1.0 Scope of Guideline

This guideline provides a standardized procedure for cleaning and disinfecting hemodialysis (HD): (a) machines; and (b) stations (routine cleaning & disinfection only).

The guideline applies to the provision of hemodialysis (HD) and hemodialfiltration (HDF) in:
- In-centre HD units (both adult and pediatric units).
- Community dialysis units (CDUs).
2.0 Definitions

Rinse: Flushing the internal hydraulics of the dialysis machine with water that meets CSA dialysis standards.

Descalent: Removal of calcification / precipitate from within the internal hydraulics of the dialysis machine. i.e., citric acid or acetic acid-based product or removal of calcification.

Heat Disinfection: Destruction of pathogenic and other kinds of microorganisms by thermal means.

NOTE: Disinfection is a less lethal process than sterilization. It destroys most recognized pathogenic microorganisms but does not necessarily destroy all microbial forms.

Chemical Disinfection: Destruction of pathogenic and other kinds of microorganisms by chemical means. Chemicals can include: sodium hypochlorite (bleach), sodium carbonate, peracetic acid / hydrogen peroxide blend (i.e., Minncare, Dialox).

Descalent with Heat Disinfection: Combination of descalent and heat disinfection.

Machine Types:
- Artis = Baxter Gambro Artis
- Phoenix = Baxter Gambro Phoenix
- Fresenius = Fresenius 5008 CorDiax

3.0 Recommendations

Recommendation #1: Each HD unit develops a process to identify, update and document the frequency of machine disinfection required for a specific patient based on the frequency tables in recommendation #2.

Suggested mechanisms to identify the frequency of machine disinfection include:
* Nephrologist/Nurse Practitioner writes an order in the patient record; or
* Nephrologist/Nurse Practitioner provides education to the HD RNs/renal techs. HD RNs/renal techs identify the frequency.

Suggested location for documentation of Hepatitis B status and frequency of disinfection: HD log ("run" sheet).
Recommendation #2: Disinfect internal pathways, the external surface of the HD machine and peripheral equipment and accessories as per Tables 1, 2 and 3.

Standards on Tables 1, 2 and 3 are consistent with the Canadian Standards Association (CSA) standards with one exception noted in the footnote.

Table 1: Disinfection of Hemodialysis/HDF Machines & Peripheral Equipment & Accessories

<table>
<thead>
<tr>
<th>Recommendation</th>
<th>Internal Pathways&lt;sup&gt;2&lt;/sup&gt;</th>
<th>Blood Tubing Transducer Protectors</th>
<th>External Surface of HD Machine</th>
<th>Peripheral Equipment &amp; Accessories</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hep B: Refer to Table 2</td>
<td>Disinfect after each patient (even if two consecutive runs of Hep B+ patients). Disinfect after each patient. If using on-line priming or using machine for HDF, machine must be disinfected before each use (i.e., if machine used on previous patient for conventional HD, machine must be disinfected before using on-line priming or using for HDF). If not possible, do not use on-line priming (i.e., use saline) or for HDF.</td>
<td>If blood tubing transducer protector(s) comes in contact with a patient’s blood, remove HD machine from clinical care after treatment is completed for biomedical inspection &amp; disinfect machine PRN.</td>
<td>Disinfect after each patient &amp; before machine is moved from a patient area to another location. Refer to recommendation #2 for a description of routine disinfection of the dialysis station.</td>
<td>If single-use, discard. If can't discard, dedicate to single patient where possible (e.g., tape, tourniquet). Disinfect peripheral equipment used with HD machine (e.g., wands, BP cuff) after each patient.</td>
</tr>
<tr>
<td>Hep B status unknown</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>All other patients</td>
<td>Disinfect at end of day;&lt;sup&gt;3&lt;/sup&gt; AND Disinfect after patient if blood leak occurs</td>
<td>As per above. If not using on-line priming or using for HDF, disinfect as per instructions in column to the left (&quot;HD, no on-line priming or substitution fluid&quot;)</td>
<td>As per above.</td>
<td>As per above.</td>
</tr>
</tbody>
</table>

<sup>1</sup> The type of disinfection selected (heat, chemical or heat/descalent combination) will depend on the type of machine and the manufacturer’s recommendations for disinfection.

