWORK OF BRITISH COLUMBIA
A program of the Provincial Health Services Authority

BRITISH COLUMBIA | Office of the Provincial Health Officer

Provincial Recommendations for Cleaning and Disinfection of Medical Equipment for High Threat Pathogens

Updated: October 30, 2024

fraserhealth
Better health. Best in health care.

Interior Health
For your whole life

island health

northern health
the northern way of caring

Provincial Health Services Authority
Province-wide solutions. Better health.

Vancouver CoastalHealth
Promoting wellness. Ensuring care.

First Nations Health Authority
Health through wellness

Providence HEALTH CARE
How you want to be treated.

PICNet
PROVINCIAL INFECTION CONTROL NETWORK OF BRITISH COLUMBIA
A program of the Provincial Health Services Authority

BRITISH COLUMBIA | Office of the Provincial Health Officer

Contents

Acknowledgement

This guideline was developed by PICNet in collaboration with the High Threat Pathogens Sub-Working Group, which includes members from infection prevention and control (IPC) programs across all health authorities and the ministry of health.
Review and/or approval was provided by the following committees, organizations, and working groups:

- Provincial Infection Prevention and Control/Workplace Health & Safety COVID-19 Working Group
- BC Biocontainment Unit
- Provincial Reprocessing Working Group
- Public Health Response, BC Centre for Disease Control
- Office of the Provincial Health Officer

Introduction

Medical devices and equipment used in the diagnosis or treatment of patients with suspected or confirmed high threat pathogen (HTP), including patients with suspected HTP who are subsequently confirmed to have a HTP, may pose a hazard to health care workers and patients if these items have not been thoroughly cleaned and disinfected prior to being put back into general circulation. This document provides information on how to clean and disinfect various reusable medical devices and equipment after they have been used in the care of a patient with suspected or confirmed HTP, prior to being placed back into general circulation.

For the purpose of this guidance, high threat pathogen is defined as:

- Viral hemorrhagic fevers (VHFs) [i.e., Ebola, Lassa, Marburg, and Crimean Congo Hemorrhagic Fever]; or
- Unknown/newly emerging pathogens that that are transmissible from human to human.

For additional information on HTPs and guidance on safe assessment and management of individuals who present with a suspected or confirmed HTP:

- In acute care settings and HA-operated UPCCs, refer to Provincial Infection Prevention and Control Guidance for the Management of a High Threat Pathogen in Acute Care Settings.
- In community-based clinic settings, including primary care and non-HA operated UPCCs, refer to Provincial Infection Prevention and Control Guidance for the Management of a High Threat Pathogen in Community-based Clinic Settings.

These procedures must be applied together with all IPC approved within each health authority/health care setting. These include but are not limited to:

- Routine practices and additional precautions in health care settings for the prevention of transmission of infection.
- The use of approved personal protective equipment (PPE), including processes for donning and doffing.
- Hand hygiene.
- Proper handling and disposal of biohazardous waste.

Definitions

- **AHP**: Accelerated Hydrogen Peroxide. Examples include Virox®, OxivirTb® and Accel Intervention®.
- **Biohazardous Waste Container**: may be known as biomedical waste in some health care settings. A container for the disposal of biohazardous waste as specified in Recommendations

for Environmental Services, Biohazardous Waste Management, and Food and Linen Management for HTPs.

