# MANITOBA RENAL PROGRAM

## POLICY AND PROCEDURE MANUAL

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MANITOBA RENAL PROGRAM

POLICY AND PROCEDURE MANUAL

TERMS OF REFERENCE

PURPOSE:

To provide a forum for the development, revision, approval and implementation of the policies, procedures, protocols and standards of care used in the Manitoba Renal Program, in order to ensure:

1. Provision of quality patient care in a safe and cost effective manner.
2. Standardization of patient care.
3. Adherence to practice standards as outlined by CRNM, CNA, CANNT, CSN and KDOQI Guidelines.

OBJECTIVE:

1. To collaborate in the development, revision, approval and implementation of policies, procedures, protocols and standards of care which provide direction on the scope, function and responsibility for patient care.
2. To communicate with and to seek approval for provincial dialysis policies and procedures within Brandon Regional Health Centre (BRHC); Health Sciences Centre (HSC) including Manitoba Local Centres Dialysis Units (MLCDU); St. Boniface General Hospital (SBGH); and Seven Oaks General Hospital (SOGH).
3. To liaise with all members of the intraprofessional team.
4. To review nursing policies, procedures, protocols and standards of care at least every two years and revise as required.

MEMBERSHIP:

Ex-Officio:
Program Director, Medicine, SBGH
Director of Patient Services, Renal Program, HSC
Director of Specialty Care Areas, SOGH

Ad Hoc:
Infection Control Nurse, BRHC
Infection Control Nurse, SBGH
Infection Control Practitioner, HSC
Infection Control Practitioner, SOGH
Director, Infection Prevention and Control Program, WRHA
Medical Coordinators, Hemodialysis
Medical Coordinator, Peritoneal Dialysis
Hemodialysis, Pediatric Program, HSC
Peritoneal Dialysis, Pediatric Program, HSC
Pharmacy Representative, Manitoba Renal Program
Dietician Representative, Manitoba Renal Program
Designated:
Program Director, Manitoba Renal Program, WRHA
Nursing Program Manager, Ambulatory Care, BRHC
Clinical Resource Nurse, Dialysis, BRHC
Manager of Patient Care, Dialysis, HSC
Clinical Resource Nurse, Dialysis, HSC (x2)
Clinical Practice Nurse, Dialysis, HSC (x2)
Renal Educator, HSC
Renal Vascular Access Nurse, HSC
Community Dialysis Nurse, HSC
Clinical Resource Nurse, MLCDU (x2)
Program Team Manager, Nephrology, SBGH
Clinical Resource Nurse, Dialysis, SBGH (x2)
Continuing Education, Instructor, SBGH
Clinical Practice Nurse, Hemodialysis, SBGH
Clinical Practice Nurse, PD, SBGH
Dialysis Access Nurse, SBGH/SOGH
Technical Manager or Dialysis Technologist delegate
Patient Care Team Manager, SOGH
Continuing Educator, SOGH
Clinical Resource Nurse, SOGH
Clinical Practice Nurse, Hemodialysis, SOGH (x2)
Clinical Practice Nurse, PD, SOGH
Regional Educator, WRHA, MRP

CHAIRPERSON:

Appointed by the Membership for a two-year term.

Responsibilities:
- To organize meetings held on a monthly basis.
- To circulate an agenda and minutes one week prior to each meeting.
- To circulate specific procedures to representatives for development and review.

COMMITTEE REPORTING RELATIONSHIP:

The Committee reports to the Manitoba Renal Program Professional Advisory Committee.

PROCESS:

1. Terms of Reference will be reviewed every two years.

2. Agenda and Minutes will be distributed to designated members.

3. Decisions concerning changes to existing or development of new policies and procedures will be made by the designated members by consensus, according to evidence-based research, documentation, literature, manufacturers’ recommendations, standards, safety and cost effectiveness.

4. Designated members are responsible for supporting and promoting revised policies and procedures to their colleagues. Designated members will provide information to their respective areas on request. Terms of Reference and minutes will be provided to the staff.

5. All written comments received will be considered at the table.

6. Meetings may occur by conference call.
PURPOSE:

1. To provide hemodialysis to patients who are at high risk for bleeding and who are not suitable candidates for low doses of heparinization.

POLICY:

1. Heparin-free dialysis can be initiated based on nursing assessment. Notify physician prior to patient’s next treatment.

2. Long term heparin-free hemodialysis treatments require a physician’s order.

3. Indications for heparin-free dialysis would include (but not exclusively):
   - A decline in platelets by 50%
   - Patient with prolonged bleeding and bleeding episodes
   - Patients at risk for bleeding
   - Patients with or suspected Heparin-Induced Thrombocytopenia (HIT)

PROCEDURE:  

A. Prepare System

   1. Prepare delivery system according to MRP Procedure 30.20.01: Use of Fresenius 2008K Delivery System.

B. Method I: Intermittent Normal Saline Flushes

   1. Establish vascular access using 0.9% NaCl as prime.

   2. Initiate dialysis as per procedure.  
      - Heparin line remains clamped. Check that cap is securely fastened to end of line.
PROCEDURE:

3. Perform saline flushes every half hour as follows:
   a. Turn blood pump down to 200 mL/minute.
   b. Open clamp on administration line and saline T line.
   c. Clamp arterial blood line between patient and arterial chamber before T-line.
   d. Infuse 100 mL of saline over 30 seconds.
   e. Observe dialyzer and chamber for failure to clear and estimate fiber loss.
   f. Unclamp arterial blood tubing between patient and the arterial chamber.
   g. Clamp both saline administration set and T line.
   h. Resume desire blood flow rate.
   i. Press override.
   j. Document flush volume and observations on Hemodialysis Treatment Record.

4. Monitor the following parameters during treatment:
   a. Blood flows and frequency of blood pump interruptions
      ▪ Blood flow rates below 200 mL/min increases chance of clotting.
   b. Transmembrane pressure (TMP) and venous pressure
      ▪ Increased TMP, decreased online clearance (Kecn) and increased venous pressures may indicate clotting in dialyzer.

5. Be prepared to act on the following interventions if excessive clotting occurs.
   a. Initiate low dose heparin as per physician’s order.

KEY POINT:

- Total volume of flushes anticipated must be calculated into planned fluid removal. The frequency of flushes may be increased or decreased as per nursing assessment.
- For pediatric hemodialysis, normal saline flush volumes must be prescribed by physician.
- Ensure adequate amount of saline to complete flush.

S/A = <1/3 (small Amount)
M/A = 1/3 (moderate Amount)
L/A = 2/3 or greater (large Amount)
PROCEDURE:

b. Return blood before extracorporeal circuit clots.

c. Resume dialysis if required.

KEY POINT:

If dialysis needs to resume, maintain patency of patient access.

C. Method II: Continuous Normal Saline Infusion

1. Attach a 1 litre 0.9% NaCl IV bag to an IV administration set, prime tubing and load set to infusion pump.

2. Connect administration set to the arterial medication port on the bloodline.

3. Program pump to infuse one litre over entire length of treatment.

4. Unclamp administration set and medication port and start infusion once dialysis treatment is initiated.

5. Monitor the following parameters during treatment.

   a. Blood flows and frequency of blood pump interruptions
   
   b. Transmembrane pressure and venous pressure

6. Be prepared to act on the following interventions if excessive clotting occurs.

   a. Initiate low dose heparin as per physician’s order.
   
   b. Return blood before extracorporeal circuit clots.
   
   c. Resume dialysis if required.

REFERENCES:


MANITOBAN RENAL PROGRAM

SUBJECT
- Use of Fresenius 2008K Delivery System

SECTION 30.20 Dialysate Delivery Systems

CODE 30.20.01

AUTHORIZATION
- Professional Advisory Committee, Manitoba Renal Program
- Nursing Leadership Council, St. Boniface General Hospital

EFFECTIVE DATE May 2001

REVISION DATE April 2009

PURPOSE:
1. To control and monitor the blood flow through the extracorporeal circuit.
2. To control and monitor the dialysate flow through the dialysate flow path.
3. To maintain a pathogen free pathway.

POLICY:
1. Registered Nurses and Licensed Practical Nurses as per facility, Dialysis Care Technicians as per facility that have received instruction and have demonstrated competency to the renal educator or delegate may operate the Fresenius 2008K. Dialysis Care Technicians may perform parts of this procedure as indicated with symbol Δ.
2. Unit Assistants, Nursing Assistants and Health Care Aides who have received instruction from the Renal Educator or delegate and who have demonstrated competency to the Renal Educator may perform part of this procedure as indicated with symbol Φ.
3. St. Boniface General Hospital Health Nursing Assistants who have received instruction from the Renal Educator or delegate and have demonstrated competency may perform part of this procedure as indicated with symbol φ.
4. Brandon Regional Health Centre Nursing Aides who have received instruction from the Renal Educator or delegate and have demonstrated competency may perform part of this procedure as indicated with symbol Є.
5. Neonatal or Pediatric Hemodialysis requirements in bold, italic, red font.
6. The Online Clearance (OLC) self test is to be performed once a month on every Fresenius 2008K. Individual hemodialysis units in the Manitoba Renal Program are responsible for tracking the successful completion of this test on each machine.
7. For the purposes of cleaning and disinfecting of fluid paths inside the Fresenius 2008K, the following tasks will be performed:
   a. Rinse
      ▪ Between every patient use on all machines.
POLICY:

b. Acid Clean Cycle
   • At the end of the treatment day (except as indicated for bleach).
   • On acute machines following the last treatment.

c. Heat Disinfect
   • At the end of each treatment day (not exceeding 48 hours).

d. Chemical Rinse
   • Twice per week *(Neonatal or Pediatric Hemodialysis: Once per week)*.

e. Following a blood leak (Refer to Procedure 30.20.03 Responding to Fresenius 2008K Blood Leak Alarms by Registered Nurses and Licensed Practical Nurses in Dialysis.)

8. A 2-litre rinse is required for dialyzers when a nursing assessment determines that the biocompatibility of the dialyzer is an issue.

9. Following a Code Blue or Critical Clinical Incident, the delivery system along with concentrates intact shall be removed from service to be inspected by a technologist. To preserve patient information the machine must be left in the same mode as it was when incident occurred (e.g. do not put into a cleaning cycle or press NEW TREATMENT).

EQUIPMENT:

- Fresenius blood lines
  - Adult 8 mm Standard or Blood Volume Monitor
  - *(Neonatal or Pediatric Hemodialysis: Pediatric lines 6.4 mm, Neonatal Husky 4.8 mm, or Neonatal 2.6 mm.)*
- Dialyzer per physician’s order
- Acid and bicarbonate concentrate per physician’s order
- Independent conductivity test supplies. Refer to Procedure 30.40.01 Use of Neo-Stat/Neo-Stat Plus Dialysate Conductivity Meter
- Independent pH test supplies
- Heparin Sodium 1000 units/mL
- 2 or 3 – 1 litre 0.9% NaCl. Refer to Policy Statement #8 above.
- 1 – 10 mL syringe with needle
- Forceps
- Prime Bag
- Chemical residue test supplies

PROCEDURE:

A. Preparation of the dialysis concentrates

1. Λ Φ £ Ensure that the Fresenius 2008K is connected to:
   - treated water
   - drain
   - appropriate electrical source.

2. Λ Φ £ Open the valve to the treated water.

3. Λ Φ £ Verify that the main power and heater switch (at rear of machine) is in the ON position.

4. Λ Φ £ Turn on the machine by pressing the Power key on the control panel.

   ▪ The green power light comes on, the machine goes into initialization and the Select Program screen appears on the monitor.
PROCEDURE:

5. △ Check for chemical residual according to the manufacturer’s instructions for use on the bottle, post Chemical Rinse.

6. △ Verify that the concentrate matches the prescribed concentrate.

7. △ Connect the acid line to the acid concentrate and bicarbonate line to bicarbonate concentrate.

8. △ Press Dialysis button on the Select Program screen.

9. △ On the Dialysate screen press the Concentrate (Conc.) button. Select the prescribed concentrate. Verify that it matches the prescription.

   To change the concentrate press the Concentrate button and select the new concentrate using the arrow keys. Press Confirm.

10. △ Select the prescribed Na+ and bicarbonate values.

   - Press base Na+, select the value by using the number keys or by using the Up or Down arrow keys.

   - Press bicarbonate. Select the value by using the number keys or by using the Up and Down arrow keys. Press Confirm.


12. △ Exit the Dialysate screen by pressing the Home button.

13. △ Confirm default settings are in place on Home screen.

B. Preparation of the Extracorporeal Blood Circuit

1. △ Φ £ Hang 2 litres of 0.9% NaCl. Hang prime bag. Clamp blue clamp on prime bag.

2. △ Φ £ Insert the dialyzer into the holder and attach dialysate port caps.

KEY POINT:

- The Select Concentrate screen will appear on the monitor.

- Ensure conductivity alarm limits are set 0.5 mS/cm above and below the Theoretical Conductivity (TCD).

- If not set appropriately:
  - Adjust alarm width to 10 mS/cm by pressing alarm width and arrow keys. Press Confirm.
  - Adjust alarm position by pressing alarm position and arrow keys. Press Confirm.

- Acceptable conductivity and temperature values should be attained within 5 minutes.

- If using central bicarb, set bicarb value to zero.

- Ultrafiltration (UF) = 3000 mL; RTD = 0; Time = 3 hours. If default parameters are not set press New Treatment button. Press Confirm. Repeat step 9. Press Home button.

- Be sure to use aseptic technique for all bloodline connections.

- If 2 litre rinse is required, hang 3 litres of 0.9% NaCl.
PROCEDURE:

3. Insert the arterial drip-chamber into its holder and clamp the medication, transducer and heparin line clamps.

4. Load the blood pump:
   - Open the blood pump door.
   - Press and hold Start/Stop key to align the rotor.
   - Thread the pump segment into the lower left side.
   - Press and hold the Start/Stop key until the segment is installed.
   - Grasp the right pump segment, position it and close the door.

5. Stabilize the remainder of the arterial tubing to the machine by following the RED tubing guide. Avoid kinking of line.

6. Attach the end of the arterial bloodline to one end of the dialyzer and rotate to the bottom.

7. Connect the arterial patient end to the prime bag.

8. Load venous drip chamber into the Air Detector holder:
   - Unlatch and open the door.
   - Push the drip chamber against one of the ultrasonic metal sensor heads, gently roll into the holder and ensure that the filter portion of the drip chamber is well below the sensor heads.
   - Close the door and latch.
   - Leave the venous bloodline out of the line clamp. Clamp the medication line and the transducer line.

9. Stabilize the remainder of the venous

KEY POINT:

- **Neonatal or Pediatric Hemodialysis: Omit this step for Neonatal and Neonatal Husky blood lines as there is no arterial chamber**

**NOTE:** Pump segment diameter is displayed when the blood pump door is open. Select the corresponding tubing diameter. Adults: 8.0 mm; Neonatal: 2.6 mm; Neonatal Husky: 4.8; Pediatric 6.4. To change, press Up and Down arrows simultaneously on blood pump segment until number begins to flash. Use Up or Down arrow to select correct tubing size. To confirm this change, close blood pump door.

- The pump will stop automatically at the correct position. Make sure the collar of the pump segment is positioned below the bottom of the blood pump. This will minimize the possibility of the segment kinking during pump operation.

- The pump will turn, installing the segment and stop automatically when the segment is inserted.

- When using Blood Volume Monitor bloodlines place cuvette into BVM holder.
PROCEDURE:

- tubing to the machine by following the BLUE tubing guide. Avoid kinking line.

10. **Attach the end of the venous bloodline to the top of the dialyzer.**

11. **Connect venous patient end to the prime bag.**

12. **Clamp saline administration tubing and Y connector. Attach the administration set to one litre 0.9% NaCl.**

13. **Attach the administration set to the saline "T" line.**

C. Priming the Blood Circuit

1. **Unclamp the administration set and prime the patient end of the arterial bloodline by gravity. When tubing is mostly free from air and fluid enters prime bag, clamp the red clamp on the prime bag.**

2. **Unclamp the arterial transducer line to allow the arterial drip chamber to fill to the line with 0.9% NaCl and clamp.**

3. **Press the Prime key. Adjust the blood pump flow rate by pressing the Up or Down keys to 150 mL/min. Press the blood pump Start/Stop key. When blood pump starts to rotate unclamp blue prime bag clamp.**

4. **Ensure that the blood pump segment is free of bubbles. To remove residual bubbles from the pump segment, press the Up key to adjust the flow to 400 mL/min momentarily (5 seconds) until bubbles are cleared.**

5. **Continue to prime the circuit at 150 mL/min.**

6. **If heparin prescribed, press heparin screen, verify the choice of syringe (BD, Terumo or Monoject). To select another syringe:**
   - Press the syringe button.
   - Highlight the desired syringe (Type) by scrolling with the Up and Down keys. Press Confirm.

7. **Connect heparin syringe to heparin line.**

8. **Load the heparin syringe:**

KEY POINT:

- Rinsing the dialyzer venous end up enhances clearance of air from the dialyzer.

- **Neonatal or Pediatric Hemodialysis:** Note for Neonatal or Neonatal Husky: saline administration set is not provided. Use a 10 gtts/min IV tubing in its place.

- Arterial drip chamber can also be filled by unclamping arterial medication line and loosening cap. Reclamp line and tighten cap. Neonatal or Pediatric Hemodialysis: Omit this step for Neonatal and Neonatal Husky lines.

- The blood pump will automatically stop at 800 mL if the prime has not been interrupted. Neonatal or Pediatric Hemodialysis: Neonatal or Neonatal Husky, prime at 80 mL/min.

- Priming at higher rates decreases surface area of dialyzer filter and increases risk of microbubbles. Neonatal or Pediatric Hemodialysis: Neonatal or Neonatal Husky, omit this step. Pediatric momentarily adjust flow to 200 mL/min.

- Roll the dialyzer to facilitate air removal. Neonatal or Pediatric Hemodialysis: Neonatal or Neonatal Husky, prime at 80 mL/min.
PROCEDURE:

- Squeeze the plunger lock tab and pull down the carriage.
- Slide the wings of the syringe barrel into the wing slots and press barrel into place.
- Squeeze the plunger lock tab. Gently slide the carriage until it makes contact with the plunger and release.

9. Unclamp the heparin line, press the heparin Prime button, then press and hold the Confirm key until the line is primed with 0.6 mL then RELEASE. Reclamp Heparin line.

10. When the 800 mL of 0.9% NaCl has infused, the blood pump stops.

11. Unclamp the venous transducer line to raise the level in the venous drip chamber to fill line. Reclamp.

12. Place the venous bloodline into the line clamp and optical detector and close the door.

13. Close the white clamp on the prime bag and open the red arterial clamp on the prime bag.

14. Press Reset to clear the Air Detector alarm. This action will automatically start the blood pump.

15. Increase the blood pump to 400 mL/min to recirculate.

D. Testing the 2008K

1. Ensure conductivity and temperature are within range by confirming status box is green.

2. Ensure dialysate flow on Home screen set at 500 mL/min.

3. Press the Test and Options Button.

4. Verify that the appropriate options have been selected i.e. dialyzer type, single needle, pediatric.

5. Select appropriate arterial pressure alarm width.

6. Verify:
   - The dialysate lines are connected behind

KEY POINT:

- The heparin line can be manually primed.
- If the prime has been interrupted, manually stop the priming once 800 mL 0.9% NaCl has been infused.
- If 3 litre rinse is required, prime with 2nd litre of NaCl.
- Venous drip chamber can also be filled by unclamping venous medication line and loosening cap. Reclamp line and tighten cap.

- If blood pump does not start turning automatically with this action, do so manually by pressing the Start/Stop key.

- Neonatal or Pediatric Hemodialysis: Neonatal or Neonatal Husky at 80 mL/min; Pediatric at 200 mL/min.

- This takes approximately 5 minutes after plugging in the concentrates.
**PROCEDURE:**

Shunt/Interlock door and the Shunt/Interlock door is closed.

- The machine is alarm free.
- Both transducer lines are clamped and disconnected from the machine.
- The Ultrafiltration (UF) and Sodium Variation System (SVS) lights are off.

7. △ Select Both Tests and Press Confirm.
   - The Alarm Tests and Pressure Tests will take approximately 7 minutes. Both tests need to be performed at the first treatment of the day then Pressure Test before each subsequent treatment. These tests do not test membrane integrity. The Pressure Test is to ensure the pressure integrity of the hydraulic system under actual pressures generated during the normal operation of the system.

8. △ In a test failure situation, after all the tests have been completed, the message BOTH TESTS FAILED, ALARM TEST FAILED or PRESSURE TEST FAILED will appear in the status box.
   - A red X appears in the failure box designating the test(s) that failed.
   - Press the Reset key to mute the alarm.
   - Note the failed test, including the additional information regarding the failure, which appears on the right side of the screen.
   - Correct the problem. Press Reset key and repeat the test section that failed.
   - If not done immediately the audible alarm will continue for remaining alarm tests.
   - If this information is not recorded before the second reset, information will be lost.
   - If the machine fails any of the tests and the cause cannot be corrected, it should not be used for treatment. Remove machine and report the incident to a technologist.

9. △ When TEST COMPLETE is displayed, press Reset key to clear the message.


11. △ Test and verify that the dialysate conductivity matches the machine readings with an independent device.

12. △ Verify pH using a test strip according to the manufacturer’s instructions for use on the bottle.


   - Acceptable range 6.5 – 7.5.

   Conductivity must be stable and within range to run this test. The test takes 6 – 10 minutes and is performed once a month or when the nurse suspects that the OLC may be erroneous. It is
PROCEDURE:

When OLC Test has passed, press Reset key.

E. Priming the Dialysate Side

1. Open the Shunt/Interlock door. Disconnect the dialysate lines from the machine and attach to the dialyzer. Close the door.

2. Tilt the dialyzer to maximize air removal. Rotate dialyzer arterial end up to facilitate filling.

3. Rotate dialyzer venous end up to facilitate removal of air from extracorporeal circuit.

4. Recirculate the blood side at a flow rate of 300 – 400 mL/min and the dialysate flow at 500 mL/min. Neonatal or Pediatric Hemodialysis: Neonatal or Neonatal Husky, run dialysate at prescribed rate [Neonatal or Pediatric Hemodialysis: Min of 4 minutes = 2L]

5. To test the air detector:

Press the Down key on the level detector to lower the fluid level in the drip chamber. Verify that:

- The blood pump stops.
- The venous clamp occludes.
- An audible and visual alarm occurs.

Press the Up key to raise the level in the drip chamber to an acceptable level. Press Reset key.

6. Check for a normal dialysate flow by observing the rise and fall of the external flow indicator located on the dialysate supply line.

