



PROVINCIAL STANDARDS & GUIDELINES



Helping in the Hemodialysis Unit: Information for Non-trained Hemodialysis Staff

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Developed by the BCR Hemodialysis Committee



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IMPORTANT INFORMATION

This BC Renal 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.bcrenal.ca for the most recent version.

For information about the use and referencing of BC Renal provincial guidelines/resources, refer to <http://www.bcrenal.ca/health-info>.




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1.0 Welcome

Welcome to our Hemodialysis (HD) Unit. Thank you for your willingness to support our program. Our team is excited to work with you.

This booklet provides information that will be helpful in your early hours/days working on our HD unit. While it will answer some of your questions, please feel free to approach any member of the team for more information.

Working on a unit or in a specialty that you have not previously worked on can be anxiety-provoking even for experienced staff. But please know that we are here to help! You are the best one to know your own strengths and limitations - if you are asked to do something that makes you feel uncomfortable, please let the charge nurse/team leader/hemodialysis nurse know. We will help meet your learning needs and/or adjust what we have asked you to do.

2.0 About Hemodialysis

When kidney function deteriorates to 10-15% of normal, toxins build up in the blood and extra fluid builds up in the tissues. This makes patients feel unwell and causes symptoms such as nausea, fatigue, itching, difficulty sleeping, forgetfulness, shortness of breath and sometimes, swelling. HD removes these toxins and excess fluid from the bloodstream ("cleans the blood"). Dialysis is not a cure for kidney disease. It is not as efficient as a healthy functioning kidney.



In HD, blood is withdrawn from a patient's body by a machine (HD machine) and passed through an artificial kidney (called a dialyzer). The dialyzer is attached to the machine and is responsible for cleaning the blood. The cleaned blood is returned to the patient.

HD helps to:

- a. Balance electrolytes (i.e., potassium, chloride, sodium etc.)
- b. Remove excess water
- c. Remove waste products (i.e., urea, creatinine, phosphorus etc.)
- d. Correct acid/base imbalance by adding bicarbonate
- e. Remove some drugs and other toxins.

HD is not painful, but some patients complain of feeling a bit sick and dizzy and some have muscle cramps during the treatment. These symptoms are caused by rapid changes in blood fluid levels that happen during the treatment.

Most people need 3 sessions of HD a week, with each session lasting around 4 hours. This can be done in hospital (as an inpatient or outpatient) or at home.

3.0 The Hemodialysis System

The HD system consists of several components:

1. **Vascular access** (patient's lifeline): Way of accessing the bloodstream over and over again. Each HD treatment, this access is accessed and connected by a tube to the HD machine. One tube takes blood to the machine to be cleaned. Another tube returns the clean blood to the body.

The 2 most common types of vascular accesses are:

- a. **Fistula (AVF)** - A vein and artery are surgically connected. The flow of blood in the artery is much faster and stronger than the flow of blood in the vein. When the artery and vein are connected, blood from the artery causes the vein to become larger and stronger. The enlarged vein is then used as the site for inserting needles to connect to the dialysis machine via tubing. Occasionally when a person does not have vessels suitable for a fistula, a short piece of tubing is used to connect the artery and vein (this is called a graft).
- b. **Central Venous Catheter (CVC)** – A CVC may also be used as a method of accessing the bloodstream for some patients. A CVC is two soft tubes joined together side-by-side. One end of the catheter is inserted into a large vein (usually the jugular vein at the side of the neck), while the other end sticks out through the skin. CVCs may be either long-term (**tunnelled or “cuffed”**) or short-term (**non-tunnelled or “non cuffed”**).

Vascular Access



Fistula

Catheter

2. **Dialysis machine:** The dialysis machine houses a computer, a pump, a dialyzer, and a dialysis solution. The computer monitors blood flow, blood pressure and how much fluid gets removed from the patient's body during treatment. The pump removes blood from the patient and sends it to the dialyzer where the blood is “cleaned” and returned to the patient. Fresenius 5008 and the Baxter Artis Physio are the two most common types of HD machines used in BC.