<sup>2</sup> Refer to Table 3 for specifics.

<sup>3</sup> CSA Standards (CSA Z364.2.1-13, 2013) states "the internal path of the HD machine shall be disinfected between each patient use." The rationale deviating from this is:

- Disinfecting at the end of the day (vs after each patient) is standard practice for conventional HD in BC and across Canada. There is no known evidence to suggest an increased risk of infection as a result not disinfecting between every patient.
- It may not be feasible in some units to disinfect after every patient (lengthens the time between treatments and could mean fewer treatments per day).
Internal Pathways

- Blood Tubing Protectors
- External Surface of HD Machine
- Peripheral Equipment & Accessories

**Recommendation**

- HD, no on-line priming or substitution fluid
- HD with on-line priming or HDF substitution fluid

outside the blood pathway (i.e., membrane is compromised & blood enters the dialysate pathway).

If blood was confirmed in the dialysate effluent, change the dialyzer, complete the run with the same patient, perform a heat or bleach disinfection, and pull the machine for Biomedical Engineering to inspect.

---

**Table 2: Hepatitis B Status & Disinfection of Hemodialysis/HDF Machines**

<table>
<thead>
<tr>
<th>Hepatitis B Status</th>
<th>Disinfection Recommendation</th>
</tr>
</thead>
<tbody>
<tr>
<td>HBsAg Negative</td>
<td>Susceptible Routine (as per &quot;all other patients&quot; on Table 1)</td>
</tr>
<tr>
<td>Anti-HBc Negative</td>
<td></td>
</tr>
<tr>
<td>Anti-HBs Negative</td>
<td></td>
</tr>
<tr>
<td>HBsAg Negative</td>
<td>Immune due to natural infection Routine (as per &quot;all other patients&quot; on Table 1)</td>
</tr>
<tr>
<td>Anti-HBc Positive</td>
<td></td>
</tr>
<tr>
<td>Anti-HBs Positive</td>
<td></td>
</tr>
<tr>
<td>HBsAg Negative</td>
<td>Immune due to hepatitis B vaccination Routine (as per &quot;all other patients&quot; on Table 1)</td>
</tr>
<tr>
<td>Anti-HBc Negative</td>
<td></td>
</tr>
<tr>
<td>Anti-HBs Positive</td>
<td></td>
</tr>
<tr>
<td>HBsAg Positive</td>
<td>Acutely infected Disinfect after each patient</td>
</tr>
<tr>
<td>Anti-HBc Positive</td>
<td></td>
</tr>
<tr>
<td>IgM anti-HBc Positive</td>
<td></td>
</tr>
</tbody>
</table>
Anti-HBs Negative

<table>
<thead>
<tr>
<th>HBsAg</th>
<th>Anti-HBc</th>
<th>IgM anti-HBc</th>
<th>Anti-HBs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Positive</td>
<td>Positive</td>
<td>Negative</td>
<td>Negative</td>
</tr>
</tbody>
</table>

Chronically infected
Disinfect after each patient

Interpretation unclear: 4 possibilities:
1. Resolved infection (most common)
2. False-positive-anti-HBc, thus susceptible
3. "Low level" chronic infection
4. Resolving acute infection
Disinfect after each patient if:
- HBV status unknown
- Confirmed HBV+; and
- Anti-HBs <10 IU/L

Source: Columns under "Hepatitis B status": Centers for Disease Control and Prevention (CDC).

**Table 3: Specifics re Disinfection of the Internal Pathways**

<table>
<thead>
<tr>
<th>Item</th>
<th>Recommendation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max time between disinfection and use</td>
<td>24 hours</td>
</tr>
<tr>
<td>Max storage time between disinfections, regardless of use</td>
<td>48 hours</td>
</tr>
</tbody>
</table>

Unless contraindicated by the machine manufacturer, place a low grade disinfectant into the machine if it is expected to sit for more than 48 hours.

If a machine has sat for more than 48 hours without a low grade disinfectant in it, perform 2 consecutive disinfections prior to patient use.