7. Open the Shunt/Interlock door and verify that the machine goes into Bypass mode. In Bypass mode verify:

- An audible alarm is heard.
- The Bypass light on the control panel should light.
- The float in the flow indicator of the dialysate supply line should drop and

KEY POINT:

operator activated and is performed prior to the day’s initial treatment. It must be done after Alarms Test and Pressure Test are successfully completed and before hooking up dialysate hoses to the dialyzer.

- Supply (blue) dialysate hose = the venous end of the dialyzer.
- Return (red) dialysate hose = the arterial end of the dialyzer.
- This will ensure counter-current blood/dialysate flow

- Air in the dialysate hoses may cause a blood leak alarm. Press Reset key to clear alarm.

- To reduce the number of nuisance alarms increase dialysate flow to the prescribed rate after dialysis has been initiated.
PROCEDURE:

remain at the bottom of the indicator.

- Close Shunt/Interlock door to resume normal dialysate flow.

8. ▲ After 10 minutes if patient is not ready to start dialysis press Dialysate On/Off key to turn dialysate flow off. Yellow light will flash.

F. Setting Treatment Parameters

1. ▲ Press the Home button.

2. ▲ Press treatment parameter buttons to set. Ensure patient specific data is used:
   - UF – Goal
   - UF – Time
   - Dialysate Flow
   - Temperature

- Use the Numeric Keyboard or Up/Down key to input the desired value.
- Enter all the parameters for the treatment as prescribed. Press Confirm.

3. ▲ UF Profile (UF) settings:

- Press the UF Profile button from the Home screen to view the available UF profiles. The UF Profile sub screen will open displaying up to nine possible profiles.
- To enter a UF Profile if prescribed, press the profile button that graphically represents the prescribed manner in which ultrafiltration is to be carried out. Press Confirm.
- Assess maximum UF rate to determine if it is appropriate for the patient. A different profile may need to be selected (suggested guideline 30 mL/kg/hour).
- Minimum UFR requirements for the system are 10 mL/hour.

4. ▲ Sodium Variation System Settings:

- Press the SVS Profile button from the Home screen to view the available SVS Profiles.
- Choose an SVS Profile that graphically represents the prescribed manner in which sodium is to be delivered. Enter prescribed Start Na+, and enter the SVS time. Press Confirm.
- SVS time to be set as per physician’s orders or per nursing assessment.

5. ▲ Heparin Screen Settings:
PROCEDURE:

- Press the Heparin button.
- Press any of the Heparin parameter buttons (Rate, Infusion, Time).
- Use the Numeric Keyboard or Up/Down key to input the desired values.
- Enter all the parameters for the Heparin as prescribed. Press Confirm.

**If a Heparin Bolus is required see Appendix II Performing a Heparin Bolus.**

6. ▲ Kt/V Settings:
   - Press Kt/V button.
   - Enter Kt/V volume.
   - Enter Kt/V target. Press Confirm.

   *The minimum Kt/V target is 1.4.*

G. Initiating Dialysis

1. ▲ Verify pre checklist on Hemodialysis Treatment Record has been completed.

2. ▲ Go to Home screen. Verify that the UF-Removed is zero. Stop the blood pump.

3. ▲ Verify patient specific UF Goal.

4. ▲ Change to a fresh 1-litre bag of 0.9% NaCl.

5. ▲ Close blue clamp and open white clamp on prime bag.

6. ▲ Allow 0.9 % NaCl to flow into the prime bag by gravity to count of 5.

7. ▲ Clamp arterial line clamp and red clamp on prime bag. Open blue clamp.

8. ▲ Start blood pump at 400 mL/min and allow 500 mL 0.9% NaCl to be infused.

   *Neonatal or Pediatric Hemodialysis: blood pump to run at prescribed blood flow rate *

9. ▲ Stop blood pump.

10. ▲ Clamp venous line clamp and blue clamp on prime bag. Clamp saline administration set and both clamps on saline T line.

11. ▲ Connect the bloodlines to patient access as per protocol.

   *Ensure all clamps are closed: IV administration line, “Y” connector, bloodlines and prime bag.*

   *Refer to following MRP procedures for vascular accesses: 30.30.01 Venipuncture of Arteriovenous Fistula/Graft and 30.30.02 Accessing and Locking Dialysis Central Venous Catheter (Anticoagulant/Thrombolytic/Antibiotic Locking)*
PROCEDURE:

12. △ Unclamp venous bloodline and vascular access.

13. △ Set the blood pump at 100 mL/min. Press Start/Stop key to start the blood pump.

14. △ Once blood pump begins to turn, unclamp arterial bloodline and access.

15. △ Press the Tx clock button once blood reaches the dialyzer. Press Confirm to start the treatment.

16. △ Check that the UF, SVS and heparin lights are ON, if prescribed. Unclamp heparin line.

17. △ Turn dialyzer over so arterial end is up.

18. △ Increase Qb as tolerated. **Neonatal or Pediatric Hemodialysis: or to prescribed rate.**

19. △ Increase dialysate flow rate (Qd) to prescribed rate.

20. △ Verify post checklist on Hemodialysis Treatment Record is complete.

If Dialysate concentrate needs to be changed see Appendix I Changing the Dialysate Concentrate.

H. VIII Discontinuing Dialysis

1. △ Press the Tx Clock and press Confirm to pause the treatment.

2. △ Document on Treatment Flow Sheet:
   - UF Removed
   - Litres processed
   - Heparin infused
   - Kt/V
   - RBV (if used)

3. △ Press the Start/Stop key to stop the blood pump.

KEY POINT:

- **Neonatal or Pediatric Hemodialysis: Set blood pump at 20-60 mL per minute**
- To create negative arterial pressure and no inflow of air.
- Arterial Pressure should not exceed -200 mmHg. **Neonatal or Pediatric Hemodialysis: There is no arterial transducer monitor for Neonatal or Neonatal Husky lines. Ensure blood flow remains in arterial line.** Venous Pressure should not exceed +250 mmHg unless otherwise ordered by physician. **Neonatal or Pediatric Hemodialysis: Venous Pressure should not exceed +200 mmHg.**
- Factors to consider are access type, arterial pressure, venous pressure, and Kt/V.
- For measuring AVG dynamic venous pressure, see Procedure 30.30.08 AVF / AVG Vascular Access Assessment.
- Tx Paused will be displayed.
PROCEDURE:

4. Ensure the saline administration set and “T” line are clamped.

5. Clamp both the arterial bloodline and access line and disconnect. Attach a syringe containing 0.9 % NaCl to arterial vascular access to maintain sterility.

6. Connect the arterial bloodline to the “Y” connector on the saline administration set.


8. To return the blood, set the blood pump speed to 150 – 200 mL/min. Press the Start/Stop key to start the blood pump.

9. When the bloodlines appear clear press the Start/Stop key to stop blood pump.

10. Ensure patient is hemodynamically stable.

11. Clamp both venous access and venous bloodline and disconnect. Attach venous bloodline to arterial medication port.

12. Discontinuation of vascular access as per procedures for vascular accesses: 30.30.01 Venipuncture of Arteriovenous Fistula/Graft and 30.30.02 Accessing and Locking Dialysis Central Venous Catheter.

I. Emptying the Dialysate Side

1. Open the Shunt/Interlock door, mute alarm.

2. Turn the dialyzer venous end up.

3. Disconnect the blue dialysate hose from the dialyzer and place on the blue connector.


5. Drain the dialysate compartment until air is in the outlet line.

6. Open the Shunt/Interlock interlock door, mute alarm.

7. Disconnect the red dialysate hose from the dialyzer and place on the red connector.

KEY POINT:

- Refer to following MRP procedures for vascular accesses: 30.30.01 Venipuncture of Arteriovenous Fistula/Graft and 30.30.02 Accessing and Locking Dialysis Central Venous Catheter.

- For Neonatal or Pediatric Hemodialysis: blood pump speed is prescribed

- To minimize body fluid exposure, maintain a closed system.
PROCEDURE:

8. ∆ Φ Close Shunt/Interlock door.

9. ∆ Φ Clamp all clamps on extracorporeal circuit.

KEY POINT:

- To minimize risk of exposure to body fluids.

J. Dismantling The Extracorporeal Blood Circuit

1. ∆ Φ ₪ Remove blood tubing from machine from left to right and discard as per hazardous waste management guidelines.

2. ∆ Φ ₪ Clear patient data by pressing NEW TREATMENT key. Press Confirm. Machine will return to default settings.

3. ∆ Φ ₪ Return Acid and Bicarbonate connectors to their respective ports on the front of the machine.

4. ∆ Φ ₪ Select appropriate program from the cleaning/disinfection screen.

- The New Treatment button can be activated any time but must be before the Acid and Bicarbonate connectors are back into their ports.

- The Select Program Screen will appear. All folders at the bottom of the screen will be grey.

- See Policy Statements steps 6 – 9.

5. ∆ Φ ₪ Clean exterior of the machine with hospital approved disinfectant at the recommended dilution.

- Pay close attention to cleaning control panels on the dialysis machines and other surfaces that are frequently touched and potentially contaminated with patient’s blood. Lift Shunt Interlock door and clean all surfaces (not when in Heat Disinfect).

6. ∆ Φ Cleaning of Concentrate Wands performed weekly with 1:100 (5.25% bleach). Soak for a minimum of 10 minutes and a maximum of 20 minutes.

- Once wands are removed from the soaking solution they must be well rinsed with tap water in a second container. The wands should be submerged in fresh tap water and agitated in the water. This should be repeated 2 times using fresh water each time. The wands are to be thoroughly dried before use.

DOCUMENTATION:

- Hemodialysis Treatment Record
- Hemodialysis Flow Sheet
- Patient Records

REFERENCES:


Changing Dialysate Concentrate

To select another concentrate when SVS profile is off:

1. From any screen, press the Dialysate button.
   - Turn the dialysate flow off by pressing Dialysate Flow On/Off key.
   - Connect up new concentrate.
   - Press the Concentrate button.
   - Highlight the desired concentrate by using the Up or Down arrow keys.
   - Press Confirm to save the selection.
   - Select desired base Na+ and bicarbonate levels. Press Confirm.
   - Turn dialysate flow on after the concentrate is changed. By pressing Dialysate Flow On/Off key.

To select another concentrate when SVS profile is on:

1. Note current Na+ level and time remaining from Home screen.
   - Turn SVS off using the SVS On/Off key.
   - From SVS screen, select None and press Confirm.
   - Turn the dialysate flow off by pressing Dialysate Flow On/Off key.
   - Connect new concentrate.
   - Press the Concentrate button.
   - Highlight the desired concentrate by using the Up or Down arrow keys.
   - Press Confirm to save the selection.

NOTE: This is done to prevent air lock in the acid or bicarb pump.

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The electrolyte profile of the highlighted selection is displayed in the left column.

Acceptable conductivity and temperature values should be attained after 5 minutes.
- Select desired base Na+ and bicarbonate levels. Press Confirm.

- Turn dialysate flow on after the concentrate is changed by pressing Dialysate Flow On/Off key.


- Wait 5 minutes for the conductivity to stabilize.

- Program SVS using Na+ level noted previously as new start Na+. Reprogram SVS time. Select desired Profile. Press Confirm.

- Turn SVS on using the SVS On/Off key.

- Na+ and bicarbonate levels will otherwise revert back to levels set when this concentrate was last used.

- Acceptable conductivity and temperature values should be attained after 5 minutes.

- Ensure that base time Na+ is set appropriately.
Appendix II

Performing a Heparin Bolus

1. Press the Heparin button.
   - Set bolus parameter. Press Confirm.
   - Press Infuse Bolus button. Press Confirm.
   - Once bolus is infused change bolus volume to zero. Press Confirm.

Appendix III

Emergency Rinseback Procedure

1. Reduce the blood pump speed to 200 mL/min. *Neonatal or Pediatric Hemodialysis: Blood pump speed will run at the prescribed rate.*

2. Open saline administration set and “T”-line.

3. Clamp or manually kink the arterial blood line on the patient side of the “T”-line.

4. With the blood pump continuing to run, allow sufficient saline to infuse until the venous blood line appears clear. More saline may be used if deemed necessary by the medical team.

5. Stop the blood pump.

6. Clamp the venous blood line and venous access.

7. Clamp arterial bloodline and access.

8. Proceed with patient care as deemed necessary.
   - Do not attempt to return blood in arterial bloodline as risk of air to patient too great. Discard blood in arterial bloodlines with blood tubing.
# MANITOBA RENAL PROGRAM

## Subject
- Responding to Fresenius 2008K Blood Leak Alarms

## Section
- 30.20 Dialysate Delivery Systems

## Code
- 30.20.03

## Authorization
- Professional Advisory Committee, Manitoba Renal Program
- Nursing Leadership Council, St. Boniface General Hospital

## Effective Date
- August 2001

## Revision Date
- February 2010

## PURPOSE:
1. To detect blood in dialysate, or contamination of blood by dialysate.

## POLICY:
1. Registered Nurses and Licensed Practical Nurses in Dialysis who have received instruction and demonstrated competency to the renal educator or delegate may respond to a blood leak alarm.

## Equipment:
- Blood testing reagent
- 3 mL syringe
- Test tube

## Key Point:
- Check expiry date of the blood testing reagent prior to use.

## PROCEDURE:

### Key Point:
- If blood is observed STOP HEMODIALYSIS, DO NOT RETURN EXTRACORPOREAL BLOOD.

1. Note alarm on screen.

2. Observe the colour of the dialysate in the outflow hose.

3. If no blood is observed press RESET key to reset the alarm. Press OVERRIDE key to continue if the machine cannot be reset.

4. If dialysate is not discoloured, withdraw dialysate sample from outflow port and check with blood testing reagent according to manufacturer’s instruction.

5. If reagent is negative:
   a. Continue dialysis.
   b. If blood leak alarm does not clear, or there are repeated FALSE alarms, return blood and repeated false alarms may be due to the blood leak detector being coated with protein. If this
PROCEDURE:

restart on a new machine.

6. If reagent is positive for blood, the membrane is no longer intact.

7. When blood is discarded, notify nephrologist.

Removing Disposables with a Confirmed Blood Leak:

1. Press TX RUNNING button and confirm. ▪ This will pause treatment and allow the removal of disposables from machine, and save treatment information.

2. Same patient:
   Rinse or chemical rinse cycle prior to new set-up for the same patient is not required unless unable to reset the blood leak alarm.
   ▪ Changing delivery system is optional prior to resuming treatment.

3. New patient:
   Chemical rinse cycle is required prior to new set-up for a new patient.
   ▪ Check for bleach residue prior to new treatment.

DOCUMENTATION:

- Hemodialysis Treatment Record
- Integrated Progress Notes
- Product Incident Form (must be completed prior to disposal of equipment)
- Occurrence Report (as per facility)

REFERENCES:


PURPOSE:

1. To facilitate fluid removal without diffusion for patients who have more fluid to be removed than usual in their conventional hemodialysis time.

POLICY:

1. Registered Nurses and Licensed Practical Nurses in Dialysis may initiate sequential ultrafiltration as per physician orders.

2. A guideline for maximum fluid removal is 30 mL/kg/hour to a maximum of 3L per hour.

3. Sequential ultrafiltration may be performed at any point during the treatment; however, sequential ultrafiltration is typically tolerated better at the start of hemodialysis.

EQUIPMENT:

- Fresenius 2008K Delivery System

PROCEDURE:

A. SEQ/UF at Start of Treatment:

1. Calculate total fluid removal for treatment and calculate desired volume for sequential ultrafiltration.


3. Turn off dialysate flow by pressing Dialysate Flow ON/OFF key.

4. Highlight the Dialysate Flow button and use the down arrow beside the numeric keyboard to set dialysate flow to “SEQ”. Press Confirm.

   ▪ Re-check pre-weight unless specific fluid removal ordered. Keep in mind guideline for maximum fluid removal.

   ▪ Ensure UF and SVS profiles are “none” before starting.

   ▪ This will deactivate the “Flow Off” warning for 60 minutes.
PROCEDURE:

5. Initiate treatment.

6. When UF time reaches 0:00, an alarm will indicate UF Goal Reached.

7. Proceed with remainder of treatment as ordered. If diffusion is to follow:
   a. Turn on dialysate flow by pressing Dialysate Flow ON/OFF key.
   b. Set the desired dialysate rate by highlighting the dialysate flow button and using the Up and Down arrows.
   d. Set the UF and SVS profiles as applicable.

KEY POINT:

• UF Not At Zero alarm will flash momentarily.

B. SEQ/UF at End of Treatment:

1. When RTD time reaches 0:00, repeat steps 1 to 4 above.

DOCUMENTATION:

• Hemodialysis Treatment Record
• Integrated Progress Notes

REFERENCES:


PURPOSE:

1. To prevent air that has inadvertently entered the extracorporeal blood circuit from being infused to the patient.

2. To troubleshoot and correct an air detector alarm situation (either real or false).

3. To manage an incident where a patient has received an air embolus.

POLICY:

1. Registered Nurses and Licensed Practical Nurses will have received instruction and demonstrated competency to the renal educator or delegate and are familiar with prevention and management of an air embolism may respond to an air detector alarm.

2. The proper functioning of the air detector sensor and alarm system shall be verified prior to each hemodialysis treatment as described in Procedure 30.20.01 Use of Fresenius 2008K – Delivery System

PROCEDURE:

A. Prevention

Prior to initiating the hemodialysis treatment:

1. Ensure all connections along the extracorporeal blood circuit are tight.

2. Ensure the venous drip chamber is properly placed between the ultrasonic metal sensor heads, the mesh filter below the sensors and the door is closed.

3. Ensure the fluid level in the arterial drip chamber is at the line (about 2/3 full).

- This level should be re-checked throughout the treatment as excessive arterial pressure or an inadequately tightened arterial transducer may lower the level allowing air to travel through to the dialyzer and venous chamber.
4. Ensure the proper functioning of the air detector alarm has been checked prior to the initiation of the treatment.

**KEY POINT:**
- This step is described in Procedure 30.20.01 and should be documented as part of the “Pre-Checks” on the Hemodialysis Treatment Record.

### B. Troubleshooting the Air Detector Alarm

In the event of a sudden Air Detector Alarm:

1. Clamp the arterial and venous access clamps.

2. Visually inspect the extracorporeal circuit starting from the patient access working back to the venous and arterial drip chambers checking each of these for blood level and air bubbles.

3. Locate the source of the problem and correct.

4. If necessary, raise the level of the blood in the venous and/or arterial drip chambers by pressing the UP arrow key.

5. If no evidence of air in blood lines exists, unclamp access and Press Reset.

6. If air in blood lines is present, clamp blood lines and access and refer to MRP Procedure 30.30.07 Recirculation of Extracorporeal Blood Circuit Fresenius 2008K.

   - As a precaution, place patient in Trendelenburg position on left side.

### C. Managing an Air embolus Incident

1. Call for help and appropriate code.

2. Ensure venous blood line is clamped and pump is off.

3. Clamp venous and arterial access.

4. Place patient in Trendelenburg on left side.

5. Assess vital signs.

   - To prevent air remaining in blood line from infusing to patient.

   - If air has travelled up the jugular vein into cerebral venous system, this may cause loss of consciousness, seizures or death.

   - If patient is recumbent, air may enter the right ventricle then on to the lungs causing dyspnea, cough and chest pain.

   - If the patient is lying on right side, the air may travel to the pulmonary arteries resulting in acute pulmonary hypertension.

6. Administer oxygen by mask.

7. Notify Nephrologist immediately.
**DOCUMENTATION:**

- Hemodialysis Treatment Record
- Integrated Progress Notes

**REFERENCES:**


MANITOBA RENAL PROGRAM

SUBJECT
- Fresenius 2008K Recirculation of Extracorporeal Circuit with Normal Saline

SECTION
- 30.20 Dialysate Delivery Systems

CODE
- 30.20.17

AUTHORIZATION
- Professional Advisory Committee, Manitoba Renal Program
- Nursing Leadership Council, St. Boniface General Hospital

EFFECTIVE DATE
- May 2001

REVISION DATE
- March 2009

PURPOSE:
1. To preserve the patient’s extracorporeal circuit during hemodialysis treatment interruption.
2. To maintain a pathogen-free extracorporeal circuit.

POLICY:
1. Registered Nurses and Licensed Practical Nurse working in Dialysis who have received instruction from the renal educator or delegate and have demonstrated competency may perform this procedure.
2. Dialysis Care Technicians who have received instruction and have demonstrated competency may assist Registered Nurses and Licensed Practical Nurses with this procedure.

EQUIPMENT:
- 2 – 10 mL syringes with 0.9% NaCl
- 1 – 3 mL syringe
- 1 – Recirculating connector

PROCEDURE:

KEY POINT:

1. Estimate the time of dialysis interruption.

2. If hemodialysis interruption is less than 20 minutes, the blood can be recirculated according to MRP Procedure 30.30.07 Recirculation of Extracorporeal Circuit Fresenius 2008K.

3. If hemodialysis interruption is greater than 20 minutes but less than 90 minutes, saline is recirculated through the dialyzer until the problem has been corrected, as follows:
   - If the anticipated interruption is greater than 20 minutes, the blood must be returned to the patient.
   - If greater than 90 minutes, proceed to Step 4.
PROCEDURE:

a. Discontinue Hemodialysis
   i. Press Tx Clock and press Confirm.
   ii. Press Start/Stop key to stop blood pump.
   iii. Clamp arterial vascular access and arterial bloodline.
   iv. Ensure administration set and “T” line is clamped.
   v. Disconnect arterial bloodline from arterial vascular access. Attach the 10 mL syringe containing 0.9% NaCl to arterial vascular access and flush to maintain patency.
   vi. Connect the arterial bloodline to the Y connector of the saline administration set.
   vii. Return patient’s blood.

b. Turn off dialysate flow.

c. Recirculate saline using the following method:
   i. Connect the arterial bloodline to the recirculating connector.
   ii. Attach 3 mL syringe to Y connector on saline T line to maintain sterility.
   iii. Clamp venous vascular access and venous bloodline.
   iv. Disconnect venous bloodline from venous vascular access. Attach the 10 mL syringe containing 0.9% NaCl to venous vascular access and flush to maintain patency.
   v. Unclamp arterial and venous bloodlines.
   vi. Unclamp normal saline administration set and T line.
   vii. Press Start/Stop key to turn on blood pump to 200 mL/minutes.

d. Re-establish dialysis once problem is corrected.

e. Re-calculate fluid removal requirements.

4. If hemodialysis interruption is greater than 90 minutes, discard extracorporeal circuit.
DOCUMENTATION:

- Hemodialysis Treatment Record

REFERENCES:


Fresenius USA *Comisset True Flow Series (December 2008)* Fresenius Medical Care North America, Waltham, MA 02451
PURPOSE:

1. To achieve adequate blood access for hemodialysis through venipuncture.
2. To promote adequate rotation and healing of puncture sites.