3. **Dialyzer (also called an artificial kidney):** The dialyzer is attached to the HD machine. It has 2 spaces: a space for blood and space for dialysate

(dialysis fluid). A very thin artificial membrane separates the two spaces from each other. Blood passes on one side of the membrane and dialysate passes on the other side. Waste products and water pass from the blood through the membrane into the dialysis fluid and are removed from the body. The freshly cleaned blood is constantly returned to the body.

4. Dialysis solution (also called dialysate or dialysis bath): Dialysate is a solution of pure water, electrolytes, and salts such as bicarbonate and sodium. The dialysate solution is prescribed by the nephrologist (kidney doctor) and tailored to the patient's blood work.

5. Bloodline tubing: Tubing transports blood to and from the patient and the dialysis machine.

4.0 A Typical “Run” for a Hemodialysis Patient

From the perspective of the patient, a typical HD treatment (also called a “run”) includes:

- a) Patient is screened for infectious diseases (e.g., COVID-19, influenza). Adjustments are made to the treatment plan, as required.
- b) Patients weigh themselves (assistance is provided, as needed). Weight is important because it affects how much fluid will be removed during the dialysis run (called the “dry weight”). If the patient weighs with a jacket or shoes, the weight of those garments will need to be weighed separately and subtracted.
- c) Baseline vital signs are taken (BP, HR and temperature).

- d) Patient is prepared for dialysis:
 - Access site is cleaned.
 - Needles are inserted (if fistula or graft). Usually, the nurse inserts the needles, although some patients prefer (and are encouraged) to do it themselves.
 - Needles are connected to the tubing is connected to the dialyzer.
- e) Dialysis treatment begins. Blood is pumped via tubing to the dialyzer for “cleaning” and the “cleaned” blood is returned to the patient via another tube. Blood pressure is monitored throughout the treatment and medications may be provided.
- f) Patient is seated in a comfortable chair or bed/ stretcher to receive their treatment (also called HD station). They may watch movies or TV, rest, read or socialize with other patients.
- g) When the treatment is complete:
 - a. Fistula or graft: Access needles are removed (if fistula or graft). The patient is instructed to hold their own needle sites for 10 minutes (assistance is provided, as needed). When the bleeding stops, gauze is taped in place and stays on for 4 – 6 hours.
 - b. Catheter: The catheter is clamped, tubing is disconnected, and the tails of the catheter (lumens) are flushed with normal saline and anticoagulant agents such as 4% sodium citrate or heparin. The catheter is secured to the patient's body.
- h) Before leaving the HD unit, the patients are asked to weigh themselves (assistance is provided, as needed) and vital signs are checked to make sure the patient is stable prior to leaving the unit.

5.0 A Typical “Day” in a Hemodialysis Unit

***This is meant as a guide and may vary in each HD unit. ***

TIME	ACTIVITIES
0700 - 0730	<ul style="list-style-type: none"> Report is given on all patients attending dialysis on this day. The nurse in charge will assign you to your duties after report.
0730 - 0900	<ul style="list-style-type: none"> Morning patient hook-up. Patients are assessed by the HD nurse. The vascular access is assessed and accessed, and machine hook-up is completed by the HD nurse assigned to the patient. Once the nurse feels the patient is safely on dialysis, the HD nurse moves to the next patient for hook-up and assessment. The HD nurse may have 3 or 4 patients to hook up in a staggered “hook-up” arrangement.
0900 - 1100	<ul style="list-style-type: none"> Bedside safety checks/documentation every hour or as needed Machine alarm and VA troubleshooting & monitoring Continuous patient monitoring and machine Medication administration Nursing interventions Patient comfort Staggered coffee breaks to ensure there is always coverage on the unit
1100 - 1130	<ul style="list-style-type: none"> Report for the afternoon shift staff. The nurse in charge will assign you to your duties after report.
1130 - 1230	<ul style="list-style-type: none"> Morning patients’ treatment is completed Take-off procedure begins HD nurse will assess the patient post-dialysis to ensure readiness to leave Post-dialysis medications given Lunch break with staggered coverage Patient is weighed post-dialysis <p>The time from 1130 - 1300 is known as <i>turn-over</i>. Morning patients have completed treatment and afternoon patients are starting treatment.</p>
1200 - 1300	<ul style="list-style-type: none"> Afternoon patient hookups Patients are assessed by the HD nurse. The vascular access is assessed and accessed, and machine hook-up is completed by the HD nurse assigned to the patient. Once the nurse feels the patient is safe to leave, the HD nurse moves to the next patient for hook-up and assessment. The nurse may have 3 or 4 patients to hook up in a staggered arrangement.