- **Intermediate Level Disinfection**: a process capable of killing vegetative bacteria, mycobacteria including Mycobacterium tuberculosis, fungi, and enveloped and non-enveloped viruses.
- **Hot Zone or Patient Room**: the room where a patient with suspected or confirmed HTP patient resides and receives treatment. This is considered to be a "***hot zone***," an area that is known or suspected to be contaminated and has a high risk of exposure.
- **MDRA/MDRD**: Medical Device Reprocessing Area / Medical Device Reprocessing Department
- **Medical equipment**: in this document, refers to non-critical patient care equipment (e.g., blood pressure cuffs, wheelchairs) as defined by Spaulding's classification. See Best Practice Guidelines for Cleaning, Disinfection and Sterilization of Critical and Semi-critical Medical Devices in BC Health Authorities for more information.
- **Medical device**: in this document, refers to semi-critical (e.g., endocavity probes) and critical medical devices (e.g., surgical instruments) as defined by Spaulding's classification. See Best Practice Guidelines for Cleaning, Disinfection and Sterilization of Critical and Semi-critical Medical Devices in BC Health Authorities for more information.
- **Warm Zone or Quarantine room/area**: a well-ventilated, controlled-access room or designated area, preferably adjacent to the patient room, which is used as the designated doffing area (and may be used for quarantine of equipment as part of the cleaning and disinfection process, if required). This is considered to be a "***warm zone***" and area is considered to have a moderate risk of exposure.
- **UVGI**: Ultraviolet germicidal irradiation – is a disinfection method that uses ultraviolet light to kill or inactivate microorganisms.

Scope and Key Principles

This guideline is intended to provide general instructions on how to manage and reprocess patient care items used in the diagnosis or treatment of patients with suspected or confirmed HTP. Makes and models, as well as mounting, vary across health authorities and organizations. Therefore, each health authority/organization will need to adapt the guideline to meet their individual setting while adhering to manufacturer's instructions for use (MIFU).

Considerations for Community-based clinics

Some recommendations listed below may not be applicable to community-based health care settings and should be adapted based on the level of clinical care provided in these settings.

Key Principles

- Single use or dedicated reusable patient care equipment and devices should preferably be used where possible. Single use items should be discarded in a designated no-touch biohazardous waste receptacle or sharps container (if applicable) after use. Third party reprocessors should not be used for single use equipment or devices.
- Re-usable patient care equipment and devices must be reprocessed according to Spaulding's classification and risk stratification. Refer to Best Practice Guidelines for Cleaning, Disinfection and Sterilization of Critical and Semi-critical Medical Devices in BC Health Authorities for further information.
    - **Non-critical patient care equipment** contacts intact skin only. Single use (disposable) bedpans and blood pressure cuffs should be used where possible or use patient dedicated reusable equipment (e.g., commode, patient monitor, glucometer, electronic thermometer) which is cleaned and disinfected according to a regular schedule and/or when visibly soiled. Re-usable equipment must be thoroughly cleaned and disinfected before it is put back into circulation or used on another patient.
    - Non-critical reusable patient care equipment should be dedicated to the use of one patient and cleaned and disinfected according to reprocessing information below before return to circulation.
    - **Semi-critical devices** come into contact with mucous membranes or non-intact skin (e.g., wound probes, transrectal probes) and **critical devices** (come into contact with vascular system or sterile tissue e.g., surgical instruments) and should be single use/disposable where possible. Reusable semi-critical and critical medical devices if used, must be pre-cleaned and reprocessed according to organizational policies and procedures. No special reprocessing measures are required.

Preparation of Equipment/Devices Prior to Use

1. Ensure there is an identification system (e.g., tagging/labelling) in place to identify equipment/devices that have been used in a patient room for HTP. This system should include a unique identification number for the equipment/device that can be used at all stages to record significant events (e.g., contamination events, stages of cleaning and disinfection, etc.) and should not be removed until the equipment/device has been assessed and approved for return to general service.
    - Determine who is responsible for identifying (e.g., tagging/labelling) equipment/devices and tracking its use.
    - Develop a log template, which includes the name of the piece of equipment/device, the identification number, and a section for recording when cleaning and disinfection is completed.
    - Prior to taking medical equipment/devices into a patient room, ensure all items are clearly identified.

2. All reasonable steps should be taken to avoid the possibility of the equipment/device or its peripheral components becoming grossly contaminated with blood and body fluids while in service. These measures should be consistent with the requirements for safe operation of the equipment.

3. Special attention is required for ventilation and heat dissipation, which can become critical, particularly under extended periods of use. Some examples of preventive measures include:
    - Locating equipment away from the patient (bedside monitors should be above and behind the patient, ventilators should be as far behind the patient as practical, etc.)
    - Placing plastic bag(s) or shrouds around ultrasound transducers and imaging plates.
    - Placing protective plastic covers over equipment, devices, and monitors.