POLICY:

1. Registered Nurses and Licensed Practical Nurses in Hemodialysis who have demonstrated competency to the renal educator or delegate shall perform venipuncture of fistula/grafts.
2. Initial puncturing of new/revised fistula/graft is based on nursing assessment of maturation of access or an order by a Nephrologist/Vascular Surgeon.
3. A native fistula will not be punctured for at least 8 – 10 weeks.
4. A prosthetic graft will not be punctured for at least 2 weeks after placement and until swelling has subsided sufficiently to palpate course of the graft.
5. Fistula failing to mature after 8-12 weeks will be referred back to the Vascular Surgeon/Nephrologist.

EQUIPMENT:

- Clean drape
- 1 pair disposable gloves
- 1 single use tourniquet
- 2 fistula needles
- 2 pkg dressings
- 2 – 10 mL syringes with heparin prime and/or saline
- Lidocaine 1% without epinephrine (optional)
- 2 pkg gauze
- Tape
- 1 syringe with 0.9% NaCl
- 2 syringes with 25 g needles or 28 g needles
- 2 pkg 2% Chlorhexidine antiseptic agent
PROCEDURE:

A. Prepare Patient:
   1. Wash or have patient wash access site with soap and water.

B. Prepare Equipment:
   1. Perform hand hygiene.
   2. Prepare heparin/saline syringe with prime as required.
   3. Optional:
      Prepare 2 syringes, each with 0.1 – 0.3 mL of 1% lidocaine without epinephrine.

C. Venipuncture:
   1. Perform hand hygiene.
   2. Position limb on clean drape.
   3. Don personal protective equipment.
   4. Assess access as per Procedure 30.30.08 Vascular Access Assessment
      ▪ Inspection
      ▪ Palpation
      ▪ Auscultation
   5. Confirm direction of blood flow in loop graft. If unable to confirm the direction of flow by asking patient, or by documentation in chart, assess the flow direction as follows:
      ▪ Compress the access near its midpoint.
      ▪ Check pulse/thrill on both sides of point of compression.
   6. For a fistula being punctured for the first time, unless specifically ordered by a physician, the following steps can be used to avoid trauma to a new fistula:
      1. For patients with a central line, it is preferable to perform only one puncture (using a teflon/angio needle) for three consecutive treatments. Use the fistula as arterial to assess blood supply or use as venous return to assist development of fistula. Use the Central line for opposite blood line.
      2. If no difficulties with Step 1, puncture fistula for both the venous blood return and the arterial blood supply for three more consecutive treatments.
      3. If there are no difficulties with puncturing fistula during these six consecutive treatments, remove non-tunneled central line.
   7. For puncturing a graft, steel needles are recommended.
   8. If patient does not have a central line, two punctures may be attempted.
   9. Do not puncture the fistula/graft in the following situations:
      ▪ pulse, thrill or bruit is absent
      ▪ signs of infection
      ▪ new aneurysm
   10. The side where the strongest pulse/thrill is felt is the arterial.
PROCEDURE:

6. Select site.

7. Swab selected sites with bactericidal agent using a back and forward motion rubbing motion and allow at least two minutes drying time.


   - Apply single-use tourniquet to fistula.
   - Stabilize access.
   - Insert needle at 20° to 45°
   - Advance needle to hub.


10. Infuse heparin prime/saline at this time.

11. Remove personal protective equipment.

12. Perform hand hygiene.

KEY POINTS:

- Always direct venous needle antegrade. The arterial needle can be placed antegrade or retrograde. Arterial and venous needle bevels should be at least 5 cm apart. Needle sites should not be within a needle’s length of an anastomosis, obstruction or anatomical flexure.

- The site selected should be at least 0.6 – 1.2 cm away from previous puncture.

- Sites should be rotated from one treatment to the next by using entire graft or fistula. Ideally, equal halves of the access will be dedicated to arterial and venous needles.

- Chlorhexidine scrub time is 30 seconds friction rub. Drying time is 2 minutes.

- If using povidone, allow each site to air dry for 2 – 3 minutes. Excess povidone that pools on the skin may be removed with sterile gauze by wicking, not wiping. Do not touch site after cleansing. If necessary to palpate, paint fingers with antiseptic agent.

- Aspirate plunger of syringe to verify that vein has not been entered. Do not inject Lidocaine into blood stream. If blood return is confirmed, remove syringe and perform a second intradermal injection.

- Do not use on grafts, may traumatize anastomosis.

- Puncture should occur over as firm an anatomical base as possible. Avoid needling near the anastamosis (2.5 cm).

- Degree of angle may change depending on depth and type of access.

- If using a teflon/angio needle follow separation technique.

- Following 2 unsuccessful attempts, the nurse must request assistance from a second nurse and notify the nurse in charge. There will be a maximum of 5 punctures per treatment. If unable to use for hemodialysis draw/send stat electrolytes and notify physician. Do not reinsert steel director back into teflon/angio once it has been separated.

- Refer to patient care plan for specific instructions for securing needles.

- Blood sampling, if required, should be done prior to infusing heparin prime/saline.
PROCEDURE:

13. Perform second venipuncture and secure as per Steps 7 – 8.

14. Establish hemodialysis.

15. Instruct patient to keep fistula arm exposed.

16. Infuse heparin prime via delivery system if not already done.

D. Removal of Needles:

1. Remove the venous needle first.

2. Apply two finger manual pressure to site for a minimum of 10 minutes or longer, until bleeding stops.

3. Ensure the patient’s sitting and standing blood pressures are stable prior to removal of arterial needle.

4. Repeat Steps 1 – 2 for the arterial needle.

5. Remove personal protective equipment

6. Perform hand hygiene

7. Cover puncture sites with sterile bandage. It is recommended to use sterile gauze and Band-aids.

KEY POINTS:

- Ensure patency of needle by infusing normal saline (10 mL syringe).

- Once dialysis is established ensure needle sites are exposed for monitoring during the treatment. For new fistulas/grafts; initial treatment blood flow should be 200 mL maximum, increase each treatment by 50 mL/min.

- It is recommended to remove only one needle at a time.

- Refer to patient care plan for specific instructions for venipuncture site care.

- Two finger pressure allows for sealing of internal and external puncture sites.

- Palpate vessel proximally to ensure there is a pulse (vessel not occluded). Do not apply pressure while removing the needles.

DOCUMENTATION:

- MRP Chart
  o Hemodialysis Treatment Record
  o Integrated Progress Notes
  o Vascular Access Record
  o Renal Patient Kardex: diagram, comments

- In-Patient Chart
  o Integrated Progress Notes
  o Vascular Access Record

Tip Stops® to remain on for 4 hours
Sure-Seals® to remain on for 6 hours
Band-Aids® to remain on for 12 to 24 hours
The projected removal time should be written on the Tip Stop and Sure-Seal dressings.
REFERENCES:


PURPOSE:
1. To access non-tunnelled or tunnelled central venous catheter (CVC) for renal replacement therapy in the management of acute or chronic renal failure.

POLICY:
1. Registered Nurses and Licensed Practical Nurses in Dialysis who have received instruction and have demonstrated competency to the renal educator or delegate may utilize a CVC for renal replacement therapy.

2. A physician’s order must be obtained prior to initial use of a CVC.

3. Registered Nurses and Licensed Practical Nurses in Dialysis may instill heparin 1000 units/mL into the CVC as per the preprinted *Chronic Hemodialysis Physician’s Orders* (Form # W-00109).

4. Registered Nurses and Licensed Practical Nurses in Dialysis may instill 4% sodium citrate (5mL pre-filled syringes), alteplase or antibiotic lock into the CVC upon obtaining a physician’s order.

EQUIPMENT:

**For Initiating Dialysis**
- Clean towel or sterile drape
- Disposable gloves
- 2 aqueous 2% chlorhexidine prep pads
- 2 – 10 mL syringes containing 5 mL of 0.9% NaCl
- 2 – 10 mL syringes for heparin/saline prime as ordered by a physician
- 1 package of sterile gauze 10 X 10 cm
- 2 procedure masks

**For Discontinuing Dialysis**
- Clean towel or sterile drape
- Disposable gloves
- 2 aqueous 2% chlorhexidine prep pads
- 1 package of unsterile/sterile 10 X 10 cm gauze
- 2 procedure masks
- 2 sterile luer-lock caps
- 2 – 3 mL syringes for instillation of heparin/alteplase/4% sodium citrate (5 mL pre-filled syringes)/antibiotic solution
- 2 syringes containing 10 – 20 mL of 0.9% NaCl
- Label with appropriate instillation information
PROCEDURE:

A. INITIATING DIALYSIS

1. Perform hand hygiene.


3. Glove.

4. Change the dressing as per Procedure 30.30.06 Hemodialysis Central Line Dressing Change.

5. Open drape and place under catheter.

6. Confirm that cannula clamps on catheter are closed.

7. Using aqueous 2% chlorhexidine prep pads, scrub connection sites for 30 seconds.

8. Place on sterile gauze and allow to dry for 2 minutes.

9. Remove one luer-lock cap from the catheter and attach the syringe with 5 mL 0.9% NaCl to the catheter.

10. Open cannula clamp and aspirate 3 mL of blood to confirm patency and withdraw previously instilled heparin and clamp. Discard syringe.

11. Connect the syringe containing saline and instill into the catheter port and clamp.

12. Repeat Steps 9 – 11 for the other lumen of the catheter. If patent, give heparin prime as per physician’s order.

13. Initiate dialysis as per Procedure 30.20.01 Use of Fresenius 2008K Delivery System.


B. CARE OF CLOTTED/SLUGGISH HEMODIALYSIS CATHETER

1. If unable to aspirate, attempt to flush using pulsatile pressure.
PROCEDURE:

2. If flush is unsuccessful, clamp line, disconnect syringe and instill alteplase per physician’s order and Procedure 30.30.12 Alteplase for Clearing Hemodialysis Catheter Thrombosis Using the Push (30 min) Method.

3. If the flush is successful.
   a. If a heparin lock is instilled, hold heparin bolus/prime and flush line with 10 – 20 mL saline.
   b. If a 4% sodium citrate lock is instilled, administer Heparin bolus/prime.
   c. If an alteplase lock is instilled, administer heparin bolus/prime.

4. Attach bloodlines.

C. DISCONTINUING DIALYSIS

1. Perform hand hygiene.


3. Glove.

4. Open the drape and place under the catheter and bloodlines.

5. Using aqueous 2% chlorhexidine prep pads, scrub connection sites for 30 seconds.

6. Place on sterile gauze and allow to dry for 2 minutes.

7. Return blood as per Procedure 30.20.01, Use of Fresenius 2008K Delivery System.

8. Proceed with lock procedure A, B, or C.

A. Procedure for Heparin Lock

1. Flush the port used for supply with 10 – 20 mL 0.9% NaCl while the blood is being returned (could be either arterial or venous port if lines have been switched) and clamp.

2. On completion of blood return, flush the venous port on the catheter with 10 – 20 mL 0.9% NaCl.

3. Attach a 3 mL syringe containing the prescribed heparin concentration to each port of the CVC and instill in each port to the volume of the lumen and clamp.

4. Attach the sterile luer-lock caps.

5. Affix the appropriate label as per unit practice. Wrap ports with unsterile gauze and anchor for comfort as per patient request.

KEY POINT:

- Refer to physician order re: Instillation of Alteplase.

- If bleeding concerns exist, notify physician.

- Flushing with 10 - 20 mL 0.9% NaCl helps to ensure the clearing of the red blood cells and protein from the catheter and reduces incidences of clotting.

- Positive pressure will be maintained if the port is clamped simultaneously with completion of instillation.
PROCEDURE:

B. Procedure for Alteplase Lock

1. Flush the port used for supply with 10 – 20 mL 0.9% NaCl while the blood is being returned (could be either arterial or venous port if lines have been switched) and clamp.

2. On completion of blood return, flush the venous port on the catheter with 10 – 20 mL 0.9% NaCl.

3. Reconstitute alteplase as per the WRHA Adult Parenteral Drug Monograph for Alteplase (Arterial or Venous Catheter Occlusion).

4. Attach a 3 mL syringe to each port of the CVC and slowly inject sufficient volume of alteplase solution to fill the priming volume of each catheter port plus a 0.1 mL overfill and clamp.
   a. For catheters with a volume of <2 mL, instill alteplase solution only.
   b. For catheters with a volume of >2 mL (as the maximum dose of alteplase is 2 mg per lumen) use 2 mL alteplase and top up to the required volume in the syringe using sterile water for injection.

5. Attach the sterile luer-lock caps.

6. Affix the appropriate label as per unit practice. Wrap ports with unsterile gauze and anchor for comfort as per patient request.

C. Procedure for Antibiotic Lock

1. Flush the port used for supply with 10 – 20 mL 0.9% NaCl while the blood is being returned (could be either arterial or venous port if lines have been switched), and clamp.

2. On completion of blood return, flush the venous port on the catheter with 10 – 20 mL 0.9% NaCl.

3. Attach a 3 mL syringe with prescribed antibiotic lock to each port of the CVC and instill to the volume of the catheter and clamp.

4. Attach sterile luer-lock caps.

D. Procedure for 4% Citrate Lock

1. Flush the port used for supply with 10 – 20 mL 0.9% NaCl while the blood is being returned (could be either arterial or venous port if lines have been switched) and clamp.

KEY POINT:

- Flushing with 10 - 20 mL 0.9% NaCl helps to ensure the clearing of the red blood cells and protein from the catheter and reduces incidences of clotting.

- The extra 0.1 mL of alteplase beyond the lumen volume will ensure alteplase gets to the tip of the catheter.

- Positive pressure will be maintained if the port is clamped simultaneously with completion of instillation.

- Flushing with 10 - 20 mL 0.9% NaCl helps to ensure the clearing of the red blood cells and protein from the catheter and reduces incidences of clotting.
**PROCEDURE:**

2. On completion of blood return, flush the venous port on the catheter with 10 – 20 mL 0.9% NaCl.

3. Attach a separate pre-filled syringe containing 2.5 mL of 4% sodium citrate to each port of the CVC and instill in each port to the volume of the lumen and clamp.

   - Positive pressure will be maintained if the port is clamped simultaneously with completion of instillation.

4. Attach the sterile luer-lock caps.

5. Affix the appropriate label as per unit practice. Wrap ports with unsterile gauze and anchor for comfort as per patient request.

**DOCUMENTATION:**

- Manitoba Renal Program Health Record:
  - Medical Administration Record
- In-hospital Unit/Ward Health Record:
  - Integrated Progress Notes if applicable
  - As above

**REFERENCES:**


**REVIEWED BY:**

WRHA, Dialysis Infection, Prevention, and Control Working Group. (September 2006)
PURPOSE:

1. To prevent aneurysm development in native AV fistulas.
2. To reduce the risk of thrombosis, infiltrations and hematoma.
3. To reduce pain associated with needle puncturing.
4. To allow puncturing of short length fistulas where rotation of sites is limited.
5. To allow self cannulation for the home hemodialysis patient.

POLICY:

1. Registered Nurses and Licensed Practical Nurses that demonstrate a highly developed skill level in cannulation of AVFs in hemodialysis may develop buttonhole sites.
2. Buttonhole Site development, in a native fistula, is based on nursing assessment of suitability and an order by a Nephrologist/Vascular Surgeon.
3. Buttonhole technique must only be used on a native AV fistula.
4. To develop buttonholes:
   - A single cannulator must perform all cannulations until the sites are well established.
   - It is important to cannulate the developing buttonhole site in the exact same place, using the same insertion angle and depth of penetration each time.
   - Needles should always be placed antegrade to facilitate hemostasis after dialysis and decrease the changes of hematoma formation.
   - For good wound healers, it will take approximately 8 – 10 cannulations using a sharp needle to create a scar tissue tunnel track. Diabetics or poor wound healers will take approximately 12 – 14 cannulations.
   - Should the primary cannulator be unavailable, the buttonhole site should not be used. An alternate distal site 1 inch from the buttonhole site should be chosen for dialysis that treatment. Refer to Procedure 30.30.01 Venipuncture of Arteriovenous Fistula/Graft.
   - If there are ongoing difficulties in establishing a buttonhole site after 12 needles, contract the vascular access nurse for further direction.
5. Once the first set of buttonhole sites is well established, a second set may be developed to serve as a back up. In such cases, the cannulation of each set should be alternated with each dialysis treatment.
6. The Renal Patient Kardex should clearly indicate when patients have buttonhole sites and the type of needles being used.
EQUIPMENT:

Establishing Buttonhole Sites
- 1 clean drape
- 1 tourniquet
- 1 pair disposable gloves
- 2 fistula needles 15 g steel sharp
- 4 packages chlorhexidine swabs
- 2 packages tegaderm occlusive dressings
- 2 packages 5 x 5 cm gauze
- 2 – 10 mL syringes heparin/saline prime with 0.9% NaCl
- 1 sterile tweezers or forceps

Maintaining Buttonhole Sites
Same as above, except
- 2 – anti-stick dull bevel buttonhole needles
- Antibacterial ointment

PROCEDURE:

A. Establishing Buttonhole Sites in a Native AVF

1. Prepare Patient:
   - a. Wash or have patient wash access site and hands with antimicrobial soap and water. The antimicrobial soap should be chlorhexidine or povidone iodine if they have an allergy to chlorhexidine.

2. Wash hands.

3. Prepare equipment:
   - a. Remove supplies such as needles and sterile normal saline syringes from their packaging and place them you your clean working field. This step can be performed while waiting for chlorhexidine to dry.
   - b. Prepare heparin/saline prime as required. According to your own hospital policy.

4. Perform a complete physical assessment of AVF and select the buttonhole sites.
   - a. Position arm on clean drape.
   - b. Assess access as per Procedure 30.30.08 AVF / AVG Vascular Access Assessment
      (i) inspection
      (ii) palpation
      (iii) auscultation
      Do not cannulate in the following situations:
      - o pulse, thrill or bruit is absent
      - o sign of infection
      - o development of a new aneurysm
      - Notify the vascular access nurse, clinical resource nurse of physician.
      - If the tunnel track exit site is red, warm, draining or displaying signs and symptoms of infection, choose another site 1” away from the tunnel track and the affected area and cannulate with a sharp needle. If there is drainage, cleanse site with normal saline and swab area for C&S.
PROCEDURE:

5. Prepare sites for cannulation.
   a. Glove.
   b. Cleanse each site with a chlorhexidine swab in a gentle circular motion working form centre of site outward.
      • Chlorhexidine cleansing time is 30 seconds and drying time is 2 minutes. If patient has chlorhexidine allergy use povidone. Povidone cleansing time is 2 minutes and drying time can be 2-3 minutes. Excessive cleansing solution that pools on the skin may be removed with sterile gauze by wicking not wiping. If allergy to both above products you may use 70% alcohol swabs.
   c. Scab removal. Some scabs may be removed with the above cleansing technique. If not, the following should be performed to aide in safe scab removal.
      (i) Apply NS soaked gauze to sites for 10 minutes or until scab softens.
      (ii) Remove NS soaked gauze in wiping motion.
      (iii) If scabs not removed with soaking, gently remove with tweezers or forceps.
         • DO NOT pick off scabs with fingers.
         • DO NOT stick through scabs.
         • DO NOT use a sterile blunt needle to remove scabs; you could cut the patient’s skin.
         • Scabs contain large amounts of bacteria, predominantly staphylococcus aureas. If scabs are broken up, pieces of it may be introduced into the buttonhole tracts and the bloodstream causing a tunnel or systemic infection.
   d. Using new packages of the same cleansing product, cleanse both sites again post scab removal.
      • This second cleansing of the sites post scab removal is important in the prevention of infection.

6. Perform Venipuncture.
   a. Apply tourniquet.
      • It is important to cannulate the developing constant-site in the exact same place, using the same insertion angle and depth of penetration each time.
      • It is recommended to insert the arterial needle first.
   b. Apply light pressure with non-dominant thumb below insertion site to keep skin taut.
      • A tourniquet should be used at all times to prevent trauma to the vessel.
   c. Using a sharp needle, holding the wings between thumb and forefinger, align the needle cannula with the bevel facing up.
      • Pressure without pulling prevents the skin insertion site and tract from moving away from vessel insertion flap.
**PROCEDURE:**

d. Insert steel needle at 20° – 40°.

e. Lower the angle of insertion once flashback is obtained and advance needle to hub.

f. Release the tourniquet.

g. Secure needle at angle of insertion to ensure it is aligned within the vessel.

h. Infuse heparin/saline prime.

7. Perform 2nd venipuncture as per Steps 1 – 6.


9. Instruct patient to keep needle sites visible at all times during treatment.

10. Infuse heparin prime via delivery system if not already done.

11. Continue to cannulate with sharp needles each treatment until the tunnel tracts are well developed. This will be individual to each patient.

**KEY POINT:**

- Degree of angle may change depending on depth and type of access. Self cannulators may require a steeper angle.
- A flashback of blood indicates when the needle is in the access.
- If unsuccessful cannulation of buttonhole site during the development of the tract, select an alternative site for that treatment.
- Refer to Procedure 30.30.01 Venipuncture of Arteriovenous Fistula/Graft.
- Use facility protocol or patient care plan.
- Blood sampling if required should be done prior to infusing prime.
- Performed for patient safety to ensure needles are intact and no bleeding at sites.
- According to hospital policy.

**B. Removal of Needles**

1. Wash hands.

2. Remove the venous needle first.

3. Cover with 5 x 5 cm gauze and apply 2 finger manual pressures. First finger directly on buttonhole site and the second finger just above the external site. Hold for a minimum of 10 minutes or longer, until bleeding stops.

- It is recommended to remove only one needle at a time.
- Refer to patient care plan for specific instructions for venipuncture site care.

- Some signs which indicate the sites are ready for blunt needles includes:
  - you can visualize a round hole at the site
  - the hole looks well healed
  - there is a significant decrease in resistance when inserting needles

- If mild to moderate resistance is met while attempting to insert the needle, rotate the needle as you advance it using gentle pressure.

- Do not use excessive force when inserting the blunt needles into the tract. If force is required the site is not yet ready for blunts, continue to use sharps.

- Two finger pressure allows for sealing of internal and external puncture sites.

- Palpate vessel proximally to ensure there is a pulse (vessel not occluded). Do not apply pressure while removing the needles.

- Use of gelfoam and surgicel to achieve hemostasis is not recommended for buttonhole sites and should be highly discouraged.
PROCEDURE:

4. Ensure the patient’s sitting and standing blood pressures are stable prior to removal of arterial needle.

5. Repeat Steps 1 to 4 for the arterial needle.

6. Apply prescribed antibacterial ointment and cover puncture sites with 5 x 5 cm gauze and secure with tape.

   • Dressings to remain on for 6 hours.

C. Maintaining and Using Buttonhole Sites

1. The procedure for accessing the buttonhole sites once established is the same as above with the exception of the equipment. Blunt “buttonhole” needles are used in place of the sharp needles.

   • The decision to switch from sharp needles to the blunt is made by the primary cannulator. Generally it takes 2 – 3 weeks to develop a proper tract but it may take longer for diabetics and elderly.