TIME	ACTIVITIES
1300 - 1600	<ul style="list-style-type: none"> • Bedside safety checks every hour or as needed • Medication administration • Nursing interventions • Patient comfort • Staggered coffee breaks to ensure there is always coverage on the unit
1500	<ul style="list-style-type: none"> • Report for the evening shift. The nurse in charge will assign you to your duties after report.
1600 - 1730	<ul style="list-style-type: none"> • Afternoon patients' treatment is completed • Take-off procedure begins • HD nurse will assess the patient post-dialysis to ensure readiness to leave • Post-dialysis medications given • Dinner break with staggered coverage <p>The time from 1600 - 1800 is known as <i>turn-over</i>. Afternoon patients are finished treatment and evening patients are starting treatment.</p>
1630 - 1800	<ul style="list-style-type: none"> • Evening patient hookups • Patients are assessed by the nurse. • The vascular access is assessed and accessed and machine hook-up is completed by the HD nurse assigned to the patient. • Once the nurse feels the patient is safe to leave, the HD nurse moves to the next patient for hook-up and assessment. • The HD nurse may have 3 or 4 patients to hook up in a staggered arrangement.
1800 - 2100	<ul style="list-style-type: none"> • Bedside safety checks every hour or as needed • Medication administration • Nursing interventions • Patient comfort • Staggered breaks to ensure there is always covered on the unit
2100 - 2200	<ul style="list-style-type: none"> • Evening patients' treatment is completed • Take-off procedure begins • HD nurse will assess the patient post-dialysis to ensure readiness to leave • Post-dialysis medications given
2200 - 2300	<ul style="list-style-type: none"> • Ensure all patients are safe to go home • Clean up • Equipment and supplies ready for morning shift

6.0 Hemodialysis Safety

There are 4 main safety risks to be particularly mindful of in an HD unit:

1. Infection prevention/control
2. Blood spills and contamination
3. Patient falls
4. Access dislodgement

6.1 Infection Prevention/Control

Standard Precautions used in the HD Unit

Below are some techniques for reducing the transmission of infections between staff and patients.

- a) Hand hygiene - Consistent hand hygiene is the single, most effective way to prevent the spread of infectious organisms. Wash or sanitize hands before and after every patient contact and before donning and after removing gloves. Alcohol-based hand sanitizers may be used for hands that are not visibly soiled with body fluids. For hands that are visibly soiled, use soap and water.
- b) Gloves – Wear disposable, single-use, non-sterile (clean) gloves whenever direct contact with non-intact skin, mucous membranes, blood, or other body fluids is anticipated. Change gloves between patients or when soiled. Wear gloves only when in treatment areas.
- c) Gowns, goggles and/or face shields – Wear when spraying or splashing of body fluids is a risk. Change gowns between clients or when soiled. Wear gowns only when in treatment areas.

- d) Sharps disposal – Place all sharps in puncture-resistant sharps containers located as close as possible to the area of use. In the HD setting, the sharps container may be wheeled to the bedside for ease of access and to decrease the risk of needle stick injury. When a container is three-quarters full, close the container and discard in the biohazardous waste.

Aseptic Technique

Infections are a leading cause of morbidity and mortality in HD patients. Vascular access-related infections are the most common cause, particularly in patients dialyzing with a catheter.

The use of aseptic technique is important in preventing infection by preventing or minimizing the introduction of infection-producing microorganisms (contaminants) into areas of the body where they may cause harm (infection). Below are some basic principles of aseptic technique.