If a machine has sat for more than 7 days (regardless of whether it has had a low grade disinfectant in it), follow machine manufacturer’s recommendation for long-term storage. Before patient use, refer to Tables 1 & 2 for disinfection requirements if machine used for on-line priming or HDF.

| Max frequency for bleach or clean cart A disinfection | Artis: One clean cart A disinfection per week
Freshenius: Use bleach a maximum of once/week
All other machines: Refer to manufacturer’s recommendations |
| Min frequency for bleach or clean cart A disinfection | All machines: once/week |
| Descaling frequency | Artis: Daily
Phoenix: After every treatment
Freshenius: 6 times/wk |
<table>
<thead>
<tr>
<th>Item</th>
<th>Recommendation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Residual check post bleach disinfection</td>
<td>If use bleach, do residual check post-bleach disinfection (Artis does not use bleach)</td>
</tr>
<tr>
<td>Residual check post citric disinfection</td>
<td>Not required⁴</td>
</tr>
<tr>
<td>Incoming hoses</td>
<td>If possible, conduct integrated heat disinfectant of the incoming water hose weekly or monthly chemical disinfection of the hoses.</td>
</tr>
</tbody>
</table>
Recommendation #3: Utilize a standardized process for routine disinfection of the dialysis station, including the exterior surface of the dialysis machine.

Refer to Appendix 1 for a checklist of the important steps in Dialysis Station Routine Disinfection.

*Disinfectants:*
- All disinfectants must have a DIN number from Health Canada and be mixed according to manufacturer’s instructions.
- Use of a low level disinfectant is adequate for cleaning the external surface of HD machines.

*Selection of disinfectant:*
- Each manufacturer provides a list of disinfectants tested and validated for use on specific HD machines (refer to Table 4). Disinfectants not on this list have not been tested.
- HD units may also request approval from the manufacturer to utilize a specific disinfectant on a specific machine.
- If a disinfectant is used that has not been approved by the manufacturer, it could damage the machine and the warranty (if the machine is under warranty) may no longer apply.

<table>
<thead>
<tr>
<th>Machine</th>
<th>Manufacturer-approved Disinfectants</th>
<th>DO NOT USE Products</th>
</tr>
</thead>
<tbody>
<tr>
<td>Artis</td>
<td>Ethanol 60% or 70%</td>
<td>Products containing benzene, toluene, xylene, acetone or similar solvents.</td>
</tr>
<tr>
<td></td>
<td>Isopropanol 60%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Sodium hypochlorite 1.5%, except on touch screen, art &amp; ven pumps, air detector, blood sensor, hemoscan sensor, arterial &amp; venous line clamps and automatic pinch valves.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Ethanol 60% or 70%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Isopropanol 60%</td>
<td></td>
</tr>
<tr>
<td>Phoenix</td>
<td>Ethanol (90%)</td>
<td>As above.</td>
</tr>
<tr>
<td></td>
<td>Isopropanol 70%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Sodium hypochlorite (active chlorine from 50,000-60,000ppm; bleach/water ratio 1:50). Do not use on the blood pump crank.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Ethanol (90%)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Isopropanol 70%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Sodium hypochlorite (active chlorine from 50,000-60,000ppm; bleach/water ratio 1:50). Rinse after appropriate contact time.</td>
<td></td>
</tr>
<tr>
<td>Fresenius</td>
<td>Virox Accel Prevention wipes</td>
<td>As above.</td>
</tr>
<tr>
<td></td>
<td>Cavi Wipes, CaviWipes XL</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Sani-Cloth Plus</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Virox Accel Prevention wipes</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Cavi Wipes</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Sani-Cloth Plus</td>
<td></td>
</tr>
</tbody>
</table>

Recommendation #4: In the event of a large blood spill, utilize a standardized process for disinfecting the internal pathways of the HD machine and the dialysis station, including the exterior surface of the dialysis machine.

*Notes:*
- All hemodialysis machine-associated blood spills will be thoroughly cleaned and disinfected at the time of the spill.
• In the event of a hemodialysis machine-related large blood spill, where components of the machine may need to be taken apart for cleaning and disinfecting:
  o Take the machine out of service.
  o Clean the outside surfaces and perform internal disinfection per Appendix 1. NOTE: Visible contaminant on any surfaces should be wiped twice using an approved disinfectant wipe material.
  o Submit a work request to Biomedical Engineering.
  o Print the request and tape it to the machine. The request must clearly indicate there was a blood spill.