DOCUMENTATION:

Manitoba Renal Program chart
   - Hemodialysis Treatment Record
   - Integrated Progress Notes
   - Vascular Access Record
   - Renal Patient Kardex
      - Diagram
      - Comments

In-patient chart
   - Integrated Progress Notes
   - Vascular Access Record

REFERENCES:


Medisystems (2002). Establishing constant-sites in native AV fistulae.


PURPOSE:

1. The Tego connectors are a split septum connector utilized to convert the open CVC to a closed protected system.

POLICY:

1. Registered Nurses and Licensed Practical Nurses in Dialysis who have received instruction may access the CVC utilizing a Tego connector.

2. Following demonstration of competency with the use of the Tego connectors, Home Hemodialysis training nurses may instruct and certify patients in the use of Tego connectors.

3. Tego connectors must be changed after every five hemodialysis treatments or at least once weekly.

EQUIPMENT:

A. Initiating Hemodialysis:

- Clean towel or sterile drape
- 2 - 4x4 gauzes
- 6 - chlorhexidine 2%/alcohol 70% prep pads
- 2 – 10 mL syringes containing 5 mL of 0.9% NaCl
- 2 – 10 mL syringes for heparin/saline prime as ordered by a physician
- Sterile drape
- 2 - Masks - optional
- Disposable gloves

B. Changing Tego Connectors:

- Supplies listed for A. Initiating Hemodialysis
- 2 - Tego connectors in sterile packaging
- 2 chlorhexidine 2%/alcohol 70% swab sticks
C. Discontinuing Dialysis:

- Blue pad
- 2 4x4 gauzes
- 6 chlorhexidine 2%/alcohol 70% prep pads
- 2 syringes containing 10 -20 mL of 0.9% NaCl
- 2 prepared syringes containing post instillation as per physician’s order, equal to the volume of the CVC
- 2 Masks - optional
- Disposable gloves

PROCEDURE:

A. Initiating Hemodialysis:

1. Perform hand hygiene.
2. Put on mask and mask patient. Optional
3. Prepare a clean work area by completing the following steps:
   a. Cover the table top with a clean opened blue pad (absorbent side up).
   b. Open 2-4 x 4 gauzes and lay the package flat on the table.
   c. Open 6 chlorhexidine/alcohol swabs (avoid touching the swab) and place them on the 4 x 4 gauzes.
   d. Place 3 saline syringes and heparin prime within easy reach in clean work area.
   e. Open sterile drape package.
   f. Place drain bag and attached bloodlines within easy reach.
4. Make sure the clamps on the Dialysis Catheter are clamped.
5. Do hand hygiene and put on gloves.
6. Place the sterile drape under the Dialysis Catheter. Handle by the edges only.
7. Vigorously scrub the Tego on the arterial extension with a chlorhexidine/alcohol swab, working from the Tego tip moving down to the collar for at least 15 seconds. Move the swab downwards to clean the lower section of the Tego and the red portion of the catheter extension for at least another 15 seconds. Move downwards only. Do not move the swab back up towards the Tego tip.
   a. Make sure the chlorhexidine/alcohol swab is in contact with all the groves on the connector.
   b. Allow the surface to dry completely.

KEY POINT:

- Optional
- Open one end of prep pad package only for ease of removal of prep pad at time of use.
- Complete the 500 mL saline refresh of the dialyzer prior to accessing the CVC.
- Clamping sequence of catheter remains the same as for an open catheter (safety precaution) with all connections and disconnections.

ALERT:

- Always hold on to the lower end of the Tego connector when attaching syringes or bloodlines. Ensure all connections meet the collar of the Tego.
- The Tego is cleansed prior to each connection.
- Ensure all air is removed from syringes and venous bloodline. Air must not enter the catheter.
- Ensure the catheter is clamped prior to any disconnection.
8. Aspirate the instillation from the last dialysis by completing the following steps:
   - a. Make sure the clamp is closed on the arterial port of the dialysis catheter.
   - b. Attach a 10 mL syringe with 5 mL of normal saline. Push the syringe straight in to the Tego and rotate the syringe until it stops. Ensure the syringe meets the collar.
   - c. Open the clamp.
   - d. Attempt to aspirate 3 mL to remove the instillation.
   - e. If not able to aspirate, infuse the saline.
   - f. Close the clamp.
   - g. Remove syringe while continuing to hold the catheter extension.

9. Take a new chlorhexidine/alcohol swab and vigorously scrub the end of the Tego connector up to the collar. Scrub for 15-30 seconds and allow to dry completely.

10. Flush the arterial lumen with saline by completing the following steps:
    - a. Attach a 10 mL syringe of saline to the Tego.
    - b. Unclamp the arterial extension.
    - c. Push the saline into the catheter.
    - d. Clamp the arterial extension.
    - e. Remove the syringe.
    - f. Let the arterial extension lay on the drape. Note how easily the saline instills.

11. Attach the arterial bloodline by completing the following steps:
    - a. Disconnect the arterial bloodline from the drainage bag, maintaining sterility of the open tip of the bloodline.
    - b. While holding the end of the arterial bloodline, take a new chlorhexidine/alcohol swab and vigorously scrub the end of the Tego connector up to the collar. Scrub for 15-30 seconds and allow to dry completely.
    - c. Attach the arterial bloodline to the Tego connector.

12. Repeat with the venous extension of the dialysis catheter using the prepared heparin prime to flush the extension instead of 10 mL saline, and attach the venous bloodline instead of the arterial bloodline.

- The blood should flow freely into the syringe; occasionally a clot may flow into the syringe.
- Ensure no air enters the catheter for all infusions.
- If heparin from the lumen has been infused, do not administer the heparin prime or portion prime accordingly.

B. Changing Tego Connectors:

1. Wash hands.

2. Put on mask and mask patient.

3. Prepare a clean work area by completing the following steps:
   a. Cover the table top with a clean blue pad (absorbent side up).
   b. Open 2-4 x 4 gauzes and lay the package flat on the table.
   c. Open 6 chlorhexidine/alcohol swabs (avoid touching the swab) and place them on the 4 x 4 gauzes.
   d. 2 chlorhexidine/alcohol swab sticks.
   e. Place three 10 mL saline syringes and a 10 mL syringe containing heparin prime within easy reach in clean work area.
   f. Take two 10 mL saline syringes and discard 5 mL from each.
   g. Open the package of the sterile Tego connector, and without touching the connector (hold the connector from the outside of the package and do not remove it from the package) attach the two 5 mL of saline to 2 Tego connectors. Leave the Tego syringe connection within the packaging.
   h. Open sterile drape package.

4. Make sure the clamps on the Dialysis Catheter are clamped.

5. Perform hand hygiene. Put on gloves as per facility practice.

6. Place the sterile drape under the Dialysis Catheter. Handle by the edges only.

7. Vigorously scrub the entire arterial connection & Tego with the chlorhexidine/alcohol swab for 15-30 sec.
   a. Make sure the chlorhexidine is in contact with all the groves on the connector.
   b. Allow the surface to dry completely.
   c. Hold the arterial extension below the Tego and do not allow the catheter to touch the drape.

- Clamping sequence of catheter remains the same as for an open catheter (safety precaution) with all connections and disconnections.

- **Alert:**
  - Always hold on to the lower end of the Tego connector when attaching syringes or bloodlines. Ensure all connections meet the collar of the Tego.
  - The Tego is cleansed prior to each connection.
  - Ensure all air is removed from syringes and venous bloodline. Air must not enter the catheter.
  - Ensure the catheter is clamped prior to any disconnection.
8. Replace the Tego by completing the following steps:
   a. Remove the old Tego connector from the arterial catheter extension. Maintain sterility of the open end.
   b. Do not touch the end of the exposed catheter extension. Examine the end for any damage or debris.
   c. Take a chlorhexidine/alcohol swabstick and clean around the outside of the open catheter extension. This must be done with each Tego change. Begin cleaning at the open end and work down the extension. Do not move the swabstick back towards the open end.
   d. Allow the catheter extension to dry completely.
   e. Pick up the syringe attached to the new Tego connector and remove the sterility protector from the new Tego without touching the Tego.
   f. Attach the new Tego to the arterial catheter extension.

9. Aspirate from the arterial extension as described in Section A. Initiating Hemodialysis step 8.

C. Discontinuing Hemodialysis:

Once all the blood is returned, close the clamps on BOTH the arterial and venous ports of the catheter, and on BOTH the arterial and venous bloodlines.

1. Perform hand hygiene.

2. Put on mask and mask patient.

3. Prepare clean working area by completing the following steps:
   a. Ensure you have a clean blue pad covering the table (absorbent side up).
   b. Have citrate/heparin syringes for both the arterial and venous ports of the catheter within easy reach. Ensure syringes contain the volume of each lumen of the catheter.
   c. Place two 10 mL syringes of saline within easy reach.
   d. Open two 4 x 4 gauzes and lay package flat.
   e. Open six chlorhexidine/alcohol swabs (avoid touching the swab) and place them on the 4 x 4 gauzes.
   f. Open sterile drape package.

   - Clamping sequence of catheter remains the same as for an open catheter (safety precaution) with all connections and disconnections.
   - Optional

5. Place the sterile drape under the Dialysis Catheter and bloodlines. Handle drape by the edges only.

6. Vigorously scrub the entire arterial connection and Tego with the chlorhexidine/alcohol swab for 15-30 seconds.
   a. Make sure the chlorhexidine/alcohol is in contact with all the groves on the connector.
   b. Allow surface to dry completely.
   c. Keep a hold of the lower end of the Tego connector until end of citrate/heparin infusion. If there is a need to set the catheter extension down, repeat step 6.
   d. Disconnect the arterial bloodline.

   ALERT:
   - Always hold on to the lower end of the Tego connector when attaching syringes or bloodlines. Ensure all connections meet the collar of the Tego
   - The Tego is cleansed prior to each connection.
   - Ensure all air is removed from syringes. Air must not enter the catheter.
   - Ensure the catheter is clamped prior to any disconnection.

7. Take a new chlorhexidine/alcohol swab and vigorously scrub the end of the Tego connector up to the collar for 15-30 seconds. Allow to dry completely.

8. Flush the arterial extension with saline by completing the following steps:
   a. Attach a 10 mL syringe of saline to the Tego.
   b. Open the clamp on the arterial extension.
   c. Push the saline into the catheter using a pulsatile motion.
   d. Clamp the arterial extension.
   e. Remove the syringe.

   ALERT:
   - Ensure no air enters the catheter with all infusions.

9. Take a new chlorhexidine/alcohol swab and vigorously scrub the end of the Tego connector up to the collar. Scrub for 15-30 seconds and allow to dry completely.

10. Instill the arterial extension with sodium citrate/heparin by completing the following steps:
    a. Ensure volume of sodium citrate/heparin is equal to the volume of the extension of the catheter.
    b. Attach the syringe containing citrate/heparin to the arterial extension.
    c. Unclamp the arterial extension.
    d. Instill the sodium citrate/heparin, clamping the extension while just finishing the instillation.
    e. Remove the syringe.

11. Repeat step 7-10 for the venous connection.

12. Ensure dressing is labeled for sodium citrate/heparin instillation.
DOCUMENTATION:

- Hemodialysis Treatment Record (indicate number of days Tego in use)

REFERENCES:

ICU Medical, Inc., Directions for using TEGO Connector, www.icumed.com

ICU Medical, Inc., Tego Connector Product Performance, 09/07

Maragakis, et al., Increased Catheter-Related bloodstream Infection Rates After the Introduction of a New Mechanical Valve Intravenous Access Port, Infection Control an Hospital Epidemiology, Jan 2006, Vol. 27, No1, 68-70


MANITOBA RENAL PROGRAM

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<td>Hemodialysis Central Line Dressing Change</td>
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<tr>
<td>30.30.06</td>
<td>Professional Advisory Committee, Manitoba Renal Program Nursing Leadership Council, St. Boniface General Hospital</td>
<td>April 2009</td>
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PURPOSE:

1. To assess and cleanse catheter site to ensure catheter security and prevent infection.

POLICY:

1. Registered Nurses and Licensed Practical Nurses in Dialysis who have received instruction and have demonstrated competency to the renal educator or delegate may change the central line dressings according to the procedure.

2. Canadian Society of Nephrology (CSN) and National Kidney Foundation (NKF) Kidney Disease Outcomes Quality Initiative (KDOQI) clinical practice guidelines recommend using non-occlusive (gauze) dressing for all hemodialysis central lines. Newly inserted Central Line temporary and tunnelled dressings are changed each treatment for 10 days post insertion using a non-occlusive dressing. Occlusive dressings (transparent) may be used after that and are changed once per week (and whenever drainage noted) and PRN. If using gauze with an occlusive dressing, change each treatment.

3. Application of povidone iodine ointment, polysporin triple ointment or mupirocin ointment at the catheter exit site with each dressing change when using non-occlusive dressing is recommended by CSN and KDOQI clinical practice guidelines but remains a physician prescription.

4. Dressing change should be done at start of treatment in order to visualize and assess exit site condition and catheter placement.

EQUIPMENT:

- 2 procedure masks
- 1 pair non-sterile disposable gloves
- Sterile or clean towel
- 1 package antiseptic swab stick (2% aqueous chlorhexidine should be the antiseptic of choice. Povidone iodine should only be used when there is an allergy to chlorhexidine.)
- 2 packages 5 x 5 cm gauze
- 1 package sterile cotton tipped applicators
- Self-adhesive dressing (occlusive or non-occlusive)
- 0.9% NaCl as required (only for removing crusting and exudates)
- Sterile dressing tray (only for removing crusting and
PROCEDURE:

1. Perform hand hygiene.

   - CSN and KDOQI clinical practice guidelines recommend both patient and nurse mask during central line dressing change procedure.

3. Glove.

4. Remove the previous dressing, taking care not to dislodge the catheter
   - Scissors are never to be used when removing dressings from hemodialysis central venous catheters.

5. Inspect the exit site and the surrounding tissue for inflammation, drainage, crusting, and skin reaction to tape and/or sutures.
   - If exudate present, obtain a swab for C&S.

6. Visually assess the catheter placement.
   - Ensure sutures are intact with a non-tunnelled catheter. If out, notify physician.
   - Ensure the catheter cuff is not visible with tunnelled catheter.
   - NOTE: Nurses that are certified to suture catheters may do so as per facility policy.

7. Prepare a clean working field. Open a package of 5 X 5 cm gauze and antiseptic swab sticks.

8. Cleanse the skin and catheter section that will be covered by the dressing with the bacteriocidal swab sticks for at least 30 seconds beginning at the exit site, extending to the area outside the dressing.
   - Crusting, exudate, or excessive adhesive should be removed using sterile 0.9% NaCl before cleansing with antiseptic swab sticks. Use no touch technique. Maintain sterility around the exit site. Use sterile dressing tray.

9. Allow a minimum of 2 minutes drying time.
   - Do not wipe. Blot only if pooling is present. Drying time is important for antiseptic effect and to minimize skin reaction when adhesive from dressing comes in contact with chlorhexidine.

10. If prescribed, apply ointment to exit site using a sterile cotton-tipped applicator.
    - CSN and KDOQI clinical practice guidelines recommend the use of povidone iodine ointment, polysporin triple ointment or mupirocin ointment at the exit site after placement and with each dressing change.

11. Apply sterile 5 X 5 cm gauze over the centre of the exit site using a “no touch” technique.
    - If not using ointment, place occlusive dressing directly on uncovered exit site.

12. Anchor the dressing as per facility. Write date and initials on dressing.
    - Ensure the dressing creates a seal around the catheter.

DOCUMENTATION:

- Hemodialysis Treatment Record
  - Each treatment in Vascular Access box, under Exit Site Assessment
- Integrated Progress Notes (if abnormal assessment)
  - Assessment of access and exit site, signs and/or symptoms of infection, swabs for C&S etc.
- Kardex
  - If q weekly dressing changes, indicate the day of the week for regular changes
  - Special instructions for individual patients
REFERENCES:


PURPOSE:

1. To maintain blood flow through the extracorporeal circuit during access interruption.

POLICY:

1. Registered Nurses and Licensed Practical Nurses working in Dialysis who have received instruction and who have demonstrated competency to the renal educator or delegate may perform recirculation of extracorporeal blood.

2. The maximum time allowed for recirculation of extracorporeal blood is 20 minutes.

3. Patients must not leave station while blood is recirculating.

EQUIPMENT:

- Sterile recirculation connector
- 2 – 10 or 20 mL syringes containing 10 mL 0.9% NaCl

PROCEDURE:

1. Press Tx Clock and Confirm to pause treatment.

2. Press Start/Stop key to turn blood pump off.

3. Clamp both arterial and venous bloodlines near the patient connection.

4. Clamp both arterial and venous vascular access needles or ports.

KEY POINT:

- Dialysis Paused appears in status bar. Heparin, UF, and SVS lights will flash indicating they are off. Dialysate flow still on.
PROCEDURE:

5. Open sterile recirculation, connector.

6. Disconnect arterial bloodline. Connect bloodline to recirculation connector. Flush vascular access needle or port with enough 0.9 % NaCl to clear the line of blood and reclamp.

7. Repeat Step 6 for venous bloodline.

8. Open saline T line clamp and administration set to provide a demand drip.

9. Unclamp arterial and venous bloodlines. Press Start/Stop key to turn blood pump on.

10. Press Heparin On/Off key to turn on.


12. Re-establish blood flow:
   a. Press Start/Stop key to turn blood pump off.
   b. Clamp saline T line and administration set.
   c. Clamp arterial and venous blood lines.
   d. Re-connect blood lines to vascular access.
   e. Unclamp all clamps.
   f. Press Start/Stop key to turn blood pump on and gradually increase blood pump speed.
   g. Press Tx Clock and Confirm to continue dialysis

KEY POINT:

- Remove sterility caps if present.
- Blood flow at a maximum of 100 – 200mL/min.
- Unless patient is heparin free.
- If correction appears to be unlikely within the 20 minute time frame, return blood. If unable to return blood or 20 minutes has been exceeded, discard blood and notify nephrologist.

DOCUMENTATION:

- Hemodialysis Treatment Record
- Vascular Access Record (if required)
- Integrated Progress Notes (if required)

REFERENCES:

# Manitoba Renal Program

## Subject
- AVF / AVG Vascular Access Assessment:
  - Clinical Assessment
  - Recirculation Blood work
  - Dynamic Venous Pressure (DVP) Monitoring
  - Access Flow

## Code
30.30.08

## Effective Date
June 2002

## Revision Date
October 2009

## Purpose:
1. To evaluate efficiency and prevent complications of vascular access used for hemodialysis therapy.

## Policy:
1. Registered Nurses and Licensed Practical Nurses in Dialysis, who have demonstrated competency to the renal educator or delegate, shall perform vascular access assessment (which includes a review of vascular issues from the chart) and a clinical assessment (which includes inspection, palpation and auscultation of AVF/AVG) each treatment prior to cannulation.

2. Urea based recirculation bloodwork may be used to assess AV fistulae. If recirculation is >15%, confirm needle position and repeat next hemodialysis treatment. If recirculation is >15% on 2 consecutive measurements, or Dynamic Venous Pressure (DVP) are increased on 3 consecutive treatments, a fistulogram may be requested.

3. DVP monitoring will be done with each treatment to assess access problems in grafts.

4. Access flow measurement will be done monthly and PRN or as ordered. Access flow results that are diminished by 20% or below 600 mL/min for grafts or below 500 mL/min for fistulae will be repeated next treatment and/or referred for fistulogram.

## Equipment:
- 3 Antiseptic swabs
- 3 – 3 cc syringes
- 3 Chemistry tubes
- 3 Chemistry requisitions
PROCEDURE:

A. **AV Fistula Recirculation Bloodwork:**

1. Label chemistry tubes and requisitions and include arterial, venous, systemic respectively.

2. Press Tx Running and Confirm to pause.

3. Swab the arterial sampling port. Collect a minimum of 2 mL of blood. Place into chemistry tube.

4. Repeat Step 3 using the venous port.

5. Lower the blood flow to 120 mL/minute.

6. After 10 seconds, turn blood pump off.

7. Clamp the arterial bloodline between the sampling port and dialyzer.

8. Clamp venous bloodline.

9. Swab the arterial sampling port. Collect a minimum of 2 mL of blood. Place into chemistry tube.

10. Unclamp the arterial and venous bloodlines and resume original blood flow.

11. Press Tx Paused and Confirm.

12. The nurse responsible for the patient this treatment or the following treatment must calculate recirculation (R) using the following formula:

\[
R = \frac{S - A}{S - V} \times 100
\]

**KEY POINT:**

- Blood will be obtained 15 – 30 minutes after initiation of hemodialysis.
- Pausing dialysis minimizes hemoconcentration and prevents variations in solute drag with lower UFR.
- Ensure chemistry tube is labelled with “arterial sample”.
- Ensure chemistry tube is labelled with “venous sample”.
- This clears recirculated blood from the access.
- To prevent backflow from the dialyzer.
- To prevent introduction of venous blood into the systemic sample.
- Systemic sampling must be obtained within 15 seconds of stopping the blood pump.
- Ensure chemistry tube is labelled with “systemic”.
- To resume hemodialysis treatment. All previous parameters will remain as before button pressed.
- Elevated levels of access recirculation will be investigated for the presence of vascular access stenosis.

B. **Dynamic Venous Pressure Monitoring in Grafts:**

1. Initiate hemodialysis with blood flow of 200 mL/min.

2. If patient is in a bed/chair, set to the lowest possible level.

3. Measure and record the venous pressure from the hemodialysis delivery system during the first 2 – 5 minutes of every hemodialysis treatment.

4. Increase Qb to desired rate.

**KEY POINT:**

- Ensure saline has cleared from the extracorporeal circuit.
- Assess at same level for all measurements. DVP will fluctuate at different elevations.
- Pressure will vary depending on the gauge of the fistula needle. If venous pressure >125 mmHg on 3 consecutive treatments or increasing progressively, a graftogram should be requested.
**PROCEDURE:**

**C. Access Flow:**

1. Initiate treatment. (Allow 2 – 5 minutes of treatment for conditions to stabilize.)
   - **KEY POINT:** The access flow should be performed within 20 minutes of initiation. Ensure on line clearance (OLC) is enabled.

2. Set Blood Pump speed to 300 mL/min or less.
   - **KEY POINT:** Pump speed must be consistent throughout test. Machine must be alarm free prior to starting Access Flow test.

3. Go to Kt/V AF screen.

   - **KEY POINT:** A manual OLC test may be done to initiate the access flow measurement.

5. Following OLC test, an audible alarm will prompt you to “Run Access Flow?”. Confirm to proceed or Escape to do test at later time.
   - **KEY POINT:** Machine will run an OLC test within first 15 minutes of treatment. Mute audible alarms related to Access Flow, do not reset. This ensures that screen prompts remain on the screen until confirmed.