- a) Select a clean work area free of drafts, dust, and traffic. Avoid coughing and sneezing. This prevents contamination of the equipment by way of air currents and droplets.
- b) Use a smooth, nonporous surface as a work area. Porous surfaces may trap bacteria and are difficult to clean.
- c) Store supplies away from other items such as food or cleaning solutions. This will help prevent cross-contamination.
- d) **Always** discard items that you know or even suspect might be contaminated. “When in doubt, throw it out!” (e.g., when something falls on the floor or you touch it with bare hands).

- e) Allow only sterile surfaces to touch sterile surfaces when opening, piercing, or connecting sterile items. This prevents contamination of sterile equipment.
- f) When making a sterile connection, **always** keep the connection in your line of sight. You will know that the connection remains sterile.
- g) **Always** before use, check that sterile packages are: sealed, intact (no rips or tears) and dry. Equipment/supplies in an open or damp package are considered unclean/contaminated and cannot be used.
- h) **Always** check your equipment for expiry dates prior to use. Items with expired dates are not to be used.
- i) **Always** remove your gloves when you have finished a procedure and wash your hands.

6.2 Blood Spills and Contamination

Spillages of blood, body fluids or other potentially infectious materials may lead to the spread of infectious agents within the HD unit and should be dealt with promptly. Below are some basic principles of handling blood spills.

- a) If you have not been trained in the proper disinfection procedures for the handling of spillages of blood and other body fluids, please ask your HD Team Leader or colleagues.
- b) Wear appropriate personal protective equipment (PPE) when dealing with spillages of blood and other body fluids. PPE should include a gown, gloves, goggles or face shield, and a mask.

- c) For spillage of blood, body fluids and other potentially infectious substances, use disposable absorbent material to clean the visible matter. Then mop the spillage area with a cloth or paper towel(s) wetted with 1 part of household bleach (5.25% hypochlorite solution) in 4 parts of water, and leave for 10 min. After 10 min, rinse the area with water. This solution may need to be prepared depending on the unit policy.
- d) Remove the PPE and perform hand hygiene after handling the spillage of blood or other body fluids.

6.3 Preventing Patient Falls

HD patients are at increased risk of falling for several reasons, including:

- Shift in fluid and electrolytes (patients are more likely to fall at the end of their dialysis run)
- Low blood pressure
- Blood loss during dialysis treatment
- Frailty and age
- Drug interactions
- Comorbidities (e.g., diabetic neuropathy, impaired vision, cardiac disease)

When patients do fall, they are at increased risk of bleeding, hematomas, and other life-threatening issues because they have heparin in their bloodstream from treatment.

Here are some basic principles of fall prevention in an HD unit:

- a) If a patient needs to go to the washroom during dialysis:
 - Check the patient's blood pressure before disconnecting the patient from HD. Note: The urge for a bowel movement is an indication that the blood pressure is about to drop.
 - The hemodialysis nurse will return the patient's blood from the machine before the patient goes to the washroom.
 - Accompany the patient to the washroom. Often blood is left in the dialysis machine, and the patient may feel dizzy from volume depletion.
 - Ensure the patient has the call bell in hand before shutting the door. Do not lock the bathroom door and stay near the washroom entrance to ensure you can respond accordingly.
 - Accompany the patient back to the dialysis chair. Further volume depletion after using the washroom could increase the risk of a fall.
- b) Perform sitting and standing blood pressure at the end of dialysis.
- c) Accompany patients to the scale post-dialysis. Often, patients feel dizzy and may fall at the scale. Remind patients to hold the rail on the scale.

- d) If a patient has low blood pressure, do not let them leave the dialysis unit until the blood pressure is in a safe range. Patients may fall in the elevator/hallway if their blood pressure is low. The BP safe range should be charted on previous run logs or in the patient kardex.

6.4 Vascular Access Disconnection/Needle Dislodgement

A serious complication of HD is vascular access disconnection/needle dislodgement.

- Dislodgement = Fistula/graft needle or catheter falls out.
- Disconnection = Separation of vascular access line(s).

