



# PROVINCIAL STANDARDS & GUIDELINES



## Dialysis Water Treatment Equipment Cleaning & Disinfection

December 2017

Developed by the BCPRA Hemodialysis Committee

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## IMPORTANT INFORMATION




This BCPRA guideline/resource was developed to support equitable, best practice care for patients with chronic kidney disease living in BC. The guideline/resource promotes standardized practices and is intended to assist renal programs in providing care that is reflected in quality patient outcome measurements. Based on the best information available at the time of publication, this guideline/resource relies on evidence and avoids opinion-based statements where possible; refer to [www.bcrenalagency.ca](http://www.bcrenalagency.ca) for the most recent version.

**For information about the use and referencing of BCPRA provincial guidelines/resources, refer to <http://bit.ly/28SFr4n>.**



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## 1.0 Scope of Guideline

This guideline applies to in-centre and community dialysis units (CDUs) that provide hemodialysis (HD) and/or hemodiafiltration (HDF). It is applicable to both adult and pediatric units.

The purpose of this guideline is to support the implementation of common standards and processes for cleaning and disinfection of the equipment used to treat dialysis water within BC's HD units.

## 2.0 Summary of the Literature & Internet

Patients undergoing conventional hemodialysis three times per week are exposed to 300-600 litres of water per week, depending on their prescription (Coulliette, 2013). More than 90% of the dialysate delivered to the dialyzer is water (Layman-Amato, 2013).

The source of water used in HD consists basically of drinking water, purified by various techniques, whose composition and quality depend on its origin. Water treatment systems employ several physical and/or chemical processes either singly or in combination. These systems may be portable units or large facility systems.

The quality of the source water can change from season to season or even day to day (Layman-Amato, 2013). Monitoring of the quality of water used for dialysis is a vital aspect of hemodialysis treatment. Minerals in the water can be toxic to patients and harmful to equipment.

## 3.0 Definitions & Abbreviations

**Cleaning:** Removal of foulants.

**Dialysis water:** Water that has been treated to meet the requirements of the CSA standard and is suitable for HD use in applications.

**Disinfection:** Destruction of pathogenic and other kinds of microorganisms by thermal or chemical means.

**Fouling:** The accumulation of unwanted material on solid surfaces to the detriment of function. The fouling materials can consist of either living organisms (biofouling) or a non-living substance (inorganic or organic).

**Product water:** Water produced by a water treatment system or individual component thereof.

**RO:** Reverse osmosis. Water is pushed through a membrane with pores small enough to remove most contaminants, including ions.

**Water treatment system:** Collection of water treatment devices and associated piping, pumps, valves, gauges, etc. that together produce treated water for hemodialysis applications and deliver it to the point of use.

## 4.0 Recommendations

**Recommendation #1: Clean and disinfect water treatment equipment according to Table 1.**

If a cleaning and disinfection is required, follow all steps in Table 1 (a cleaning is always followed by

disinfection). If only disinfection is required, follow the steps under “disinfection” and “frequency” in Table 1.

**Table 1: Components, Method & Frequency for Cleaning and Disinfecting Water Treatment Equipment**

Component		Cleaning	Disinfection	Minimum Frequency
RO system	No membrane heat disinfection	Clean with an acid cleaner and an alkaline cleaner as recommended by manufacturer.	Peracetic acid (e.g., Minncare, Dialox, AquaFX)	Unit specific, depending on feed water quality
	With membrane heat disinfection	Not required unless membranes are clogged. If required, clean with manufacturer's recommended solutions.	Heat	Weekly
Portable RO system	No membrane heat disinfection	Not required unless RO membranes are clogged or fouled. If cleaning is required, Clean with an acid cleaner and an alkaline cleaner as recommended by manufacturer.	Peracetic acid (e.g., Minncare, Dialox, AquaFX)	Unit specific, depending on product water quality
	With membrane heat disinfection	Some manufacturers require a chemical cleaning prior to heat disinfection, depending on feed water hardness.	Heat	Daily
RO distribution loops	Heat disinfected loop	Not applicable.	Heat	Daily or weekly
	Chemically disinfected loop	Not applicable.	Peracetic acid (e.g., Minncare, Dialox, AquaFX)	Quarterly

Notes:

1. If cleaning and disinfection does not provide the expected results, consider contacting the RO vendor.
2. The frequency of RO cleaning due to fouling will vary by unit. A rough rule of thumb is to clean once every 3 - 12 months. If the RO requires cleaning more than once a month, capital expenditures for improved RO pre-treatment should be justifiable, or a redesign of the RO operation should be done.
3. Flush routinely (manual or auto flush) if possible as a way to reduce bacterial growth.
4. If there is the ability to connect your portable to flush and disinfect using RO source water, it may reduce bacterial growth and extend the life of the machine.

**Recommendation #2: Document cleaning and disinfection of water treatment system on designated log sheet(s).**

Log sheets will be site or manufacturer-specific.

## 5.0 Procedure

The procedure for cleaning and disinfecting water treatment systems is dependent on the system.

General principles include:

1. Clean and disinfect the water treatment system when no patients are present or, at a minimum, patients are physically disconnected from any live loop. If procedure is automated (chemical disinfection), schedule outside patient dialysis times.
2. Record values pre-cleaning.
3. Follow the manufacturer’s guideline for cleaning and disinfection, including the recommended chemicals, dosage, pH, temperature and contact time guidelines. Ensure proper disposal of chemicals.
4. Check to make sure there is no residual chemical prior to reconnecting to the patient loop.
5. Record values post-cleaning.

## 6.0 References

### CSA Standards (CSA)

*CSA Standards (CSA, 2013)*

CAN/CSA-Z23500-12-Guidance for the preparation and quality management of fluids for haemodialysis and related therapies, *Canadian Standards Association*, March 2012.

Wayne T. Bates, Cleaning Your RO, Hydronautics (www.membranes.com). [http://www.membranes.com/docs/papers/02\\_cleaning.pdf](http://www.membranes.com/docs/papers/02_cleaning.pdf). Accessed May 3, 2016.

### Articles

Coulliette, A. and Arduino, M. (2013). *Seminars in Dialysis*, 26:4 (July-August), p.p., 427-438. <http://onlinelibrary.wiley.com.ezproxy.library.ubc.ca/doi/10.1111/sdi.12113/epdf>. Accessed Sept 10, 2015.

Layman-Amato, R, Curtis, J and Payne, G (2013). *Nephrology Nursing Journal*, 40:5 (September-October 2013), p. 383. <http://go.galegroup.com.ezproxy.library.ubc.ca/ps/i>. Accessed Sept 10, 2015.

## 7.0 Sponsors

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Developed by:

- a working group of biomedical/renal technicians from across BC (one per health authority)

Approved by:

- BCPRA Hemodialysis Committee
- BCPRA Medical Advisory Committee

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