6. Follow screen prompt “Reverse Blood Lines” and “Confirm”.
   - **KEY POINT:** If using twister lines disregard screen prompts to clamp and reverse lines and instead use twist mechanism. UF will be interrupted during this section of the test. Status Bar will display “Access Flow Scheduled” for approximately 2 minutes while conditions stabilize. Status Bar will then display “Access Flow Running” for approximately 7 – 10 minutes.

7. Mute audible alarm and follow on screen prompts to “Switch Bloodlines Back” to the correct position.
   - **KEY POINT:** When test has been completed “Access Flow Completed” will appear in the Status Bar.

8. Return blood flow to desired rate.

**D. Vascular Access Assessment:**

1. **INSPECTION**
   - a. Compare arms looking for ecchymosis, erythema, discoloration of skin or any breaks in the skin.
   - b. Inspect access arm for aneurysms, hematomae, curves or flattening of the vessel, presence of accessory vessels, signs of steal syndrome and previous puncture sites.

2. **PALPATION**
   - a. Assess the thrill – to determine patency of fistula
   - **KEY POINT:** Felt only at the anastomosis and disappears with compression of anastomosis. (If strong blood flow through the vessel, you may feel the thrill up the entire length of the fistula.) Should start out strong and diminish as you go up the fistula.
   - No thrill indicates clotted fistula. Therefore do not
PROCEDURE:

b. Assess for the following:
   (i) Aneurysms
   (ii) Temperature – increased temp may indicate infection
   (iii) Decreased temperature to distal extremity may indicate steal syndrome
   (iv) Capillary refill <3 seconds is normal
   (v) Assess vessel length for two needles
   (vi) When palpating the vessel roll your fingers over the vessel to gauge vessel diameter

   Pain may also indicate steal syndrome.

3. AUSCULTATION

a. Listen for the bruit beginning at the anastomosis and following the entire length of the access, including the outflow veins of the upper arm.

   Flow of blood in the vessel should be continuous in sound and diminish evenly along the vessel
   Pulse like sounds or high-pitched sounds could mean a stenosis. Notify vascular access nurse and/or nephrologist.

DOCUMENTATION:

- Hemodialysis Treatment Record
- Vascular Access Record
- Integrated Progress Notes

REFERENCES:


### Purpose:

1. To ensure the process used for obtaining blood specimens to measure the prescribed dose of dialysis is performed accurately and consistently.

### Policy:

1. Measuring the prescribed dose of dialysis using pre and post hemodialysis blood specimens is not a routine procedure. This procedure is ordered by a Nephrologist.

2. Pre-dialysis and post-dialysis samples must be drawn at the same dialysis session, mid-week. For urea kinetic modelling, a second pre-dialysis sample is to be drawn at the patient’s next dialysis.

3. The post-dialysis blood sample must not be diluted with recirculated blood or saline.

4. For formal urea kinetic modelling, the sample must be drawn before rebound. Therefore the *slow flow technique* must be used.

5. For Percent Urea Reduction (PUR) calculations, the sample is taken at least 2 – 3 minutes post-dialysis, when the possibility of cardiopulmonary recirculation is eliminated.

### Equipment:

- Appropriate blood sampling supplies

### Procedure:

A. **Drawing Pre-Dialysis Urea Bloodwork:**

1. Draw sample from the first vascular access before administering any saline or heparin.

2. When central lines are used, aspirate instillation, and then withdraw at least 10 mL of blood before drawing the sample using a separate syringe or device.  
   - The 10 mL withdraw may be re-infused if the syringe tip has been kept sterile.
PROCEDURE:  

B. Drawing Post-Dialysis Bloodwork: PUR Measurements:

1. At the end of treatment time, discontinue dialysis.
2. Two to three minutes post-dialysis withdraw 10 mL of blood from the arterial access.
3. Draw blood sample.
4. Re-transfuse the 10 mL of blood from Step 2.

C. Drawing Post-Dialysis Urea Using the Slow Flow Sampling Technique for Urea Kinetic Modelling:

1. When dialysis time is complete, press Dialysate Flow. Put delivery system into Bypass.
2. Decrease Qb to 50 – 100 mL/min for 15 seconds. ▪ This eliminates access recirculation by clearing the dead space in the arterial bloodlines.
3. Draw the blood sample from the arterial sample port.
4. Stop the blood pump and discontinue dialysis. ▪ Refer to Procedure 30.20.01 Use of Fresenius 2008K Delivery System.

REFERENCES:


PURPOSE:

1. To provide for safe removal of non-tunnelled hemodialysis central venous catheters.

POLICY:

1. Registered Nurses and Licensed Practical Nurses in Dialysis who received instruction and have demonstrated competency to the renal educator or delegate may perform removal of non-tunnelled hemodialysis central venous catheter as per physician’s order.

2. If the central line catheter is to be removed during or post hemodialysis, the patient will be dialyzed heparin free; as per MRP Procedure 30.10.03 Providing Hemodialysis without Heparinization unless otherwise ordered by physician.

3. The patient must be monitored for a minimum of 30 minutes post removal of the hemodialysis central venous catheter. Hemodialysis central venous catheters should only be removed if the vessel is not being used for any other catheter.

EQUIPMENT:

- 4 – Sterile gauze 10 x 10 cm
- Sterile scissors
- Sterile forceps
- Dressing tray (optional)
- Sterile specimen container (optional)
- Disposable gloves
- Chlorhexidine swab
- Adhesive dressing
- Sterile petroleum impregnated gauze or sterile ointment

PROCEDURE:

1. Verify the physician’s order and the patient’s lab results for uncorrected coagulopathies.

KEY POINT:

Notify physician is platelet count <50 x 10⁹ litres as this could increase the risk of hematoma post-removal.
PROCEDURE:

2. Explain this procedure, including the Valsalva maneuver and instruction to watch for bleeding at home.

3. Place patient in a flat and supine position.

4. Clamp catheter.

5. Remove dressing.

6. Assess the exit site for evidence of redness, swelling or drainage.

7. Prepare sterile field and add appropriate equipment.

8. Open sterile specimen container as required.

9. Glove.

10. Clean catheter insertion site and surrounding skin with chlorhexidine swab and allow a minimum of 2 minutes drying time.

KEY POINT:

- Valsalva manoeuvre does not apply for femoral catheters.

- This position will decrease the chance of air embolism.

- Turn head away from catheter site if removing a subclavian or jugular catheter.

- Gloves should be changed and hand hygiene performed before and after dressing removal.

- If drainage present, collect swab for C&S and notify physician.

- If patient sensitive to chlorhexidine, use other antibacterial cleaning agent.

- If patient unable to cooperate with these instructions, remove catheter at the end of inspiration and during exhalation.

- Inspect for intactness of catheter. Notify physician if not intact.

- DO NOT FORCE catheter removal. If it is difficult to remove, stop, tape catheter in place, and notify physician. Ensure side ports are not open to air.

- If ordered by physician or if any indication of an infection, send catheter tip (about 2.5 cm) for C&S using sterile scissors and a sterile container.

- Dressing may be removed after 24 – 48 hours. On dressing, indicate the time and date of catheter removal and initial.

- Observe for bleeding, hematoma, edema or any changes in patient’s condition.

11. Remove sutures at insertion site.

12. When removing a subclavian or jugular central line, instruct patient to perform Valsalva manoeuvre or hold breath at the end of a deep inspiration while gently withdrawing catheter or withdraw catheter during expiration.

13. Place petroleum impregnated gauze or sterile ointment and sterile gauze over insertion site and apply firm pressure. With other hand, grasp catheter at distal end and withdraw smoothly and continuously. Pressure should be continuous over insertion site until catheter is completely removed.

14. Apply firm pressure over insertion site for a minimum of 10 minutes or until bleeding and oozing stops.

15. Cover sterile gauze with folded 10 x 10 cm gauze and then completely cover with an airtight dressing such as a transparent occlusive dressing.

DOCUMENTATION:

- Vascular Access Record
  o Date, time, type and size of catheter removed

- Hemodialysis Treatment Record/Integrated Progress Notes
  o Sutures removed
  o Type of dressing applied
  o Patient’s response
  o Appearance of the site
  o C&S specimen sent

- Kardex
  o Date, time, type and size of catheter removed

REFERENCES:


MANITOBA RENAL PROGRAM

SUBJECT
- Alteplase for Clearing Hemodialysis Catheter Thrombosis using the Push (30 minute) Method

SECTION 30.30  Vascular Access

CODE 30.30.12

AUTHORIZATION
- Professional Advisory Committee, Manitoba Renal Program
- Nursing Leadership Council, St. Boniface General Hospital

EFFECTIVE DATE June 2005

REVISION DATE June 2010

PURPOSE:
1. Alteplase is a thrombolytic agent used for the treatment of catheter-related thrombosis. Catheter thrombosis should be suspected if there is a decrease in blood flow rate or an inability to withdraw blood or infuse fluid through the dialysis catheter. Once mechanical obstruction has been ruled out through visual inspection and patient re-positioning, alteplase will be instilled as outlined in this procedure. The maximum dose used is 2 mg per lumen. There are minimal side effects at this dose but the patient should be monitored for signs of bleeding.

POLICY:
1. Registered Nurses and Licensed Practical Nurses in Dialysis who have received instruction and have demonstrated competency to the renal educator or delegate may instill alteplase as indicated on the standing Chronic Hemodialysis Physician’s Order Sheet.

2. Registered Nurses and Licensed Practical Nurses in Dialysis are not required to obtain a physician order each time alteplase is instilled. The standing orders (as above) are intended for repetitive use.

3. Registered Nurses and Licensed Practical Nurses in Dialysis must notify the nephrologist by the following dialysis day if alteplase has been instilled 2 times within a 2-week period.

EQUIPMENT:

- 6 – 10 mL syringes
- 4 – 3 mL syringes
- 2 vials alteplase (2 mg)
- Sterile water for injection (without bacteriostat)
- 0.9% NaCl for injection
- Alcohol swabs
- Clean disposable gloves

PROCEDURE:

1. Check if patient has a history of active bleeding or platelets less than 135 X 10⁹/Litre. If patient has a history of active bleeding, notify physician prior to instillation of Alteplase.
PROCEDURE:

2. Check if patient has received Alteplase in the past 2 weeks. If patient has received Alteplase in the past 2 weeks, notify physician.

3. Withdraw 2.2 mL of sterile water for injection and inject into a 2 mg alteplase vial. Final concentration = 1 mg/mL (vial contains 2.2 mg alteplase).

4. Swirl vial until contents are completely dissolved. Do not shake. Reconstituted solution should be colorless or pale yellow and transparent.

5. Repeat Steps 1 and 2 for the second vial of alteplase. Expiry of the solution is 24 hours after reconstitution when stored at 2 to 30 °C.

6. Withdraw 2 mL (2 mg) of reconstituted solution from each vial into 2 separate syringes. The extra 0.1 mL alteplase beyond the lumen volume will ensure alteplase gets to the tip of the catheter.

7. Access catheter lumen following Procedure 30.30.02 Accessing and Locking Dialysis Central Venous Catheter (Anticoagulant/Thrombolytic/Antibiotic Locking). Example:

a. For catheters with lumen volumes <2 mL: If the lumen volume is <2 mL, only alteplase is instilled (to a volume equal to the catheter lumen volume + 0.1 mL). See example under “Key Point”.

   Example:
   - For a 1.7 mL arterial lumen and a 1.8 mL venous lumen:
     - Instill 1.8 mL (1.7 mL + 0.1 mL) alteplase into the arterial lumen.
     - Instill 1.9 mL (1.8 mL + 0.1 mL) alteplase into the venous lumen.

b. For catheters with lumen volume ≥2 mL: If the lumen volume is ≥2 mL, a mixture of alteplase and sterile water for injection is instilled. This is because the maximum dose of alteplase is 2 mL (2 mg) per lumen. See example under “Key Point”.

   Example:
   - For a 2.1 mL arterial lumen and a 2.2 mL venous lumen:
     - Total volume needed for arterial lumen: 2.1 mL + 0.1 mL = 2.2 mL.
     - Instill 2 mL (2 mg) of alteplase + 0.2 mL sterile water for injection.
     - Total volume needed for the venous lumen: 2.2 mL + 0.1 mL = 2.3 mL.
     - Instill 2 mL (2 mg) alteplase + 0.3 mL sterile water for injection.

10. Wait 10 minutes. Monitor patient for signs of allergic reactions (i.e. pruritis, edema). There is a very low risk of hypersensitivity reactions (<0.02%). Monitor patient for any signs of bleeding, particularly at any sites of recent trauma or venipuncture. The risk of bleeding is minor due to small dose of alteplase used (maximum dose = 4 mg).

11. Instill 0.3 mL 0.9% NaCl into EACH catheter lumen using a 3 mL syringe.

12. Wait 10 minutes.
PROCEDURE:

13. Instill another 0.3 mL 0.9% NaCl into EACH catheter lumen.

14. Wait 10 minutes.

15. Attempt to aspirate the catheter using 10 mL syringes.

16. Flush with 10mL 0.9% NaCl.

17. If catheter is clear, initiate dialysis. If unsuccessful, contact nephrologist.

KEY POINTS:

DOCUMENTATION:

- PRN Medication Administration Record
- Integrated Progress Notes:
  - Time of administration
  - Blood flow rate prior to alteplase administration (if applicable)
  - Blood flow rate after alteplase administration

REFERENCES:


POLICY & PROCEDURE DEVELOPERS

Lori Wazny, Pharm.D., Pharmaceutical Care Coordinator, Manitoba Renal Program

Lavern Vercaigne, Pharm.D., Professor, Faculty of Pharmacy, University of Manitoba
# Alteplase IV Infusion for Clearing Hemodialysis Catheter Thrombosis

## Purpose:

1. If a large clot is observed on cathetergram or previous local instillations of alteplase have not cleared the catheter, a systemic infusion of alteplase may be ordered by the nephrologist. The dose is 3 mg alteplase in 50 mL 0.9% NaCl into both lumens over 3 hours (17 mL/hr). Thus, two infusions of 3 mg alteplase in 50 mL 0.9% NaCl will be required. The total dose infused will be 6 mg so the risk of bleeding is minimal.

## Policy:

1. Registered Nurses and Licensed Practical Nurses Dialysis may infuse IV alteplase upon obtaining a physician’s order that is separate to the preprinted *Chronic Hemodialysis Physician’s Order Sheet*.

## Equipment:

- 3 – 2 mg vials alteplase (2 mg)
- 4 – 10 mL syringes
- Sterile water for injection (without bacteriostat)
- 2 – 50 mL mini bags 0.9% NaCl
- 2 medication infusion pumps
- Alcohol swabs
- Clean disposable gloves
- Equipment to access catheter lumens as per procedure 30.30.02

## Procedure:

1. Withdraw 2.2 mL of sterile water for injection and inject into a 2 mg alteplase vial.

2. Swirl vial until contents are completely dissolved. Do not shake.

3. Repeat Steps 1 and 2 for the remaining 2 vials of alteplase.

4. Withdraw 3 mL (3 mg) of reconstituted solution from 2 alteplase vials (i.e. will use 1½ vials).

5. Inject 3 mg alteplase into a 50 mL mini bag of 0.9% NaCl.

## Key Points:

- Final concentration = 1 mg/mL (vial contains 2.2 mg alteplase).
- Reconstituted solution should be colourless or pale yellow and transparent.
- Expiry of the mixed solution is 24 hours at room temperature.
- Minimum concentration alteplase = 0.06 mg/mL in 0.9% NaCl.
PROCEDURE:

6. Repeat Steps 4 and 5 for the second infusion bag.


8. Flush each lumen with 20 mL 0.9% NaCl.

9. Infuse both mini bags at the same time, one into each catheter lumen at 17 mL/hr (i.e. over approximately 3 hours) using the infusion pumps.

10. Flush both catheter lumens with 10 mL 0.9% NaCl to ensure patient receives full dose of alteplase.

11. Initiate dialysis or lock catheter per procedure 30.30.02 Accessing and Locking Dialysis Central Venous Catheter.

KEY POINTS:

- Monitor blood pressure, heart rate, and temperature prior to start of infusion then monitor blood pressure and heart rate every 30 minutes x 2.
- Monitor patient for signs of allergic reactions (i.e. pruritus, edema). There is a very low risk of hypersensitivity reactions (<0.02%).
- Monitor the patient for any signs of bleeding, particularly at any sites of recent trauma or venipuncture. Risk of bleeding is minor due to small dose of alteplase used (6 mg).

DOCUMENTATION:

- PRN Medication Administration Record
- Integrated Progress Notes
  - Time of administration
  - Blood flow rate prior to alteplase administration (if applicable)
  - Blood flow rate after alteplase administration

REFERENCES:


POLICY & PROCEDURE DEVELOPERS:

Lori Wazny, Pharm.D., Pharmaceutical Care Coordinator, Manitoba Renal Program
Lavern Vercaigne, Pharm.D., Professor, Faculty of Pharmacy, University of Manitoba
PURPOSE:

1. Antibiotic locks may be ordered in hemodialysis patients with a catheter-related infection. Studies have indicated that antibiotic locks in combination with intravenous antibiotic therapy can improve the cure rates of hemodialysis catheter-related bacteremia (approximately 70% cure) versus intravenous antibiotic therapy alone (approximately 25-30% cure). However, this cure rate is highly dependent on the infecting organism. Antibiotic locks may be used to treat *Staphylococcus epidermidis*, *Enterococcus*, and gram negative infections. Locks should not be used to treat *Staphylococcus aureus* or *Candida* infections due to high rates of failure.

POLICY:

1. Pharmacy will prepare the antibiotic lock upon a physician’s order. At hemodialysis units which do not have a pharmacy available, Registered Nurses (RN)/Licensed Practical Nurse (LPN) in hemodialysis may prepare the antibiotic lock upon a physician’s order.

A. **Preparation of Gentamicin 2.5 mg/mL in 4% Sodium Citrate Procedure:**

**EQUIPMENT:**

- 1 mL syringe
- 1 vial 40 mg/mL gentamicin (2 mL)
- 2 syringes sodium citrate 4% (2.5 mL each)
- Alcohol swab
- Disposable gloves

**PROCEDURE:**

1. Wipe top of gentamicin vial with an alcohol swab.

2. Withdraw 0.16 mL of gentamicin 40 mg/mL using the 1mL syringe.
PROCEDURE:

3. Add the 0.16 mL gentamicin to one of the sodium citrate 4% 2.5 mL syringes.

4. Agitate the syringe to mix.

5. Repeat steps 2 and 3 for the second sodium citrate syringe.

6. Label the 2 syringes as “gentamicin 2.5 mg/mL in 4% sodium citrate lock”.

B. Preparation of Gentamicin 1 mg/mL & Heparin 2,500 units/mL Procedure:

EQUIPMENT:

- 10 mL syringe
- 1 mL syringe
- 3 x 3 mL syringes
- 1 vial 40 mg/mL gentamicin (2 mL)
- 1 vial heparin 10,000 u/mL (5mL)
- 1 amp 0.9% NaCl (normal saline) (10 mL)
- Alcohol swab
- Disposable gloves

PROCEDURE:

1. Wipe top of gentamicin vial with an alcohol swab.

2. Withdraw 0.13 mL of gentamicin 40 mg/mL using the 1mL syringe.

3. Withdraw 1.25 mL heparin 10,000 u/mL using the 3mL syringe.

4. Add the 0.13 mL gentamicin and 1.25 mL heparin to the 10 mL syringe. Then draw up to 5mL with normal saline (final syringe volume = 5 mL). Agitate well.

5. Draw up 2.5 mL into 2 separate 3 mL syringes to access both lumens of the catheter (i.e. one syringe per lumen).

6. Label the 2 syringes with “gentamicin 1 mg/mL in heparin 2,500 units/mL lock”
C. Preparation of Vancomycin 2.5 mg/mL in 4% Sodium Citrate Procedure:

**EQUIPMENT:**
- 10 mL syringe
- 1 mL syringe
- 1 vial vancomycin 500 mg
- 2 syringes sodium citrate 4% (2.5 mL each)
- Alcohol swab
- 1 amp Sterile Water for Injection (10 mL)
- Disposable gloves

**PROCEDURE:**

1. Wipe top of vancomycin vial with an alcohol swab.
2. Reconstitute the vancomycin 500 mg vial with 10 mL sterile water for injection using the 10 mL syringe (final concentration = 50 mg/mL). Shake vial to dissolve.
3. Withdraw 0.13 mL vancomycin (50 mg/mL). **KEY POINTS:**
   - Expiry of the mixed syringes is 3 days at room temperature.
   - Final volume/syringe = 2.63 mL
   - (Actual final concentrations: vancomycin 2.47 mg/mL 3.8% sodium citrate)
4. Add the 0.13 mL to one of the sodium citrate 4% 2.5 mL syringes.
5. Agitate the syringes.
6. Repeat steps 3 and 4 for the second sodium citrate syringe.
7. Label the 2 syringes as “vancomycin 2.5 mg/mL in 4% sodium citrate lock”.

D. Preparation of Vancomycin 2.5 mg/mL & Heparin 2,500 units/mL Procedure:

**EQUIPMENT:**
- 10 mL syringe
- 1 mL syringe
- 3 mL syringe
- 1 vial vancomycin 500 mg
- 1 vial heparin 10,000 u/mL (5mL)
- 2 amps sterile water for injection (10 mL)
- Alcohol swab
- Disposable gloves

**PROCEDURE:**

1. Wipe top of 500 mg vancomycin vial with an alcohol swab.

**KEY POINTS:**
- Obtain from pharmacy (heparin 10,000 u/mL no longer dialysis wardstock).
PROCEDURE:  

2. Reconstitute the vancomycin 500 mg vial with 10 mL sterile water for injection using the 10 mL syringe (final concentration = 50 mg/mL). Shake vial to dissolve.

3. Withdraw 0.25 mL of vancomycin (50 mg/mL) using the 1 mL syringe.

4. Withdraw 1.25 mL heparin 10,000 u/mL using the 3 mL syringe.

5. Add the 0.25 mL vancomycin and 1.25 mL heparin to the 10 mL syringe. Then draw up to 5mL with sterile water for injection (final syringe volume = 5 mL). Agitate well.

7. Label the 2 syringes as “vancomycin 2.5 mg/mL in heparin 2,500 units/mL lock”.

6. Draw up 2.5 mL into 2 separate 3 mL syringes to access both lumens of the catheter (i.e. one syringe per lumen).

E. Preparation of Cefazolin 5 mg/mL & Heparin 2,500 units/mL Procedure:

EQUIPMENT:  

1. Wipe top of 500 mg cefazolin vial with an alcohol swab.

2. Reconstitute the cefazolin 500 mg vial with 10 mL sterile water for injection using the 10 mL syringe (final concentration = 50 mg/mL). Shake vial to dissolve.