The most common causes of vascular access disconnection/needle dislodgement include:

- Poorly secured access. e.g., improper taping of access tubing to the skin, loose tubing connection, bloodlines not looped loosely enough, small needles.
- Patient factors. e.g., confused, restless, agitated, cognitively impaired &/or sedated, frequent manipulation of lines and connections, excessive movement of arm or body, hypotension or muscle cramps during treatment, diaphoresis, or pruritus, nonadherent skin (e.g., excess body hair, waxy skin), unwilling to keep access areas & bloodlines uncovered or on nocturnal HD.

Signs and symptoms of vascular access disconnection/needle dislodgement include:

- Blood circuit pressure alarm (venous or arterial) **BE AWARE:** Pressure alarms are not always reliable & may not provide an alert
- Patient reports moisture in the area of access
- Visible blood leakage or spray
- Hypotension with alteration in level of consciousness

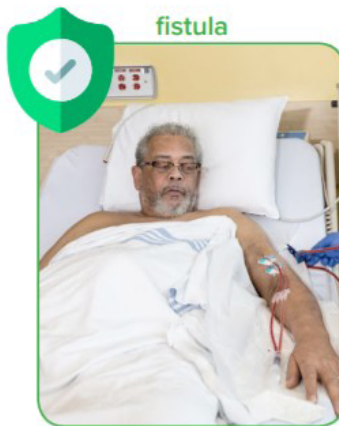
If you notice any of these signs/symptoms, call for help. An HD nurse will provide direction for the next steps.

To prevent vascular access disconnection/needle dislodgement:

- Visibly check the access, needle sites, bloodline positions & all luer connections as part of routine monitoring.
- Remind the patient to (1) keep their access area & bloodlines visible at all times; (2) regularly check their access during dialysis; (3) avoid touching the needles/catheter, connection or tape holding the access during dialysis; and (4) to be aware of access when moving (move slowly).



Don't hide your access under a blanket!



Keep your access in plain sight.

7.0 Helping in the Hemodialysis Unit

Here are some of the activities that you may be asked to assist with in a HD unit. There will always be a HD nurse to support and advise you.

	HD Trained Nurse (RN, LPN)	Non-HD Trained Nurse (RN, LPN)	Non-HD trained staff (Employed Student Nurse, Technician, Health Care Aide, Allied Health)
<p>Scope</p> <p>Refer to:</p> <ul style="list-style-type: none"> • Matching Skill Mix Document (BC Renal) • BCCNM RN Scope of Practice • BCCNM LPN Scope of Practice 	<p>Nursing care is provided using a team-based or primary care model. If a team-based model, care may be shared with a non-HD trained nurse(s), with the HD trained nurse(s) providing all HD-specific care.</p>	<p>Nursing care is provided in a team-based model. Responsibility for patients is shared with an HD trained nurse(s) who provides all HD-specific care.</p>	<p>Nursing care is provided in a functional team-based model. An HD-trained nurse(s) assumes overall responsibility for the care. Each member of the team is assigned aspects of care that are within their scope & competency.</p> <p>Staff can only perform activities for which they have been trained in post-secondary school, and if authorized by the unit.</p>
<p>Activities (examples)</p>	<p>All activities under Non-HD trained nurse PLUS:</p> <p>HD-specific care including:</p> <ul style="list-style-type: none"> • Sets up HD machine • Puts patients on HD, takes off HD • Cannulates AVF/AVG • Accesses CVC, caps off CVC • Administers alteplase • Changes CVC dressing • Takes action on HD machine alarms • Transonic measurements • Disinfects HD machines 	<p>All activities under Non-HD trained staff column PLUS:</p> <p>Care of patients before, during and after dialysis:</p> <ul style="list-style-type: none"> • Head to toe assessment • Non-HD-specific nursing care (e.g., oxygen support, glucometers) • Medications (PO, SQ and IM) • Second checker for IV antibiotics / infusions/narcotics/blood products • Drainage tube care • Pain & symptom assessment & management 	<p>Before dialysis:</p> <ul style="list-style-type: none"> • Infectious disease screening (e.g., COVID-19, influenza) • Weighs patient and records findings • Settles patient • Takes and records vital signs (if training complete & unit policy permits) • Ensures access to call bell <p>During dialysis:</p> <ul style="list-style-type: none"> • Basic care (hygiene)/toileting • Patient comforts (e.g., blanket, pillow, adjust bed, ice chips)