4. If the equipment/device is grossly contaminated with potential seepage of blood or body fluids into inaccessible areas, it may not be amenable to cleaning and disinfection and therefore, require disposal. It is recommended that older equipment nearing end of lifespan be used where practical.
    - See Provincial Recommendations for Environmental Services, Biohazardous Waste Management, and Food and Linen Management for HTPs for more information on waste management.

Cleaning and Disinfection Process for Equipment used by Patients with a Confirmed HTP

Please note: Equipment used in the care of patients with a suspected HTP, who are subsequently found to be negative, is cleaned and disinfected according to usual protocols. The extensive process described below applies only to equipment/devices used in the care of patients with a confirmed HTP. After cleaning at point of use, these items should remain in the quarantine room/area (**warm zone**) until diagnosis is confirmed.

- Assign responsibility and accountability for managing equipment/devices used for patients with a confirmed HTP.
    - Health authorities/organizations will determine and assign responsibility for cleaning and disinfection of equipment/devices beyond the patient room (**hot zone**).

- Personnel involved in the cleaning and disinfection of equipment used for patients with a confirmed HTP must use approved PPE. For more information refer to:
    - Provincial Infection Prevention and Control Guidance for the Management of a High Threat Pathogen in Acute Care Settings for acute care and health authority-operated UPCCs.
    - Provincial Infection Prevention and Control Guidance for the Management of a High Threat Pathogen in Community-based Clinic Settings for primary care settings and non-health authority operated UPCCs.

- Provide additional education, hands-on training, and repeated practice, observation of ability to adhere to correct processes and procedures, and appropriate PPE to those responsible for reprocessing (cleaning and disinfection) of reusable medical equipment/devices.
- Standard operating procedures outlining specific responsibilities and tasks should be developed by each setting.
- Where possible, ready-to-use solutions that both clean and disinfect are recommended, and where dilution is needed, ensure the recommended dilution rate is followed. Use disinfectants or reprocessing methods that are approved by Health Canada. Clean and disinfect non-critical medical devices with a Low-level or intermediate-level disinfectant that has a Health Canada issued Drug Identification Number (DIN) with broad spectrum virucidal and/or specific HTP (if pathogen is known) claims.
- Ensure that the disinfection method used is compatible with the medical equipment.

Cleaning and disinfection and/or sterilization of medical equipment/devices used in the care of patients with a confirmed HTP includes four distinct phases:

1. Initial cleaning and removal of all surface contaminants
2. Intermediate level disinfection of exterior (or a low-level disinfectant with a virucidal claim)
3. Disassembly, inspection, and cleaning of interior of equipment
4. Re-assembly, verification testing and return to service.

These phases are described in the sections below. Currently, there is no requirement to quarantine equipment for a specific period of time. In future, this may be required for unknown/newly emerging pathogens, as the procedures outlined here or products used for cleaning and disinfection may not have been validated as effective against the unknown/newly emerging pathogen. This guidance will be updated as new information/evidence becomes available or may be supplemented or superseded with situational guidance for emergent pathogens based on available knowledge.

1. Initial Cleaning and Removal of All Surface Contamination

Removal of surface contamination should be undertaken for all components, regardless of whether the equipment/device can or cannot be disinfected and/or sterilized. Clean at point of use and ensure contaminated items are covered and contained for removal from the patient room (**hot zone**) and safely transported to MDRD, if required.

Prior to the equipment/device being removed from the patient room (**hot zone**) clean and remove any gross contamination (biological fluids/material, food, foreign material from the exterior of the equipment/device. All equipment/devices should have all sources of power removed/disconnected prior to any cleaning activity - this includes electrical, water and gases. Follow the steps below:

- Ensure appropriate PPE is worn. For more information:
  - In acute care settings and HA-operated UPCCs, refer to Provincial Infection Prevention and Control Guidance for the Management of a High Threat Pathogen in Acute Care Settings.