3. Withdraw 0.5 mL of cefazolin (50 mg/mL) using the 1 mL syringe.

4. Withdraw 1.25 mL heparin 10,000 u/mL using the 3mL syringe.
PROCEDURE:

5. Add the 0.5 mL cefazolin and 1.25 mL heparin to the 10 mL syringe. Then draw up to 5mL with sterile water for injection (final syringe volume = 5 mL). Agitate well.

6. Draw up 2.5 mL into 2 separate 3 mL syringes to access both lumens of the catheter (i.e. one syringe per lumen).

7. Label the 2 syringes as “cefazolin 5 mg/mL in heparin 2,500 units/mL lock”.

KEY POINTS:

- Expiry of the mixed solution is 24 hours at room temperature.

ADMINISTRATION:

Registered Nurses (RN)/Licensed Practical Nurse (LPN) in hemodialysis refer to Manitoba Renal Program Procedure 30.30.02 Dialysis Indwelling Catheter; Accessing and Locking (Anticoagulant/Thrombolytic/Antibiotic Locking).

REFERENCES:


Personal communication (Cali Orsulak, Renal Pharmacist SCDU and SOGH Renal Pharmacists). Gentamicin 2.5 mg/mL + Heparin 2,500 u/mL can result in precipitation of the solution. June 2008.


PROCEDURE DEVELOPERS:

Lori Wazny, Pharm.D., Clinical Pharmacist, Manitoba Renal Program

Lavern Vercaigne, Pharm.D., Professor, University of Manitoba
### OBJECTIVE:

1. The Conductivity Meter is a portable battery-operated device for measuring the electrical conductivity of all the dissolved ionisable substances in dialysate solutions when the conductivity of such a solution falls within the range of 1 – 20 mS/cm.

### POLICY:

1. Registered Nurses, Licensed Practical Nurses, Dialysis Technologists and Dialysis Care Technicians in Dialysis will verify the accuracy of conductivity on a dialysis Delivery System by use of an independent test:
   b. If deviation of conductivity occurs during dialysis treatment.

2. Registered Nurses, Dialysis Care Technicians, Unit Assistants, Nursing Assistants, Dialysis Technologists are responsible for the cleaning of the meter internally once weekly and externally once daily.

3. The dialysate solution is considered safe for use if:
   a. Dialysate solutions used for hemodialysis have an electrical conductivity within the range of 13.5 – 15.5 mS/cm.
   b. The Neo-Stat measures the SAME value ± 2% as that indicated on the delivery system.

### EQUIPMENT:

- Neo-Stat or Neo-Stat Plus Dialysate Conductivity Meter
- Single Patient Delivery System

### PROCEDURE:

**A. Testing Dialysis Bath:**

1. Connect the Neo-Stat fluid intake port to the sample port fitting on the delivery system inlet hose.
PROCEDURE:

2. Draw dialysate solution in syringe maintaining a continuous slow flow of solution through the cell until syringe barrel is full.

3. Disconnect the Neo-Stat from the sample port fitting.

4. Press the Neo-Stat ON or Neo-Stat Plus MODE button.

5. Into a separate container or basin, slowly expel the sample while observing the reading on the display. Note the reading.

KEY POINT:

▪ Do not expel used dialysate back into flow path of the delivery system.

▪ The Neo-Stat Plus has a display HOLD option. When reading stabilizes, press and release the MODE button to hold the reading on the display. A “HOLD” symbol will appear.

▪ Ensure hold option is off by pressing MODE button again if needed for another reading. The Neo-Stat will turn off automatically 2 minutes after the last test.

B. Rinsing the Meter:

1. Attach the Neo-Stat to the Reverse Osmosis (RO) water bottle. Draw the RO water through the cell completely filling the syringe barrel and then expel via the one-way check valve to drain. Repeat 2 – 3 times. Disconnect from the RO bottle.

2. Dry the cell by alternately drawing and expelling air through cell 2 – 3 times.

KEY POINT:

▪ The Neo-Stat meter should be rinsed with RO water after each use or after patient shift.

▪ When not in use, store the Neo-Stat meter in its holder away from moisture and temperature extremes.

C. Cleaning the Meter:

1. Attach the cell to the Neo-Care bottle. Draw Neo-Care solution through the cell completely filling the syringe barrel. Disconnect. Allow it to remain in syringe for at least 10 minutes. Expel Neo-Care solution to drain.

2. Rinse again 2 – 3 times with RO water. Dry cell by alternately drawing and expelling air through cell 2 – 3 times.

3. Wipe external surface of meter with facility-approved cleaning solution once daily at the end of the day.

KEY POINT:

▪ The technologist will clean and verify accuracy of meter on a weekly basis.

▪ Local Centre staff will be responsible for cleaning and verifying accuracy of the meters. Any adjustments will be made by the technologist.

▪ Even small amounts of residual Neo-Care present in the cell or syringe will alter your conductivity readings.

D. Verifying Accuracy of Meter:

1. Connect the cell to the standard solution bottle. Hold the syringe with the plunger end elevated so that any air bubbles remain in the syringe. Press the Neo-Stat on or Neo-Stat plus MODE button. Draw solution through the cell and then expel via the one-way check valve to drain. Observe the display as the

KEY POINT:

▪ Ensure hold option is off on the Neo-Stat plus. Display will indicate “HOLD” if on. To remove hold option press MODE button again.
PROCEDURE:

solution flow in and out of the cell. The reading on the display should match the value of the solution (14.0 mS± 0.1).

2. Rinse again 2 – 3 times with RO water. Dry cell by alternately drawing and expelling air though cell 2 – 3 times.

KEY POINT:

- Even a small amount of residual standard solution in the cell or syringe will alter your conductivity readings.
- When not in use, store the Neo-Stat in its holder away from moisture and temperature extremes.

DOCUMENTATION:

- Hemodialysis Treatment Record
- Calibration Log Sheet

REFERENCES:

PURPOSE:

1. To repair a cracked or broken female luer lock connector, or repair a damaged extension where there is a minimum of 4.5 cm of viable extension on catheters specified by the BARD catheter repair kit specification sheet.

POLICY:

1. A physician’s order is required to repair catheters.

2. Vascular/Dialysis Access Nurses and Clinical Resource Nurses working in Dialysis may utilize this procedure to repair catheters once they have reviewed this procedure.

3. Aseptic technique is to be used throughout this procedure.

EQUIPMENT:

- 1 BARD Access Systems catheter repair kit with replacement connector
- 2 pairs sterile gloves
- Povidone solution
- Sterile normal saline
- Dressing tray
- Sterile bowls
- Sterile 10 x 10 cm gauze
- 10 cc syringes
- Sterile injection caps

PROCEDURE:

A. Prepare Patient:

1. Explain procedure and screen for privacy.  
   - Have patient demonstrate Valsalva maneuver in the event that they have to perform it during the procedure.

2. Place patient in supine position.
PROCEDURE:

B. Method:

1. Assemble supplies.

2. Wash hands.

3. Examine entire length of extension tubing for damage. If the extension tubing is split or swollen or has other damage or is shorter than 4.5 cm, the catheter may need to be replaced.

4. Starting at the bifurcation, measure the length of usable extension tubing that will remain after the connector and any damaged part of the lumen are cut off.

   - If the remaining tubing length is over 4.5 cm, proceed with repair.

5. Wash hands.

6. Open the sterile repair kit. Create sterile field with drapes.

   - Strict aseptic technique must be used during this procedure. Touch corner of drape only.

7. Clamp off the catheter at the distal end of the extension tubing with the original clamp attached to the extension tubing.

   - WARNING: Failure to clamp could lead to air embolism or blood loss.

8. Using sterile technique, put on sterile gloves. If using powdered gloves, wipe powder from gloves with sterile saline and sterile gauze.

9. Clean the external segment of the catheter lumen with povidone iodine solution and gauze. Allow to dry for 30 seconds and place cleaned segment of catheter on a sterile drape.

10. Discard gloves. Using sterile technique, put on second pair of sterile gloves. If using powdered gloves, wipe powder from gloves with sterile saline and sterile gauze.

11. Remove the cap from the affected catheter lumen and aspirate any fluid in the extension tubing using the 10 cc syringe and clamp.

12. Slide the green slide clamp provided in the kit, onto the extension tubing between the clamp and the catheter bifurcation.

13. Use the scissors provided in the kit to cut off the damaged connector/extension tubing at the 90° angle of the bonding stem. Make the cut as close to the connector as possible. Measure the removed length of extension for future priming volume calculations.

14. Remove the original clamp from the extension tubing. Replace with the appropriate colour-coded thumb clamp provided in the kit and close the clamp.

   - Blue – Venous
   - Red – Arterial
PROCEDURE:

15. Remove the green slide clamp. Replace with green slide clamp between the thumb clamp and the cut end of the tubing.

16. Reposition thumb clamp, sliding it partially over the bifurcation and close clamp on extension tubing.

17. Remove green slide clamp and dispose.

18. Remove the white replacement connector and collar from the package.

19. To assemble the replacement connector to the extension tube, slide collar over the extension tube so that the tapered end faces the catheter bifurcation.  

   ▪ The cut end of the extension tube should be ½ way into the collar.

20. Push the barbed end of the connector into the extension tubing.

21. Rotate the collar to engage the threads and continue to thread the collar onto the connector until there is no gap between them.

22. Tug on the new connector to test the security of the connection.

23. If the connector pulls apart or seems loose, repeat the repair procedure. A connection failure may be due to one or both of the following reasons:
   a. The replacement connector is not fully inserted into the extension tubing.
   b. The extension tubing is damaged, preventing a secure connection. If the failure is due to damaged tubing, the catheter may need to be removed and replaced.

   CAUTION: The priming volume of the repaired lumen will decrease by 0.1 cc for initial repair and 0.05 cc for every additional cm of extension tube removed.

24. With a sterile 10 cc syringe, aspirate any air introduced during the repair from the extension legs.

25. If the catheter is not used immediately, inject each lumen with currently prescribed locking solution in the amounts equal to the revised priming volume of each repaired lumen.

26. At this time, the catheter may be used as before.

   CAUTION: In the rare event of a leak, the catheter must be clamped immediately. Necessary remedial action must be taken prior to resuming dialysis treatment.
DOCUMENTATION:

- Dialysis Chart
  - Integrated Progress Notes
  - Renal Patient Kardex
  - Hemodialysis Treatment Sheet
  - Medication Administration Record
- Ward Chart (for in-hospital patients)
  - Integrated Progress Notes

REFERENCES:

PURPOSE:
1. The HEMOdialert™ is a blood access leakage alert. This device will sound an alarm when it detects moisture. The purpose of this alarm is to alert the patient or staff if blood is leaking from the patient’s fistula/graft due to needle dislodgement or if there is a CVC disconnection.

POLICY:
1. The HEMOdialert™ must be used with all patients that are dialyzed in an isolation room or in a curtained isolation area in CDU and SCDU, and are using a fistula for vascular access. Other units may opt to use the device.
2. Patients dialyzing in Critical Care areas at HSC require a HEMOdialert™ device if they are in isolation and have a fistula, and are not admitted to Critical Care.
3. All nocturnal Hemodialysis patients should be instructed in the use of the HEMOdialert™.
4. The HEMOdialert™ is a single patient use device that can be used multiple times for the same patient. Each device will be labeled with the patient’s name. The HEMOdialert™ will be kept in a clean Ziplock bag in a designated area.

EQUIPMENT:
- HEMOdialert™
- Two 2x2 gauze
- Burn net/arm band (optional)
- Tape
- Ziploc plastic bag

PROCEDURE:

A. Use of the HEMOdialert™
   1. Test the HEMOdialert™ alarm by touching the pad/probe with a wet finger or wet alcohol swab.  
      - If you do not hear an alarm, the battery needs to be replaced.
PROCEDURE:

2. Disconnect the wire from the base to stop and reset the alarm.

3. Reconnect the alarm to the base.

4. Once the venous needle has been inserted and taped, place a 2x2 gauze under the line below the needle insertion site if possible. Due to needle placement of the arterial needle, it may be necessary to place the HEMOdialert™ to the side of the venous puncture site. The gauze is used to prevent perspiration from setting off the alarm.

5. Place the HEMOdialert™ black pad over the gauze and secure with tape. Burnet dressing may be used to help secure the pad and gauze.

6. For in center patients, place the HEMOdialert™ in the Ziploc bag for the duration of the treatment. This is done to prevent gross contamination of the device with blood in the event of blood leakage.

B. Cleaning of the HEMOdialert™

1. Following use, wipe the detector with an approved cleaning solution and soft cloth. Place the device in a clean Ziploc bag, which then may be placed in a designated area. The caregiver removing the first needle is responsible for ensuring that the HEMOdialert™ is cleaned, placed in a clean Ziploc bag and returned to the designated area.

C. Adherence to Isolation Precautions:

1. When the patient arrives for dialysis, bring the bag containing the device into the room.

2. Place the device (except for the pad and cable) in the Ziploc bag during use as indicated above.

3. Once the treatment is complete, remove the device from the bag, wipe it with approved germicidal wipe and place it into a clean bag which has not entered the isolation area. The clean bag containing the device can be placed in the designated area.

DOCUMENTATION:

- Hemodialysis Treatment Sheet - Document testing and use of the HEMOdialert™

REFERENCES:

AMG Medical Inc Product insert HEMOdialert™ by Anzacare,., Montreal, QC H4T 1V5, www.amgmedical.com


PURPOSE:

1. To purge the bicarbonate dialysate solution loops in the Solution Delivery System (SDS) if the head tank empties during treatment or if there is an air lock in the loop.

POLICY:

1. This procedure is to be used to purge the bicarb distribution loop ONLY when there is bicarbonate in the Solution Delivery System (mix tank, head tank and loop).

2. Registered Nurses, Licensed Practical Nurses, Home Care Attendants, Dialysis Care Technicians and Dialysis Technologists working in Dialysis who have received instruction and have demonstrated competency to the renal educator or delegate may use the Solution Delivery System.

3. The purging procedure must be done twice a week or after a 24 hour downtime and as necessary.

EQUIPMENT:

- Solution Delivery System

PROCEDURE: KEY POINT:

1. All dialysis machine bicarbonate concentrate lines must be disconnected from the wall dispenser access ports by each hemodialysis station.

2. Verify all switch and valve positions are in the NORMAL operation position. Refer to the Switch \ Valve Positions table on page 3.

3. Place the bicarb loop wand in the TANK port.
PROCEDURE:

4. Turn the Loop Rapid Distribution Pump Switch to the ON position.

5. Close (V11) Bicarb Loop 2 Return Valve, to purge the air from Loop 1.

6. Purge air from the bicarb distribution loop for a minimum of 5 minutes with the loop rapid distribution pump running.

7. After all air is purged from the Loop 1, purge the air from Loop 2:
   a. Close (V10) Bicarb Loop 1 Return Valve.
   b. Open (V11) Bicarb Loop 2 Return Valve.

8. Purge air from the bicarb distribution loop for a minimum of 5 minutes with the loop rapid distribution pump running.

9. After all air is purged from loop 2, open (V10) Bicarb Loop 1 Return Valve.

10. Turn the Loop Rapid Distribution Pump Switch to the OFF position.

11. Place the bicarb loop wand in the OPERATE port.

12. Verify the switch and valve positions are in the NORMAL position. Refer to the Switch \ Valve Position table on page 3.

13. The system is ready for normal operation.

REFERENCES:


KEY POINT:

- The loop rapid distribution pump will start when the bicarb solution is above the low level switch in the head tank and following a 1 minute delay.

- If the level in the head tank falls below the low level switch, the loop rapid distribution pump will shut down, and then restart following a 1 minute delay after the bicarb solution rises above the head tank lower level switch.
Switch \ Valve Positions

The following switch, valve, and indicator positions for NORMAL operation:

**Ozone Sanitizing System**

<table>
<thead>
<tr>
<th>SWITCH / INDICATOR</th>
<th>POSITION</th>
</tr>
</thead>
<tbody>
<tr>
<td>ON/OFF Switch</td>
<td>OFF</td>
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<tr>
<td>No Flow Indicator</td>
<td>ON</td>
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<tr>
<td>Fuse Indicator</td>
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<td>Ozone Indicator</td>
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<td>Main Indicator</td>
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**SDS Solution Delivery System**

<table>
<thead>
<tr>
<th>SWITCH / VALVE</th>
<th>POSITION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Main Power Switch</td>
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<tr>
<td>Mix Pump Switch</td>
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<tr>
<td>Loop Rapid Distribution Pump Switch</td>
<td>OFF</td>
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<tr>
<td>UV Unit Switch</td>
<td>ON</td>
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<tr>
<td>Mix Pump Discharge Valve</td>
<td>OPEN</td>
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<tr>
<td>(V-2) Spray Head Supply Valve</td>
<td>CLOSE</td>
</tr>
<tr>
<td>(V-3) Inlet Valve</td>
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</tr>
<tr>
<td>(V-4) Mix Pump Suction Valve</td>
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</tr>
<tr>
<td>(V-5) Mix Tank Drain Valve</td>
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<tr>
<td>(V-6) Bicarb Head Tank Drain Valve</td>
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<tr>
<td>(V-7) Mix Tank Sample Valve</td>
<td>CLOSE</td>
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<tr>
<td>(V-9) Drain Line Sample Port Valve</td>
<td>CLOSE</td>
</tr>
<tr>
<td>(V-10) Bicarb Loop Return A6 Valve</td>
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<tr>
<td>(V-11) Bicarb Loop Return B6 Valve</td>
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<td>(OZ-1) Ozone Disinfect Valve</td>
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<tr>
<td>(OZ-2) Ozone Disinfect Valve</td>
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<tr>
<td>(OZ-3) Ozone Bypass Valve</td>
<td>OPEN</td>
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<tr>
<td>(OZ-4) Ozone Flow Valve</td>
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<tr>
<td>Bicarb Loop Wand</td>
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# Manitoba Renal Program

## Section 30.40 Accessory Equipment

### Subject
- ZyzaTech Solution Delivery System Treatment Mix

### Code
- 30.40.24

### Effective Date
- January 2005

### Revision Date
- September 2008

### Authorization
- Professional Advisory Committee, Manitoba Renal Program
- Nursing Leadership Council, St. Boniface General Hospital

## Purpose

1. To prepare bicarbonate solution (bicarb) using the Solution Delivery System (SDS).

   **Note:** The bicarb mix tank level switch will initiate an audible and visual alarm when the mix tank reaches the low level. The mix tank will have approximately 10 gallons (30 gallons at SOGH) of bicarb solution remaining. The bicarb head tank transfer function will stop.

## Policy

1. Registered Nurses, Licensed Practical Nurses, Health Care Aides, Dialysis Care Technicians and Dialysis Technologists working in Dialysis who have received instruction and have demonstrated competency to the renal educator or delegate may operate the SDS.

## Equipment

- Solution Delivery System
- Ultra Meter
- Safety glasses
- Face mask that takes away dust – specified type by WHMIS
- Gloves (optional)

## Procedure

1. Push the Alarm Mute push button switch to silence the audible and cancel the low-level alarm.

2. Verify that the Reverse Osmosis (RO) is operating.

3. Verify all switch and valve positions are in the NORMAL operation position. Refer to the Switch \ Valve Positions table on page 6.
PROCEDURE:

4. Turn the Mix Pump switch to the OFF position.

5. Push the Transfer Pump Manual Override push button switch. This will transfer the solution from the mix tank to the head tank for 5 minutes or until the Head Tank Full light turns on.

6. After the transfer pump has stopped and the Head Tank Full light is off, push the Transfer Pump Manual Override push button switch as necessary until the Head Tank Full light turns ON.

7. Open (V-5) Mix Tank Drain Valve and drain the remaining bicarb solution.

8. Open (V-3) Inlet Valve.

9. Set the Auto Fill Mode Time preset timer for E001m, the time required to rinse the mix tank.

10. Verify that the mix tank is empty by confirming there is no flow from the drain line.

11. Turn the Mix Tank Auto Fill switch to the START position again and release switch.

   If the timer displays OFF OUTPUT and the countdown has not occurred, turn the Mix Tank Auto Fill switch to the START position and release switch again.

12. Set the (V-8) Flow Meter Valve by looking at the top of the float for a reading and adjust between:
    CDU, SOGH: 4.5 – 5.0 gallons per minute (GPM)
    SCDU, SBGH: 3.5 – 4.0 GPM

13. Confirm that water is flowing to drain.

14. After the timer stops, set the Auto Fill Mode Time preset timer for the time required to fill the mix tank above the low limit alarm.
    CDU, SBGH: E007m
    SCDU, SOGH: E009m

15. Verify that the mix tank is empty by confirming there is no flow from the drain line.


17. Turn the Mix Tank Auto Fill switch to the START position and release switch.

   If the timer displays OFF OUTPUT and the countdown has not occurred, turn the Mix Tank Auto Fill switch to the START position and release

KEY POINT:

- Operator must manually transfer bicarb as necessary to ensure the head tank does not completely empty during the mixing of the bicarb solution.

- If solution is flowing down through the head tank overflow tubing, turn the Mix Pump switch to the Transfer position, then to the OFF position.

- The timer display will display OUTPUT ON when filling and will count down from a full black bar to a dash-lined white bar.

- The timer display will display OFF OUTPUT when finished.

- During this step the water is flowing through the mix tank spray head, rinsing down the lid and tank and then going to drain.
PROCEDURE:

18. Set the (V-8) Flow Meter Valve by looking at the top of the float for a reading and adjust between
   CDU, SOGH: 4.5 – 5.0 GPM
   SCDU, SBGH: 3.5 – 4.0 GPM

19. After the timer stops, turn the Mix Pump Switch to the MIX position.

20. After 1 minute, turn the Mix Pump Switch to the OFF position.


22. Set the Auto Fill Mode Time Preset timer for the time required to fill the mix tank.
   CDU, SOGH, SBGH: E020m
   SCDU: E025m

23. Open (V-2) Spray Head supply valve.

24. Verify that the mix tank is empty by confirming there is no flow from the drain line.


26. Turn the Mix Tank Auto Fill switch to the START position and release switch.

   If the timer displays OFF OUTPUT and the countdown has not occurred, turn the Mix Tank Auto Fill switch to the START position and release switch again.

27. Set the (V-8) Flow Meter Valve by looking at the top of the float for a reading between
   CDU, SOGH: 4.5 – 5.0 GPM
   SCDU, SBGH: 3.5 – 4.0 GPM

   If the timer is still filling when the water is above the fill line, turn the Mix Tank Auto Fill switch to the START position and release switch.

28. After the timer stops, check that the water level in the mix tank is at the fill line for 5 containers of bicarb (4 containers for SBGH).

   If the water level is:
   a. LOW
      Turn and hold the Mix Tank Auto Fill switch in the MANUAL position for as long as necessary to bring the amount of water to the correct level.
   b. HIGH
      Open (V-5) Mix Tank drain valve and drain the water until the level is correct.