	HD Trained Nurse (RN, LPN)	Non-HD Trained Nurse (RN, LPN)	Non-HD trained staff (Employed Student Nurse, Technician, Health Care Aide, Allied Health)
		<ul style="list-style-type: none"> • Monitors and supports challenging behaviors • Monitors patients before, during and after dialysis (e.g., visual checks, vital signs, safety monitoring, bleeding from access, etc). <p>Other:</p> <ul style="list-style-type: none"> • Prepares blood work tubes, assists with identification/labelling • Prepares supplies for HD, with guidance (e.g., take-off trays) • Bed space safety checks e.g., O2 flow meters; suction, emergency cart • Chart checks 	<ul style="list-style-type: none"> • Takes and records vital signs (if training complete) • Responds to patient call bells • Alerts HD nurse to machine alarms/changes in patient's condition/safety issues • Anticipates portering needs and prepares/assists with transfer • Prepares HD take-off supplies (this will be discussed with the HD nurse) <p>After dialysis:</p> <ul style="list-style-type: none"> • Holds sites once needles are removed, applies dressing • Weighs patient and records findings • Takes and records vital signs (if training complete) • Assists with porting patient, if needed • If applicable, cleans and disinfects HD station post HD (e.g., wipe down bed, table, non-HD equipment) <p>Other:</p> <ul style="list-style-type: none"> • Makes patient transport arrangements (e.g., HandyDART, call family members for pick-up) • Answers telephones • Assists with workflow/supply stocking • Pulls charts, sets up tables for next shift • Assists in moving chairs/beds, HD machines when needed

8.0 Resources

In addition to the HD team, additional websites that may be helpful include:

www.bcrenal.ca/health-professionals/clinical-resources/hemodialysis

www.bcrenal.ca/health-professionals/clinical-resources/vascular-access

<https://kidney.ca/Support/Resources/Living-With-Kidney-Failure#> (Living with Kidney Failure, Book Two)

Appendix I: Unit Orientation Checklist

Name: _____ Orientation done by: _____ Date: _____

UNIT TOUR	COMPLETE
<input type="checkbox"/> Unit lay-out: Introduction to staff	
<input type="checkbox"/> Staff sign-in sheet	
<input type="checkbox"/> Assignment sheet/board	
<input type="checkbox"/> Patient boards/charts	
<input type="checkbox"/> Patient drop-off and pick up/routines	
<input type="checkbox"/> Patient screening process	
<input type="checkbox"/> Phone numbers	
<input type="checkbox"/> Nephrologists	
<input type="checkbox"/> Emergency numbers	
<input type="checkbox"/> Hospital operator	
<input type="checkbox"/> Break entitlement/times 1) _____ 2) _____ 3) _____	
Location of: <ul style="list-style-type: none"> <input type="checkbox"/> Blanket warmer <input type="checkbox"/> Clean room (supply room)/dirty room <input type="checkbox"/> Cleaning supplies <input type="checkbox"/> Code blue button <input type="checkbox"/> Commodes <input type="checkbox"/> Evacuation exits: extinguishers & fire alarm <input type="checkbox"/> Eye wash station/sink <input type="checkbox"/> Glucometers <input type="checkbox"/> Isolation rooms & signs <input type="checkbox"/> Kitchen/ice machine <input type="checkbox"/> Linen & dirty linen <input type="checkbox"/> Lounge: staff & patient <input type="checkbox"/> Medication fridge (for ESA) <input type="checkbox"/> Medication room <input type="checkbox"/> O2 saturation machines <input type="checkbox"/> PPE locations <input type="checkbox"/> Supply carts <input type="checkbox"/> Thermometers <input type="checkbox"/> Ultrasound machines & pumps <input type="checkbox"/> Washroom and codes (staff & patient) <input type="checkbox"/> Weigh scales 	
Comments:	