• If the blood spill was caused by suspected failure of bloodline or dialyzer component, and the renal program / unit has appropriate procedures and facilities in place to store contaminated supplies, the supplies should be saved for investigation (lot number must be reported).

• If blood spill occurred during the patient treatment and/or before blood was returned to the patient, a PSLS report must be completed by the nurse.

• If blood spill occurred after the patient treatment was completed and blood returned to the patient, a PSLS report must be completed by either the nurse or the renal technician/care aide.

**Recommendation #5: Utilize a standardized process for disinfecting small multiple-use items.**

Refer to Appendix 2 for a checklist of steps for disinfectant solution preparation and disinfection of small multi-use items.
4.0 References

**CSA Standards (CSA, 2013)**

CSA standard CAN/CSA-Z23500:12 (heat disinfection)
CSA standard CAN/CSA-Z23500:12 (chemical disinfection)
CSA standard CAN/CSA-Z23500:12 (descalent with heat disinfection)

**International Standards**

**KDIGO, 2008.**

**European Renal Best Practice Guidelines, 2009.** HCV+ patients (response to KDIGO guidelines)
http://ndt.oxfordjournals.org/content/early/2009/02/08/ndt.gfn608.short

**KDOQI, 2015.** HCV+ patients (response to KDIGO guidelines).
https://www.kidney.org/professionals/KDOQI/12-10-1601

**UK Renal Association, 2007;** BBV+ http://www.renal.org/guidelines/modules/blood-borne-virus-infection#sthash.6azLVUZH.dpbs (Guideline 2.1 - 2.5)


**Canadian Society of Nephrology (CSN), 2005.** BBV+ patients.

**Other**


3. Fresenius "Cleaning the 5008 CorDix: General External Cleaning Instructions."

Refer to Appendix 2 for a summary of the standards from various professional associations.
5.0 Sponsors

This provincial guideline was developed to support improvements in the quality of hemodialysis care delivered to patients with chronic kidney disease in BC. Based on the best information available at the time it was published, the guideline relies on evidence and avoids opinion-based statements where possible. When used in conjunction with pertinent clinical data, it is a tool health authorities and health professionals can use to develop local guidelines.

Developed by two working groups of renal care providers from across BC (biomedical and renal educators groups), the guideline was approved by the BCPRA Hemodialysis Committee and the BCPRA Medical Advisory Committee. It has been adopted by BCPRA as a provincial guideline.

This guideline is based on scientific evidence available at the time of the effective date; refer to www.bcrenalagency.ca for most recent version.

6.0 Appendices

Appendix 1: Checklist for Dialysis Station Routine Disinfection
Appendix 2: Checklist for Disinfecting Small Multi-Use Items
Appendix 3: Recommendations from National/International Standards
Appendix 1: Checklist for Dialysis Station Routine Disinfection

Preparation for Disinfection of the Dialysis Station

☐ Gather necessary supplies including:
• Personal protective equipment (PPE): eye goggles, gown and clean gloves.
• Properly diluted hospital disinfectant (with a DIN number from Health Canada) and wipes/cloths (separate wipe(s)/cloth(s) per machine).
• Biohazard disposal container(s)

☐ Perform hand hygiene.⁵

☐ Don gown, eye goggles and clean gloves.

☐ Disconnect and takedown used blood tubing and dialyzer from the dialysis machine.

☐ Discard tubing and dialyzers in a leak-proof container (container is brought to the dialyzer station or is placed as near to the station as is practical as part of the supply set-up in step 1).

☐ Check that there is no visible soil or blood on surfaces.

☐ If drain bag is still hanging, remove bag and empty in the soiled utility area.

☐ Ensure that the patient has left the dialysis station.

• Patients should not be removed from the station until they have completed treatment and are clinically stable.
• If a patient cannot be moved safely, delay routine disinfection of the dialysis station.
• If patients are moved to a separate seating area prior to removing cannulation needles or while trying to achieve hemostasis, disinfect the chairs and armrests in those areas in between patients.

☐ Discard all single-use supplies. Move any reusable supplies (e.g., clamps) to an area where they will be cleaned and disinfected before being stored or returned to a dialysis station. This may occur before or after the patient has left the station.

☐ Remove gloves and perform hand hygiene.