   The timer display will display OUTPUT ON when filling and will count down from a full black bar to a dash-lined white bar.

   The timer display will display OFF OUTPUT when finished.
PROCEDURE:

29. Close (V-2) Spray Head supply valve.

30. Close (V-3) Inlet valve.

31. Turn the Mix Pump Switch to the MIX position.

32. Unlock (combination 241, push to release) and open the mix tank lid by grasping the 2 handles in the middle of the lid and turning it counter clockwise.

33. Wear goggles and mask while adding bicarb powder.

34. Add 5 containers of bicarb powder to the mix tank (4 containers for SBGH). Record the bicarb powder lot # from the container on the SDS log sheet.

35. Completely mix the bicarb solution, which takes minimum 10 minutes and verify the powder has been dissolved and the solution is clear.

36. Close the mix tank lid by grasping the 2 handles in the middle of the lid and turning it clockwise. Lock the mix tank lid.

37. Record the Mix Tank Conductivity on the SDS log sheet with the reading Measure Mix Tank xx.x mS/cm from the conductivity meter on the SDS front panel and confirm the reading reads between 48.0 – 52.0 mS/cm.

    Sign the Mixed By column on the SDS log sheet.

38. Verify the bicarb solution by using the Myron 4P portable conductivity meter.

    Place a container under (V-7) Mix Tank sample valve and momentarily open the valve until there is a flow of bicarb solution to the container.

KEY POINT:

WARNING: The (V-3) Inlet valve should be CLOSED AT ALL TIMES except when the mix tank is being filled with water. If this valve is left open during treatment, and the inlet solenoid valve fails, the bicarb solution will be diluted, causing interruption of treatment.

• At SBGH, this step must be performed by a nurse.

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• If leaving the SDS unattended re-lock tank.

• At SBGH, this step must be performed by a nurse.

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• If reading outside parameters, contact technologist.

• If unable to resolve problem, use bicarbonate concentrate jugs.

At SBGH, this step must be performed by a nurse.
PROCEDURE:

Rinse the conductivity meter 3 times with RO water.

Press COND on the conductivity meter and take 3 sample readings from the (V-7) Mix Tank sample valve and confirm the 3rd sample reads between 48.0 - 52.0 mS.

A Registered Nurse, Licensed Practical Nurse or Dialysis Care Technician will verify the reading and record the conductivity meter reading on the SDS log sheet and initial the Verified By column on the SDS log sheet.

Rinse the conductivity meter 3 times with RO water.

39. Turn the Mix Pump Switch to the TRANSFER position.

40. Verify all switch and valve positions are in the NORMAL operation position. Refer to the Switch \ Valve Positions table on page 6.

41. The system is ready for normal operation.

REFERENCES:


Switch \ Valve Positions

The following switch, valve, and indicator positions for **NORMAL** operation:

### Ozone Sanitizing System

<table>
<thead>
<tr>
<th>SWITCH / INDICATOR</th>
<th>POSITION</th>
</tr>
</thead>
<tbody>
<tr>
<td>ON/OFF Switch</td>
<td>OFF</td>
</tr>
<tr>
<td>No Flow Indicator</td>
<td>ON</td>
</tr>
<tr>
<td>Fuse Indicator</td>
<td>OFF</td>
</tr>
<tr>
<td>Ozone Indicator</td>
<td>OFF</td>
</tr>
<tr>
<td>Main Indicator</td>
<td>ON</td>
</tr>
</tbody>
</table>

### SDS Solution Delivery System

<table>
<thead>
<tr>
<th>SWITCH / VALVE</th>
<th>POSITION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Main Power Switch</td>
<td>ON</td>
</tr>
<tr>
<td>Mix Pump Switch</td>
<td>TRANSFER</td>
</tr>
<tr>
<td>Loop Rapid Distribution Pump Switch</td>
<td>OFF</td>
</tr>
<tr>
<td>UV Unit Switch</td>
<td>ON</td>
</tr>
<tr>
<td>(V-1) Mix Pump Discharge Valve</td>
<td>OPEN</td>
</tr>
<tr>
<td>(V-2) Spray Head Supply Valve</td>
<td>CLOSE</td>
</tr>
<tr>
<td>(V-3) Inlet Valve</td>
<td>CLOSE</td>
</tr>
<tr>
<td>(V-4) Mix Pump Suction Valve</td>
<td>OPEN</td>
</tr>
<tr>
<td>(V-5) Mix Tank Drain Valve</td>
<td>CLOSE</td>
</tr>
<tr>
<td>(V-6) Bicarb Head Tank Drain Valve</td>
<td>CLOSE</td>
</tr>
<tr>
<td>(V-7) Mix Tank Sample Valve</td>
<td>CLOSE</td>
</tr>
<tr>
<td>(V-9) Drain Line Sample Port Valve</td>
<td>CLOSE</td>
</tr>
<tr>
<td>(V-10) Bicarb Loop Return A6 Valve</td>
<td>OPEN</td>
</tr>
<tr>
<td>(V-11) Bicarb Loop Return B6 Valve</td>
<td>OPEN</td>
</tr>
<tr>
<td>(OZ-1) Ozone Disinfect Valve</td>
<td>CLOSE</td>
</tr>
<tr>
<td>(OZ-2) Ozone Disinfect Valve</td>
<td>CLOSE</td>
</tr>
<tr>
<td>(OZ-3) Ozone Bypass Valve</td>
<td>OPEN</td>
</tr>
<tr>
<td>(OZ-4) Ozone Flow Valve</td>
<td>CLOSED</td>
</tr>
<tr>
<td>Bicarb Loop Wand</td>
<td>OPERATE PORT</td>
</tr>
</tbody>
</table>

![Closed Valve](image1.png) ![Open Valve](image2.png) ![Closed Valve](image3.png) ![Open Valve](image4.png)
PURPOSE:

1. To provide staff with instructions for use of the CCMS system during dialysis treatments and for end of day operations.

POLICY:

1. Registered Nurses, Licensed Practical Nurses, Dialysis Technologists, Unit Assistants, Nursing Assistants and Health Care Aides working in Dialysis who have received instruction and have demonstrated competency to the renal educator or delegate may use the CCMS system.

EQUIPMENT:

- Continuous Concentrate Mixing System (CCMS)
- Single Patient Hemodialysis Delivery Systems

PROCEDURE:

A. Morning Bicarbonate Solution Preparation

1. Open the CCMS hopper lid and load hopper with the appropriate amount of bicarbonate powder for that day.
   - Check any powder still in the hopper from the previous day for clumps. During filling, ensure that no pieces of paper or other particles can enter the hopper.
   - One 6.0 kg bicarbonate powder jug will prepare enough bicarb solution for approximately 7 dialysis treatments.
   - For safety reasons, the CCMS only functions with the cover closed.

2. Close the cover of the hopper.

3. Remove bicarb loop return hoses from the CCMS system and connect to wall block side connectors.
   - Connect according to colour codes.
PROCEDURE:

4. On the CCMS system Control panel.
   Press: SELECT> key
   Choose "Automatic"
   Press: CONFIRM> key

5. Wait approximately 10 minutes before connecting the dialysis machine bicarb connector to wall outlet.

B. End of Day Operation

1. On the CCMS system Control panel
   Press: SELECT> key
   Choose "end process"
   Press: CONFIRM> key

2. When end process completes its cycle and the panel displays CCMS READY, remove the bicarb loop return hoses from the wall block side connectors and connect to the CCMS system.
   • Connect according to colour codes.

3. Main RO should now be turned off.

4. Ensure there is some bicarb powder left in the hopper for the loop purge.

5. On the CCMS control panel.
   Press: SELECT> key
   Choose "disinf ciro"
   Press: CONFIRM> key
   • The RO should restart automatically. The CCMS will go through a heat disinfect and then prepare a bicarb batch to purge the loop.

C. CCMS Routine Maintenance

• To be completed in the morning before beginning Bicarb Prep procedure.

• To be completed once every 3 weeks.

I. Coarse Filter check

1. Unscrew the filter cover, left side panel.
   • If heavily contaminated, replace filter.

2. Pull out filter and clean under running water.

3. Re-install filter and filter cover.

II. Change Bicarbonate Preparation Bag

1. Remove lower panel of CCMS.
   • The bag should be empty.
PROCEDURE:

2. Disconnect the two hoses from the bag by pushing the metal tab on the connector.

3. Remove bag from CCMS and discard.

4. Install new bag, ensuring connectors are at left front corner.

5. Connect left most bag connector to outlet hose and connect the other bag connector to the remaining hose.

6. Replace panel.

REFERENCES:

- Manufacturer information, DWA Operator Manual.
- Manager, Renal Technology, Manitoba Renal Program
CCMS TROUBLE-SHOOTING GUIDE

General Statements

- Lid Contact: The hopper cover must be in place; magnet must make contact. Avoid opening the cover while CCMS is dosing as this will interrupt process and cause alarms such as Time-Out Dosing.
- All Faults must be confirmed to clear the alarm. This will reset the machine. Select appropriate action to resume function.

ALERTS

1. END OF DAY PROCEDURE

Once hoses are moved back to the front of the CCMS, your CCMS display should now read:

   CCMS – Ready
   Select: Cleaning

If it displays CCMS – Ready
   Select: Automatic

Ensure all connections are secure, ie. good magnet contact, as the CCMS does not recognize the hoses attached to the front of it.

Tighten connectors/clean connectors as appropriate.

Once CCMS displays: CCMS – Ready
   Select: Cleaning

**ALERT!** Do Not Select & Confirm CLEANING!

Press select Key to display CCMS – Ready
   Select: Circ: disinfect

Confirm.
2. INCREASED NOISE FROM AUGER

Causes:  
- Hopper overloaded with bicarb powder
- Paper/foreign body in bicarb powder
- Bicarb build-up in augers

NOTE: if this develops, the augers will eventually seize.

Actions:  
- Check hopper for bicarb powder supply
- Check hopper for foreign matter
- Add bicarb powder if required

NOTE: Avoid overloading hopper with bicarb ongoing

Contact techs if noise persists or worsens.

FAULTS

1. FAULT - TIME-OUT DOSING

Occurs when prep time of new batch of bicarb exceeds preset time limit or if conductivity is not within required range.

ACTIONS:  
- Press ➢ select: QUIT
- Press to Confirm

This will reset the alarm & AUTO: REJECT ie. dump out the glass container of fluid.

Ensure hopper is not empty.

Add powder as necessary

Wait a few minutes then  
- Press Select: Automatic
- Press to Confirm

Machine should proceed with filling, dosing, etc.
2. FAULT - CHECK SENSOR LINE 1

Usually occurs when a connector in the line is not making good contact.

ACTIONS: Press ➤ select: QUIT

Press to Confirm

This will clear the alarm.

Clean all connections of any bicarb residue with vinegar & water (R.O. water?)

Tighten rings on connectors to ensure secure.

Ensure quick connect connectors are clipped together, making good magnet contact.

Ensure there are no kinks in the lines or any flow obstruction.

3. FAULT - TIME-OUT WATER INFLOW

Occurs when there is an interruption or obstruction of water supply to the CCMS.

ACTIONS: Press ➤ select: QUIT

Press to Confirm

This will clear the alarm.

Check all connectors & lines to make sure secure, ie. good magnet contact.

Check water supply from R.O. to ensure it’s ON & that there is no flow obstruction.
4. **FAULT - CD RESERVOIR**

Occurs because the prepared concentrate in the reservoir (glass jar) is outside the limits (batch of bicarb is no good).

**ACTIONS:**

Press ▶ select: QUIT

Press ➡ to Confirm

This will clear the alarm.

Press ▶ select: Terminate Process

Press ➡ to Confirm

Ensure hopper is not empty; add powder if needed.

Wait while the reservoir empties, then

Press ▶ Select: Automatic

Press ➡ to Confirm

Machine will proceed with filling, dosing, etc.
CCMS TROUBLE-SHOOTING GUIDE

General Statements

- Lid Contact  The hopper cover must be in place; magnet must make contact. Avoid opening the cover while CCMS is dosing as this will interrupt process and cause alarms such as Time-Out Dosing.
- All Faults must be confirmed to clear the alarm. This will reset the machine. Select appropriate action to resume function.

ALERTS

1. END OF DAY PROCEDURE

Once hoses are moved back to the front of the CCMS, your CCMS display should now read:

CCMS – Ready
Select: Cleaning

If it displays  CCMS – Ready
Select: Automatic

Ensure all connections are secure, ie. good magnet contact, as the CCMS does not recognize the hoses attached to the front of it.

Tighten connectors/clean connectors as appropriate.

Once CCMS displays:  CCMS – Ready
Select: Cleaning

**ALERT! Do Not Select & Confirm CLEANING!**

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Confirm.
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**NOTE:** if this develops, the augers will eventually seize.

**Actions:**
- Check hopper for bicarb powder supply
- Check hopper for foreign matter
- Add bicarb powder if required

**NOTE:** Avoid overloading hopper with bicarb ongoing

Contact techs if noise persists or worsens.

**FAULTS**

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Occurs when prep time of new batch of bicarb exceeds preset time limit or if conductivity is not within required range.

**ACTIONS:**
- Press ➤ select: QUIT
- Press to Confirm

This will reset the alarm & AUTO: REJECT ie. dump out the glass container of fluid.

- Ensure hopper is not empty.
- Add powder as necessary

Wait a few minutes then
- Press Select: Automatic
- Press to Confirm

Machine should proceed with filling, dosing, etc.
2. **FAULT - CHECK SENSOR LINE 1**

Usually occurs when a connector in the line is not making good contact.

**ACTIONS:** Press ▶ select: QUIT

Press to Confirm

This will clear the alarm.

Clean all connections of any bicarb residue with vinegar & water (R.O. water?)

Tighten rings on connectors to ensure secure.

Ensure quick connect connectors are clipped together, making good magnet contact.

Ensure there are no kinks in the lines or any flow obstruction.

3. **FAULT - TIME-OUT WATER INFLOW**

Occurs when there is an interruption or obstruction of water supply to the CCMS.

**ACTIONS:** Press ▶ select: QUIT

Press to Confirm

This will clear the alarm.

Check all connectors & lines to make sure secure, ie. good magnet contact.

Check water supply from R.O. to ensure it’s ON & that there is no flow obstruction.
4. FAULT - CD RESERVOIR

Occurs because the prepared concentrate in the reservoir (glass jar) is outside the limits (batch of bicarb is no good).

**ACTIONS:**

Press ▶ select: QUIT

Press to Confirm

This will clear the alarm.

Press ▶ select: Terminate Process

Press to Confirm

Ensure hopper is not empty; add powder if needed.

Wait while the reservoir empties, then

Press ▶ Select: Automatic

Press to Confirm

Machine will proceed with filling, dosing, etc.
PURPOSE:

- To provide instructions for system start-up, shutdown and troubleshooting of the Canadian Water Technology (CWT) Reverse Osmosis System. The CWT Reverse Osmosis System is a water treatment process whereby organic matter and electrolytes are removed from the water. The processed water is required by delivery systems in the preparation of dialysate.

POLICY:

1. Registered Nurses, Licensed Practical Nurses, Dialysis Technologists, Dialysis Care Technicians, Unit Assistants, Nursing Assistants and Health Care Aides working in Dialysis who have received instruction and demonstrated competency to the renal educator or delegate may use the CWT Reverse Osmosis System.

EQUIPMENT:

- CWT Reverse Osmosis System

PROCEDURE:  

A. System Start-Up (Remote Station)

1. Touch the surface of the “Remote Station” screen to access the start-stop menu.

2. To begin the RO system start-up sequence, touch the “ON” button on the start-up screen. The “Reverse Osmosis Unit On” light and the “Auto Flush” light will illuminate. Indication of which RO is running and start-up mode is also displayed on the touch screen. The screen will automatically go to a system parameters screen after a pre-set time.

3. When the “Reverse Osmosis Unit On” light and touch screen displays that the RO unit is in the RUN mode, the RO system is ready to deliver high quality water for delivery system operation.
PROCEDURE:

(approximately 2½ minutes).

B. System Shut-down (Remote Station)

1. Touch the surface of the Remote Station screen to access the start-stop menu.

2. To begin the RO system shut-down sequence, touch the “OFF” button on the screen. The “Reverse Osmosis Unit On” light will remain on and the “Auto Flush” light will illuminate. Indication of which RO is running and shut-down mode will be displayed on the touch screen. The screen will return to the parameters screen to be viewed until RO shuts off. After the RO has shut down, the screen will automatically advance to the main CWT logo page.

TROUBLESHOOTING:

A. Alarm Conditions (Remote Station)

1. Low Pressure Alarm
   A low pressure alarm condition will occur when the feed pressure to the RO unit falls below a programmed set-point. Cancel alarm using the procedure below (B). Advance to the stand-by RO unit using the procedure below (C). Inform the technologist of the alarm condition.

2. High Temperature Alarm
   A high temperature alarm condition will occur when the feed water to the RO unit exceeds a programmed set-point. Immediate attention will be required. Auto-flush will be invoked in an attempt to purge over-temp water from the RO unit. Cancel alarm using the procedure below (C). **DO NOT ADVANCE** to the stand-by RO system. Inform the technologist of the alarm condition.

3. Low Quality Alarm
   A low quality alarm condition will occur when the permeate water delivered to the dialysis unit becomes unfit for use. Permeate divert will automatically be in effect and divert poor quality water from the dialysis unit. Cancel alarm using the procedure below (B). Advance to the stand-by RO unit using the procedure below (C). Inform the technologist of the alarm condition.

4. Motor Overload
   A motor overload condition will occur when the high pressure pump motor on the RO unit overheats or draws more current than it was designed for. Cancel alarm using the procedure below (B). Advance to the stand-by RO using the procedure below (C). Inform the technologist of the alarm condition.

   ▪ There will be a 2½ minute start-up sequence before water from the stand-by RO is routed to the dialysis unit.
TROUBLESHOOTING:

5. Emergency Shutdown
   An Emergency Shutdown alarm condition will occur when the Emergency Stop Button on the Remote Station is pressed. To remove the alarm condition, rotate the Emergency Stop Button clockwise to re-start the RO unit.

6. No High Quality Water
   In the event that there are no alarms on the Remote Panel and the delivery systems are showing NO WATER alarms, advance to the stand-by RO using the procedure below (C). Inform the technologist of the alarm condition.

7. Remote Panel Not Responding
   In the event of a power failure the remote panels can lose communication with the RO system. The RO system must be started manually by using the procedure below (D).

B. Alarm Cancellation (Remote Station)

   1. Alarms may be acknowledged and silenced by the following.
      a. Push "Neglect" button (bottom left of the screen).
      b. Push "Yes" (OK to continue).

   2. Should an alarm condition persist, the alarm will re-sound again in 3 minutes.

C. Reverse Osmosis Advance

   1. To advance to the Stand-by RO system, press the black Reverse Osmosis Advance button on the Remote Panel box. The amber Auto Flush light will illuminate followed by the blue Permeate divert light. The original RO will automatically turn off when the Advance sequence is finished.

   2. The RO system has an automatic advance at the end of the treatment day. If the RO is manually advanced the technologist must be informed, as the faulty RO will try to start-up the following day.

   3. There will be a 2½ minute start-up sequence before water from the stand-by RO is routed to the dialysis unit.

D. Manual RO Operation

   1. To start the RO manually, switch the RO control switch on both of the RO units from the AUTO position to the OFF position. Turn 1 of the RO control switches to the HAND position. The RO will now begin the RO sequence.

   2. The RO system must be turned off manually if it is running in HAND position.

   3. There will be a 2½ minute start-up sequence before water from the RO is routed to the dialysis unit.

REFERENCES:

PURPOSE:

1. To provide instructions to hemodialysis staff and home hemodialysis patients for the use and disinfection of the portable Aquaboss Reverse Osmosis (RO) system for dialysis treatments.

POLICY:

1. Registered Nurses, Technologists, Unit Assistants, Health Care Aides, Dialysis Care Technicians, Nursing Assistants and Home Hemodialysis patients who have received instruction and have demonstrated competency to the renal educator or delegate may use the Lauer Aquaboss RO system.

2. Disinfection of the Aquaboss RO System must be performed monthly

EQUIPMENT:

- Lauer Aquaboss portable RO system
- Disinfectant – Dialox®
- Residual test strips – hydrogen peroxide
- 60 mL syringe
- Blunt plastic needle
- 10 mL syringe
- High Quality Water (HQW) Sample Connector
- Single Patient Hemodialysis Delivery Systems
- Gloves
- Goggles
- Container/bucket
- Tempered water supply (25°C)

WARNING! Dialox® can cause irritation and damage to eyes, skin and the respiratory system. Always wear protective eyewear and gloves, and ensure adequate ventilation.
PROCEDURE:

A. Start Up:

1. Connect RO to appropriate water and electrical supply.
2. Ensure water supply tap to RO is open.
3. Turn Main Power Switch (green) on RO to ON
   • RO will run through various start-up tests (1 minute).
   • The 2nd line in the display will then show the current operating mode. This will be the same mode the RO was in when it was turned off.

B. Normal Operation:

1. Start up RO if not already on.
   • See Start Up section.
2. Determine current operating mode of RO as indicated on 2nd line of display.
   • Normally this would be SYSTEM OFF.
3. If the display shows “OPERATION”, the RO is ready to use for dialysis once the pre-flushing is complete.
   • The RO will run through 3 phases initially, as indicated in the 3rd line of the display:
     1) Empty Tank
     2) Fill Tank
     3) Preflushing (approximately 5 minutes)
   • The 3rd line of the display will show HQW conductivity and RR (rejection ratio) once the preflushing is complete.
   • Once the PREFLUSHING is complete the RO will be producing High Quality Water (HQW) for the dialysis machine.
4. If not in OPERATION mode, press the button under the “ON” selection. Confirm that the 2nd line of the display reads “OPERATION”
   • See Key Point above.
   • The dialysis machine SHOULD NOT be turned on until the PREFLUSHING is complete.

C. Disinfection:

1. Important: Disconnect the RO HQW output from the dialysis machine.
   • Disinfectant can be drawn up by the dialysis machine if left connected to the RO.
2. Start up RO, if not already on.
   • See Start Up section.
3. Determine current operating mode on the 2nd line of display. If in “OPERATION”, select the “OFF” option by pressing the button under that selection.
   • C&D option (Clean and Disinfect) is not available when the RO is in OPERATION mode.
4. Select the “C&D” option by pressing the button under that selection.
5. Press “D” for disinfection
6. Press and hold the “5 sec” button until the disinfection is initiated.
   • The disinfection will proceed through several short phases.
PROCEDURE:

7. When the display reads “Fill in Disinfect”, add 60 mL of disinfectant through the septum port.
   a. Draw 60 mL of disinfectant into a syringe.
   b. Place the plastic blunt needle on the end of the syringe.
   c. Pierce the RO septum with the syringe and slowly inject the full 60 mL of disinfectant.
   d. Remove syringe and discard.