- In primary care settings and non-HA operated UPCCs, refer to Provincial Infection Prevention and Control Guidance for the Management of a High Threat Pathogen in Community-based Clinic Settings.

} Ensure the working area is well lit and ventilated and there is adequate processes for waste management. See Recommendations for Environmental Services, Biohazardous Waste Management, and Food and Linen Management for HTPs for more information.

} Remove all patient contact components and separate into disposable and reusable categories:

- Disposable parts are those intended to be used for one patient only and then discarded. Patient care equipment and devices marked or assigned as single use or single patient use shall be discarded after use. These may include ECG leads, single patient use blood pressure cuffs and hoses, oxygen saturation sensors, breathing circuits, dialysis sets including the dialyzer, etc.
- Reusable parts are those that can be cleaned and disinfected or sterilized. These include infusion pumps, ultrasound transducers and X-ray detector plates (including computed radiography plates).

} Dispose of all disposable parts in a designated biohazardous waste container for HTP waste. Do not use third party reprocessing for these items.

} **Send pre-cleaned, reusable, semi-critical and critical medical devices to MDRD for reprocessing.** The container must be leakproof and puncture proof, have a biohazardous label, and should be brought into the patient room (**Hot zone**), to minimize damage to the device and environmental contamination.

- Wearing the required PPE, ensure device is pre-cleaned in the patient room (**Hot zone**) then placed in the enclosed container.
- Ensure items are covered and contained for safe transport to MDRD. Wipe down the container before bringing into the quarantine or exit room/area (**Warm zone**).
- Doff PPE in the quarantine or exit room/are (**Warm Zone**) and don clean gown and gloves to transport the container to MDRD.
- Container should be wiped down again in the **Warm zone** before transporting MDRD.

} **For reusable non-critical equipment, clean and disinfect as described below.**

- Using approved cleaning agent/product (e.g., accelerated hydrogen peroxide (AHP) wipes), wipe down all exterior surfaces using friction (rub/scrub motion) and remove all surface contamination.
- Ensure cleaning fluid does not enter inside the medical equipment to minimize damage. Pay particular attention to areas where fluid may accumulate.
- For wheeled equipment: Before the equipment is removed from the patient room (**hot zone**), roll the equipment over a disinfectant-soaked mat for a minimum of two full wheel rotations. For 15 cm (six inch) diameter wheels this would be a minimum of one

meter (39 inches). While on the mat, ensure brake is on and wipe down wheels and brakes with approved cleaning agent/product (e.g., AHP wipes).

- All cleaning materials must be disposed of in a designated biohazardous waste container for HTP waste.
- Do not towel dry the equipment. Instead, allow to air dry prior to moving equipment to the quarantine room/area (**warm zone**).
- If any visible contamination cannot be removed or the equipment cannot be effectively cleaned, consult site experts including Infection Prevention and Control and Biomedical Engineering before proceeding.

2. Intermediate Level Disinfection of Equipment Exterior (or Low Level Disinfection with a Virucidal Claim)

In this phase, the exterior of the equipment is disinfected using a low level disinfectant with a virucidal claim or intermediate level disinfectant (e.g., AHP or bleach wipes). Follow the steps below while the equipment is still in the quarantine room/area (**warm zone**):

- Ensure appropriate PPE is worn. For more information:
  - In acute care settings and HA-operated UPCCs, refer to Provincial Infection Prevention and Control Guidance for the Management of a High Threat Pathogen in Acute Care Settings.
  - In primary care settings and non-HA operated UPCCs, refer to Provincial Infection Prevention and Control Guidance for the Management of a High Threat Pathogen in Community-based Clinic Settings.
- With assistance from Biomedical Engineering (if required), remove and discard any air cleaning filters from the equipment, and dispose of in a designated biohazardous waste container used for HTP waste.
- Using approved product (e.g., new AHP or bleach wipes), disinfect **ALL EXTERIOR SURFACES** of the equipment using friction (rub/scrub motion).
- Do not allow disinfectant fluid to get inside the equipment (i.e., through ventilation or other openings).
- Disconnect all cables and transducers from the equipment and clean and disinfect separately.
- Clean and disinfect the power cord and plug separately.
- Using a mirror mounted on a handle in conjunction with adequate lighting (flashlight or inspection lamp), inspect the underside of the equipment, paying particular attention to the wheels and brakes.
- Ensure equipment surface remains wet for the required contact time as specified by disinfectant instructions for use. Reapply the disinfectant solution to meet the required contact time if the surface dries before the wet contact time is achieved. Then, allow to air dry.