Routine Disinfection of the Dialysis Station

⁵ Perform hand hygiene at the beginning of this process, at the end and at any point there is a contamination.
Perform hand hygiene and don clean gloves.

Using a wiping motion (with friction), disinfect all surfaces in the dialysis station in contact with the patient and/or staff. e.g., dialysis chair or bed; tray tables; blood pressure cuffs; countertops; keyboard, etc.

Clean dialysis machine from top to bottom.
- If visible contaminant on the machine, wipe off using an absorbent material.
- Clean the machine using wipes/cloths with a disinfectant that is acceptable to the HD machine manufacturer and the HA renal program/infection control.
- Remove excess fluid from the wipes/cloth(s) prior to using to clean machine.
- Clean the monitor.
  - If available on machine, activate the wipe screen option (pauses the screen).
  - If any residue remains after cleaning, wipe down screen with a clean, dry cloth.
- Clean the top of the machine.
- If the machine has a door(s), clean the front first, then the insides of the doors.
- Clean all components of the main interface (screen) and the back of the machine* unless recommended otherwise by the manufacturer. e.g., sensors and optical detectors.
- Clean exposed surfaces of dialysate, concentrate, and bicarb connectors.
- Clean each side of machine.
- Clean the area between the main interface (screen) and brakes, including the shelf.
- Clean the brakes.
  * Frequency of cleaning back of machine is as per HA protocol.

Ensure surfaces are visibly wet with disinfectant but not dripping. Allow surfaces to air-dry. Air-drying is recommended to allow for sufficient contact time with the disinfectant.

Remove gloves, eye goggles and gown.

Perform hand hygiene.

**Special Note on Cleaning the Fresenius 5008 CorDix Hemodialysis Machine**

**AVOID** wiping the following areas (clean the plastic but NOT the sensor/connector):

- Venous pressure luer connector (carefully wipe around and do not allow wipe to cover the connector).
- Single needle pressure luer connector (carefully wipe around and do not allow wipe to cover the connector).

---

6 Perform hand hygiene at the beginning of the process, at the end and at any point there is a contamination.
☐ Blood/air detector.
☐ Temperature sensors.
☐ Blood volume monitor.

Do not bring patient or clean supplies to station until these steps have been completed.

References:
2. Fresenius "Cleaning the 5008 CorDix: General External Cleaning Instructions."
Appendix 2: Checklist for Disinfecting Small Multi-Use Items

Applies to facilities that do not use external medical device reprocessing (MDR) providers.

☐ Gather necessary supplies including:
  - Personal protective equipment (PPE): eye goggles, gown and clean gloves.
  - Disinfectant wipes.
  - Disinfectant concentrate (accelerated hydrogen peroxide).
  - Measuring cup.
  - 1-4L water (depending on number of items).
  - 1-4L container (clean).
  - Drying rack or clean absorbent cloths.

☐ The schematic process of disinfection is shown on the diagram below:

Perform hand hygiene.7

☐ Don gown, eye goggles and clean gloves.

☐ Discard solutions if containers are not empty.

☐ Prepare fresh solutions daily.

☐ Fill clean container with 1-4L of water.

☐ Add 25 mL of accelerated hydrogen peroxide per 1L of water (100mL of concentrate for 4L of water).

☐ Collect dirty small items in soiled utility room until ready to disinfect.

☐ Wipe any soiled items with approved disinfectant wipes.

7 Perform hand hygiene at the beginning of this process, at the end and at any point there is a contamination.
☐ Soak small items in solution for 5 minutes.

☐ Allow small items to air dry in drying rack or on clean absorbent cloth.

☐ Discard solutions at end of day.
## Appendix 3: National/International Standards (for background)

<table>
<thead>
<tr>
<th>Standards</th>
<th>Internal Pathways</th>
<th>Blood Tubing Transducer Protectors (Filters)</th>
<th>External Surface of HD Machine</th>
<th>Peripheral Equipment &amp; Accessories</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Canadian Standards Association (CSA, 2013)</strong></td>
<td>- Disinfect between each patient.</td>
<td>- If in contact with patient’s blood, remove machine from service &amp; change filter/disinfect machine PRN.</td>
<td>- Disinfect between patients &amp; before being moved from a patient area to another location.</td>
<td>- Disinfect between each patient.</td>
</tr>
</tbody>
</table>

- All patients (regardless if patient has BBV)

  - Disinfect between each patient.
  - If in contact with patient’s blood, remove machine from service & change filter/disinfect machine PRN.
  - If blood leak has occurred, disinfect internal pathways and dialysate-to-dialyzer (Hansen) connectors.
  - Dedicated machine not required.

**KDIGO, 2008**

- Variances for HCV+ patients.

  - Systematic review concluded that most Hep B spread is caused by cross-contamination from supplies and surfaces, not transmission via internal pathways of the HD machine. [http://www.kdigo.org/clinical_practice_guidelines/pdf/KDIGO%20Hepatitis%20C%20Guideline.pdf (guideline 3)]

  - No need to disinfect between patients unless a blood leak has occurred.
  - If blood leak has occurred, disinfect internal pathways and dialysate-to-dialyzer (Hansen) connectors.
  - Dedicated machine not required.

**European Renal Best Practice Guidelines, 2009**

- HCV+ patients (response to KDIGO guidelines)

  - Support KDIGO guideline.

  - Support KDIGO guideline.

  - Support KDIGO guideline.

  - Support KDIGO guideline.

**KDOQI, 2015**

- HCV+ patients (response to KDIGO guidelines)

  - Support KDIGO guideline.

  - Support KDIGO guideline.

  - Support KDIGO guideline.

  - Support KDIGO guideline.
<table>
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<tr>
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</tr>
</thead>
<tbody>
<tr>
<td><strong>UK Renal Association, 2007</strong>&lt;br&gt;BBV+&lt;br&gt;<a href="http://www.renal.org/guidelines/modules/blood-borne-virus-infection#sthash.6azLVUZH.dpbs">Guideline 2.1 - 2.5</a>&lt;br&gt;HBV+ &amp; HIV: Dedicated machine not required.&lt;br&gt;Standard disinfection protocol between patients.&lt;br&gt;(standard disinfection protocol not identified).&lt;br&gt;Hep B+: Use separate machine for Hep B+ infected patients. Can use for non-Hep B+ patients if machine decontaminated (including Hansen connectors &amp; pressure transducer ports unless double transducer protectors routinely used).&lt;br&gt;Same as CSA.&lt;br&gt;Same as CSA.&lt;br&gt;Hep B+: Use separate equipment &amp; accessories.</td>
<td><strong>Community &amp; Hospital Infection Control Association (CHICA) - Canada, Dialysis Interest Group, 2007</strong>&lt;br&gt;BBV+ patients&lt;br&gt;<a href="http://www.ipac-canada.org/cjic/vol22no4.pdf">page-220</a>&lt;br&gt;HCV+ and HIV+: Routine practices (doesn't identify what routine practices mean).&lt;br&gt;Hep B+: Clean &amp; disinfect between patients.&lt;br&gt;Hep B+: Clean &amp; disinfect between patients.&lt;br&gt;Hep B+: Clean &amp; disinfect between patients.</td>
<td><strong>Canadian Society of Nephrology (CSN), 2005</strong>&lt;br&gt;BBV+ patients&lt;br&gt;<a href="https://www.csnscn.ca/images/Docs_Misc/VAWG/The_Prevention_of_Transmission_of_Blood-Borne_Pathogens_in_Hemodialysis_Patients.pdf">page-220</a>&lt;br&gt;Follow manufacturers recommendations for frequency and types of cleaning and disinfection required.</td>
<td><strong>Follow manufacturers recommendations for frequency and types of cleaning and disinfection required.</strong></td>
<td><strong>Follow manufacturers recommendations for frequency and types of cleaning and disinfection required.</strong></td>
</tr>
<tr>
<td>Standards</td>
<td>Internal Pathways</td>
<td>Blood Tubing Transducer Protectors (Filters)</td>
<td>External Surface of HD Machine</td>
<td>Peripheral Equipment &amp; Accessories</td>
</tr>
<tr>
<td>-----------------------------------</td>
<td>------------------------</td>
<td>---------------------------------------------</td>
<td>--------------------------------</td>
<td>----------------------------------</td>
</tr>
<tr>
<td>Manufacturer's Guidelines (same for all types of HD machines)</td>
<td>As per CSA Standards</td>
<td>As per CSA Standards</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>