- Dispose of all cleaning materials in a designated biohazardous waste container used for HTP waste.
- If the equipment cannot be effectively cleaned and disinfected, it should be taken out of service. Consult equipment-specific instructions for use, manufacturer's instructions for use or the manufacturer. Consult with Infection Prevention and Control and Biomedical Engineering, as needed.
- Submit a work request to Biomedical Engineering or the appropriate service based on the site/piece of equipment, to begin the next phase of cleaning and disinfecting the interior of the equipment. This request should clearly indicate the environment the equipment has been used in, that it has been subject to intermediate level disinfection, and is ready for the next phase of cleaning and disinfection.

3. Disassembly, Inspection, Cleaning and Disinfection of Interior of Equipment

After the intermediate level disinfection of the exterior is complete, the next phase is disassembly, inspection, cleaning and disinfection of the interior of the equipment. This work is done by Biomedical Engineering or other services as appropriate for the site/piece of equipment. Follow the steps below while the equipment is still in the quarantine room/area (**warm zone**):

- Ensure appropriate PPE is worn. For more information:
  - In acute care settings and HA-operated UPCCs, refer to Provincial Infection Prevention and Control Guidance for the Management of a High Threat Pathogen in Acute Care Settings.
  - In primary care settings and non-HA operated UPCCs, refer to Provincial Infection Prevention and Control Guidance for the Management of a High Threat Pathogen in Community-based Clinic Settings.
- Inspect the exterior of the equipment to ensure there is no visible contamination.
- Remove any remaining air cleaning filters from the equipment and dispose of in a designated biohazardous waste container for HTP waste.
- Remove the covers of the equipment and inspect all internal components for signs of internal contamination.
- Pay particular attention to areas around ventilation openings.
- If there are signs of internal contamination on the electronic circuitry:
  - Do not attempt to clean the equipment.
  - Cover and contain the entire piece of equipment in clear plastic wrap with a minimum thickness of four millimetres.
  - Tag the equipment as contaminated.
  - Report the contamination to personnel who have expertise with the equipment, and may include Biomedical Engineering, Respiratory Therapy, or Infection Prevention and Control, who will consult and advise on further action to be taken.

- If there are no signs of internal contamination of the electronic circuitry, use approved product (e.g., new AHP or bleach wipes) to clean and disinfect, where possible, all interior surfaces of the equipment (except the electronic circuitry).
- Do not allow cleaning fluids to get onto the electronic circuitry.
- After the interior has been inspected and cleaned/disinfected as per above, subject the open equipment to UVGI disinfection (if available, appropriate for the equipment and validated for use) while the equipment is in the quarantine room/area (**warm zone**).
  Note: This step may only be undertaken after the equipment has been thoroughly cleaned and all organic material removed. A technical expert should be consulted at the time of UVGI use to ensure adequate exposures are achieved and all internal areas are exposed to the UVGI.
- When the above steps have been completed, the equipment should be put back together.
- Ensure all tools used in the process are thoroughly cleaned and disinfected prior to removal from the quarantine room/area (**warm zone**). They should also be subjected to UVGI along with the equipment.

4. Re-assembly, Verification Testing and Return to Service

- Once the equipment has been cleaned and disinfected Biomedical Engineering or other services (as appropriate for the site/piece of equipment) will move the equipment to a place where routine performance and verification testing to ensure equipment is functioning properly can be performed. The identification tag will be removed, and a copy of the work order will be made available for the record of the event.
- When all testing has been successfully completed, the equipment may be returned to routine service. Each health authority will determine who will provide the authorization and under what conditions each piece of equipment may be placed back into routine service.