8. Press the button under the “→” selection to continue the disinfection process.

9. When the RO alarms momentarily and the display reads “Check UP for Residual DI”.
   a. Connect sample connector to HQW connector.
   b. Run water to a container for 1 minute, before testing.
   c. Test output for residual disinfectant using the appropriate test strips.
   d. Disconnect sample connector.
   e. Also test RO drain water for residual disinfect.

10. Once “FLUSHING” is complete, the display will read “Check UP for Residual DI?” only.
    a. Confirm the results of your residual test.
    b. Select “Yes (5 sec)”, hold for 5 seconds, if a NEGATIVE residual result was obtained.
    c. Select “NO” if a POSITIVE residual result was obtained.

11. Press the button under the “→” selection to confirm completion of the disinfection process.

12. Reconnect the RO HQW connector to the dialysis machine.

13. Press “ON” button
    Select “OFF” to shutdown the RO, if desired.

KEY POINT:

- Use gloves and eye protection when handling disinfectant.
- The RO is now in the recirc. phase (5 minutes). The internal conductivity must reach 120 uS in order for the disinfection to continue. If not reached, the RO will return to Step 7 for more disinfectant.
- The 2 remaining phases (dwell 20 minutes and flush 30 minutes) will continue. (This will include the stopping and starting of the internal pump.) The remaining time of each phase is shown on the display in seconds.
- After 15 minutes of the flush phase the RO will alarm and display that a residual check can be performed.
- Use container to catch sampling water.
- You have approximately 15 minutes while the RO continues its rinse to test the water at the HQW connector and drain line sample port until a negative residual disinfectant result is obtained.
- If drain line sample port present, use 10 mL syringe to draw sample. Flush sample port with drain water 3 times using a syringe before testing.
- A “NO” selection will initiate a further 30 minute rinse during which further samples can be taken for residual testing.
- The “ESC” key can be selected to cancel the remaining rinse time if desired.
- Exits the disinfection mode.
- RO will begin to enter into Standby mode (5 minutes).
- RO is now in “Normal Operation”.
- See RO “System Shutdown” section.
PROCEDURE:

D. RO System Shutdown:

1. Press the button under the “OFF” selection
   • The RO will move through 2 phases (approximately 3 minutes) after which the power can be turned off.
     o Tank Filling,
     o Tank Emptying

2. Turn “OFF” main power switch (green)

3. Turn “OFF” water supply tap.

E. Reset Filter Check Timer:

1. Select “Menu” option from display.
   • Resets timer for filter change reminder.

2. Use “↓” button to scroll to #1 “Timer Reset”, press “Enter”.

3. Use “↓” button to scroll to 1.1 “PreFilter Change”, press “Enter”.

4. Press “Reset”.
   • Date will reset to current date.

5. Press “ESC” 3 times to return to main page on display.

F. Standby:

1. The RO is in standby if the 2nd line of the display reads “Standby”.
   • Standby is used to conserve water when HQW is not required, but automatically allows for intermittent internal flushing to prevent stagnation.
   • Standby has 3 phases:
     o Rinsing
     o Break
     o Interim flushing

2. Select any of the other Operating Modes if desired
   • ON, C&D and OFF modes are available at the bottom of the display.

TROUBLESHOOTING:

1. The AquaBoss has two types of numbered fault messages:
   a. Alarms – Alarms indicate a parameter has deviated from the allowable range. The alarm notifies the operator and the RO remains operational. The alarm will automatically reset once the parameter is back in normal range.
      • Red LED blinks.
      • Green LED blinks.
      • Audible alarm sounds once.

   Errors – Errors indicate a non recoverable fault. The RO will not continue to work. The RO must be turned OFF/ON with the Main Power Switch in order to reset the error fault.
      • Red LED blinks.
      • Green LED off.
      • Intermittent audible alarm.
TROUBLESHOOTING:

Common Faults:

1. ALARM 19
   No water, on start up.
   ▪ Turn on water supply to RO.
   ▪ Low water pressure, check pre-filters.

2. ERROR 6
   RO waste water temperature greater than 37˚ C during operation.
   ▪ Check pre RO temperature.
   ▪ Set temperature mix valve to 25˚ C.

3. ERROR 25
   RO water temperature less than 10˚ C.
   ▪ Check pre RO temperature.
   ▪ Set temperature mix valve to 25˚ C.

4. ERROR 26
   HQW temperature greater than 37˚ C during start up test.
   ▪ Check pre RO temperature.
   ▪ Set temperature mix valve to 25˚ C.

5. ALARM 7
   No water
   ▪ Turn on water supply to RO.
   ▪ Low water pressure, check pre-filters

6. For all other ERROR/ ALARM codes, call the technologist for assistance.

REFERENCES:

Manufacturer’s information, Lauer Aquaboss Eco RO Dia 70 Operator Manual (rev4.5 May01/06) and ECO 70 Quick Reference Guide (rev E 2009/12).
PURPOSE:

1. The Reverse Osmosis System (RO) is a water treatment process whereby organic matter and electrolytes are removed from the water. The processed water can then be used with delivery systems in the preparation of dialyzing fluid.

POLICY:

1. Registered Nurses, Licensed Practical Nurses, Dialysis Technologists and Unit Assistants employed in Dialysis who have received instruction and have demonstrated competency to the renal educator or delegate may use the RO equipment.

EQUIPMENT:

- US Filter/Petwa Reverse Osmosis System
- CWT Reverse Osmosis System
- Single Patient Delivery System

PROCEDURE:

KEY POINT:

A. RO System Start Up

1. Touch screen at bottom to activate Touch Screen.  
   - Screen will automatically turn off after several minutes.

2. Repeatedly touch screen to scroll through available windows.  
   - Four windows available:
     o Manufacturer logo
     o Inlet pressure and temperature
     o Product water conductivity
     o RO on/off switch

3. Select window with Reverse Osmosis ON/OFF display.
**PROCEDURE:**

4. Touch the ON arrow symbol on the screen.
   - “RO ON”, “AUTOFLUSH” and “PERMEATE DIVERT” panel lights will be lit. After 60 seconds, “AUTOFLUSH” will turn off. After 240 seconds, “PERMEATE DIVERT” will turn off, leaving only the green “RO ON” on.
   - DO NOT OPERATE delivery systems until only the green "RO ON" light is on.

5. Product water is now available to the delivery systems.

**B. RO System Shutdown**

1. Touch screen at bottom to activate Touch Screen.
   - Screen will automatically turn off after several minutes.

2. Repeatedly touch screen to scroll windows.
   - Four windows available:
     - Us Filter logo
     - Inlet pressure and temperature
     - Product water conductivity
     - RO on/off switch

3. Select window with Reverse Osmosis ON/OFF display.

4. Touch OFF arrow symbol.
   - “RO ON”, “AUTOFLUSH” and “PERMEATE DIVERT” panel lights will be lit. The RO will autoflush for 300 seconds and automatically shutdown.

**C. Emergency RO System Shutdown and Restart**

1. Push in red Emergency Stop button.
   - Can be used in case of large water leak in the RO system or smoke/fire.
   - RO will shut down immediately. Audible alarm will sound, touch Stop button on screen to silence.

**D. Restart RO System after Emergency Shutdown**

1. Pull out red Emergency Stop button.
   - Allows RO system to be started normally.


**TROUBLESHOOTING ALARMS:**

- All alarms will occur with an audible alarm and a visible screen alarm. On the bottom of the alarm screen are the buttons:
  - STOP – touch to silence audible alarm.
  - ACK – (acknowledge) enables operator to further investigate multiple active alarms through the MON1 and MON2 buttons.
  - MON1 and MON2 – touch to view other multiple alarms.
  - NEGLECT – touch to bring you back to the four main screens or the initial alarm screen.
TROUBLESHOOTING ALARMS:

Low Inlet Pressure
The inlet water pressure to the RO system has fallen below 10 psi for more than 5 seconds. The RO has now shut down, until water pressure is restored. Low water pressure may be caused by fouled pre-RO or RO filters or low hospital water pressure. Inform the technologist.

High Inlet Temperature
The inlet water temperature to the RO system has risen above 45° C for 5 seconds causing the RO to shut down. This is done to protect the RO membranes. High inlet temperature may be caused by failure of the temperature mixing valves. Inform the technologist.

High Conductivity
The product water conductivity has risen above 20 microsiemens for 5 seconds and the alarm has sounded as a warning. The RO system will still operate normally. Inform the technologist.

Motor Overload
The thermal overload protection circuit has tripped and power has been shut off to the RO motor. The RO will need to be turned off and the circuit manually reset before the RO is restarted. Inform the technologist.

Motor Trip
The ground fault protection circuit has been tripped and power has been shut off to the RO motor. The RO will need to be turned off and the circuit manually reset before the RO is restarted. Inform the technologist.

Emergency Shutdown
The red Emergency Stop button has been pushed in. The RO will shut down immediately. The button must be pulled out in order to restart RO.

REFERENCES:
PURPOSE:

1. The Reverse Osmosis (RO) System is a water treatment process whereby organic matter and electrolytes are removed from the water. The processed water can then be used with delivery systems in the preparation of dialyzing fluid.

POLICY:

1. Registered Nurses, Licensed Practical Nurses, Dialysis Technologists, Dialysis Care Technicians and Unit Assistants employed in Dialysis may use the RO equipment after referring to this procedure.

EQUIPMENT:

- US Filter/Petwa Reverse Osmosis (RO) System
- Single Patient Delivery System

PROCEDURE:

A. System Start Up

1. On the nurse’s panel ensure key is in power switch #1 and is in the “ON” position.

2. Turn RO power switch #2 to “ON” position.

KEY POINT:

- Switch #1 should be left in the “ON” position and key removed at all times. Dialysis Technologists should be in charge of key.

- The RO system will power up in 30 seconds on a pre-set delay to ensure system is flushed with water before motor start-up. Power up system will enter AUTOFLUSH mode with light illuminating for 300 seconds. After this, system will stay in PERMEATE DIVERT mode for additional 30 seconds with light illuminating. DO NOT OPERATE delivery systems during these modes as no high quality water is supplied to the delivery systems.
PROCEDURE:

KEY POINT:

- The process scanner located on the nurse’s panel allows the monitoring of the RO in use.
  - CH 1 - RO #1 conductivity
  - CH 2 - RO #2 conductivity
  - CH 3 - Pre RO water temperature
  - CH 4 - RO high quality water loop pressure

B. System Shut Down

1. Turn RO power switch #2 to “OFF” position.

- The RO system will enter AUTOFLUSH mode for 300 seconds and will automatically shut down after this pre-set time.

TRROUBLESHOOTING:

A. Low Pressure Alarm
This alarm is for monitoring the incoming supply water pressure to the RO system. The pre RO water pressure has dropped below normal operating pressure and the RO system has shut down until supply pressure is restored. The RO should be advanced to the other RO system by pressing RO Advance Button. Switching the RO system, alarm may reoccur with second RO. If second RO operates, possible cause may be due to dirty pre filters on first RO. If second RO does not operate there is a problem with the incoming supply water. Notify technologist of the alarm before the next treatment day, as the RO has an automatic advance at end of treatment day.

NOTE: Pressing the “Audible Alarm” button will silence audible alarm.

B. High Temperature Alarm
This alarm is for monitoring the incoming supply water temperature to the RO system. The pre RO water temperature has increased above normal operating temperature and the RO system has shut down until supply temperature is corrected. Running the RO system with high water temperature would cause premature failure of the RO membranes and/or high-pressure pump. DO NOT ADVANCE to the other RO as this water supplies both RO systems. Notify technologist.

NOTE: Pressing the “Audible Alarm” button will silence audible alarm.

C. Low Water Quality
This alarm is for monitoring the conductivity of the high quality water. The conductivity has increased above a safe operating range and all high quality water has been diverted to drain. No high quality water is being supplied to delivery systems. The RO should be advanced to the other RO system by pressing RO Advance Button. Possible cause may due to a membrane failure. Notify technologist of the alarm before the next treatment day, as the RO has an automatic advance at end of treatment day.

NOTE: Pressing the “Audible Alarm” button will silence audible alarm.

D. No High Water Quality
When there is no alarm on panel and all delivery systems are showing no water alarms, the RO should be advanced to the other RO system by pressing RO Advance Button. Water Treatment Room (GA614) should be inspected for possible water leak. After switching the RO system, same issue may re-occur with second RO. If second RO operates, possible cause may be valve failure or leak on first RO. If second RO does not operate, shut down RO system immediately. Notify technologist of the alarm before the next treatment day, as the RO has an automatic advance at end of treatment day.

REFERENCES:


Manager, Renal Technology, Manitoba Renal Program
PURPOSE:

1. To ensure the process used for obtaining International Normalized Ratio (INR) blood samples from a patient with a central venous catheter is performed accurately and consistently.

POLICY:

1. Registered Nurses and Licensed Practical Nurses in Dialysis who have received instruction and have demonstrated competency to the renal educator or delegate shall perform this procedure.

EQUIPMENT:

- 1 Syringe (minimum 5 mL)
- 1 Alcohol prep pad
- 1 INR blood specimen collection tube
- 1 Blunt fill needle

PROCEDURE:

1. Access catheter as per Procedure 30.30.02 Accessing and Locking Dialysis Central Venous Catheter (Anticoagulant/Thrombolytic/Antibiotic Locking)

2. Initiate dialysis.

3. Wait a minimum of 5 minutes then swab arterial blood line injection port with alcohol and draw blood sample for INR.

4. Give heparin prime via syringe pump on delivery system and start heparin continuous infusion.

KEY POINT:

- Do not give heparin prime.

- Do not start heparin infusion until sample collected. If heparin instilled cannot be aspirated and is pushed, initiate dialysis and draw sample between 20 and 30 minutes.

- If INR is urgently required after patient is heparinized, discontinue infusion for 1 hour and draw sample.
DOCUMENTATION:

- Hemodialysis Treatment Record
- Anticoagulation Flowsheet
- Lab Flowsheet

REFERENCES:

MANITOBA RENAL PROGRAM

SUBJECT  
- Intradialytic Blood Product Administration  

SECTION 30.70 Standards of Care  
CODE 30.70.02  

AUTHORIZATION  
- Professional Advisory Committee, Manitoba Renal Program  
- Nursing Practice Council, St. Boniface General Hospital  

EFFECTIVE DATE October 2009  

REVISION DATE  

PURPOSE:

1. To administer Red Cell Preparations (Red Cell Concentrate, Whole Blood and Special Red Cell Preparations) during hemodialysis.  

2. To provide information on safe storage and administration of Red Cell Preparations.  

3. To provide information for early recognition and prompt treatment of transfusion reactions.  

POLICY:

1. Registered Nurses and Licensed Practical Nurse in Dialysis may administer blood products during treatment as ordered by the physician.  

EQUIPMENT:

- **Blood Product Requisition Form**  
- Blood Product as ordered with attached *Product Chart Copy Form*  
- Blood administration set & filter (Baxter Y-Type Blood Solution Set)  
- 0.9% Normal saline solution (500 mL)  
- Infusion pump  
- Patient chart  
- Gloves  
- *Cumulative Blood Product Administration & Assessment Record Form* (CBPAAR) (#05363) addressographed with patient name  

KEY POINT:

- Refer to your hospital requisition.  
- Refer to individual hospital’s *Parenteral Administration Set Reference Guide*.  
- Volume according to individual hospital policy used to prime administration set and tubing prior to transfusion.
**PROCEDURE:**

1. Ensure the physician has obtained informed consent for transfusion and written orders for transfusion.

2. Prepare patient for transfusion:
   a. Prime Y-Type blood administration set with 0.9% NS.
   b. Obtain blood pump to infuse product.
   c. Take baseline vital signs (VS): BP, T, P, RR. Ask patient if he/she has received blood products in the past and if had any reactions.


4. Perform 2-person check to verify correct patient and correct product.
   a. The correct patient is verified by one person reading the following **out loud** from the Product Chart Copy:
      i. Spelling of the patient’s last and first names
      ii. Patient’s PHIN number
      iii. Type of blood product
   b. The second person confirms the identical information is on:
      i. Physician’s order
      ii. Admission Face or Summary Sheet
   c. The correct product is verified by the first person reading the following **out loud** from the Product Chart Copy:
      i. ABO blood group
      ii. Rh blood group

**KEY POINT:**

- As recommended by Canadian Blood Services (CBS), physician’s order should include:
  - Volume or amount to be infused
  - Length of time product to be infused
  - Use of pressure infusion devices
  - Use of blood warmers
  - Pre-medications
- With all MRP dialysis patients, consent for transfusion is included in Consent for Treatment form. Check with own hospital policy if further additional consent is required.

- When priming, ensure filter is completely wet and drip chamber is 1/3 to 1/2 full prior to infusion.
- Use only 0.9% NS. All blood and blood products must be administered through a blood filter.
- Exceptions: Albumin and IVIG uses vented tubing that comes with the product. Pentaspan uses regular IV tubing.

- Record on CBPAAR and Hemodialysis Treatment Record.
- Ensure patient has received appropriate education as per CBS guidelines.

- Transfusion of blood product must be initiated within 30 minutes of removal from Blood Bank. Blood components that have been outside of a temperature controlled environment for more than 30 minutes must be discarded.
- Each dialysis unit will retrieve the unit of blood per their hospital policy.

- To be done at the bedside in the presence of the patient immediately before the transfusion is established.
- Persons authorized to perform 2-person check will vary according to hospital policy. Please check with hospital policy/guidelines.

- Medical Record Number (MRN) is used only when PHIN is not available.

- Report any discrepancies to Blood Bank and Canadian Blood Services and notify physician. The physician must decide whether or not to proceed with transfusion despite the discrepancies.
PROCEDURE:

iii. Unit serial number

d. The second person confirms the identical information is on the blood product bag label.

e. Both people confirm the date on the bag is NOT past the expiry date and sign the bottom of the Product Chart Copy Form where indicated.

5. Inspect the blood for abnormalities. Gently rotate the blood product bag from side-to-side several times.

6. Attach blood unit to administration tubing and connect tubing to the medication access port of the venous drip chamber of the hemodialysis bloodlines set and initiate infusion.

For red blood cell concentrate, each unit may contain anywhere from 250 mL to 400 mL. When calculating fluid volume for ultrafiltration goal, count 350 mL per unit.

a. Establish infusion rate at 120 mL/hr for first 15 minutes infusing total of 30 mL. (The nurse must stay with the patient for the first 15 minutes of transfusion.)

b. Observe for any adverse reaction.
   i. If reaction, stop transfusion immediately and refer to Transfusion Reaction Procedure per your hospital policy and procedures.

c. After 15 minutes, repeat VS. If there are no signs of reaction and patient is tolerating well, increase infusion rate as per physician’s order. Infusion rate should take into account the number of units to be infused to allow completion of all units during the treatment.

d. Continue to monitor BP, T, P & RR every 30 minutes or as clinically indicated while blood is infusing.

7. Upon completion of blood transfusion, flush line with 0.9% NS until clear and record post VS

KEY POINT:

- The shelf life of red blood cell preparation is dependent on anticoagulant nutrient used, manipulation of the unit including washing or irradiation.
- Return any outdated red cell preparation to the Blood Bank and inform Blood Bank personnel.
- If your hospital has pneumatic tube system, do NOT return products through the tube.

- If clots, clumps or discoloration present, notify Blood Bank and return the product.
- Order another unit of blood. If none available notify physician.

- It is recommended that the blood product administration set be attached to the extracorporeal circuit post dialyzer because plasma, proteins, high red cell concentration and platelets in the blood will initiate clot formation in the dialyzer.

- NOTE: With blood administration set, filter must be completely wet and drip chamber 1/3 to 1/2 full prior to initiating the transfusion.
- Medications should not be given at the same time as blood transfusions. It is recommended that if IV iron is due to be given, hold it until the next treatment. Required medications such as antibiotic therapy should be given at the end of treatment with blood transfusion given at the maximum rate in order to leave time for the drug administration.

- CBS recommends initiation rate of 2 mL/min = 120 mL/hr for the first 15 minutes to observe for reaction. Majority of reactions occur during the first 30 mL of blood administration.

- Signs or symptoms such as chills, chest pain, back pain, dyspnea, rash, or urticaria may indicate reaction.
- Follow CBS standard operating procedure.

- In hemodialysis, the use of central vein catheters or fistulas will allow high infusion rates. The ultrafiltration rate during treatment eliminates any chance of fluid overload.
- Each unit must be infused within 4 hours.

- Blood administration set must be changed after 4 consecutive units; or > 8 hours elapsed; or if more than 30 minutes elapse between the infusion of units.

- Flushing of the line is to ensure all product has been transfused.
PROCEDURE:

including BP, T, P & RR.

8. Remove the *Product Chart Copy Tag* from the blood product bag and complete the information required. Attach the white copy to the back of the CBPAAR form, return the Blood Bank copy (pink) to Hospital Blood Bank. Discard the blood services returns only copy (yellow) into confidential shredding bin.

   • This procedure may vary with each dialysis unit; please refer to your hospital policy.

9. Discard empty blood product bag and tubing as per hospital policy.

10. If patient is a transplant candidate, ensure orders are obtained to draw antibody blood work 14 -18 days post transfusion.

   • Ensure discarded bag and administration set will not leak (i.e. close all clamps, cap ports, tie tubing).

DOCUMENTATION:

- Hemodialysis Treatment Record
- Integrated Progress Notes
- Cumulative Blood Product Administration & Assessment Record Form
  - date and time transfusion established
  - type of product
  - blood group and Rh of donor unit
  - donor unit number
  - vital signs
  - assessments and interventions during transfusion
  - date and time transfusion completed

The CBPAAR is a mandatory form for all Regional Health Authorities.

If original transfusion order is in the "in patient" chart, the original CBPAAR form should be filed in hospital chart and a copy placed in the renal chart.

Although it may be hospital policy to give the patient the white copy of CBPAAR, if the transfusion order originated in dialysis chart, retain the original and place in chart. Provide patient with a photocopy or transcribe information as per hospital policy.

REFERENCES:

PURPOSE:

1. To ensure accurate ordering of dialysis supplies for Home Hemodialysis patients.

POLICY:

1. The Home Hemodialysis training nurse will complete a Home Hemodialysis Script Order Form and forward it to HSC Supply and Distribution for all new patients. At this time, initial supplies will be ordered using the master quota list of supplies for Home Hemodialysis patients. A quota will be established for each item per week, month or year. HSC Supply & Distribution will fill the initial order and then develop a customized order form for the patient’s future use.

2. The Home Hemodialysis training nurse will send a new Home Hemodialysis Script Order Form for any future added or deleted items. HSC Supply & Distribution will update the patient’s record and customized order form as requested.

3. The Home Hemodialysis training nurse will notify HSC Supply & Distribution, by sending a Home Hemodialysis Script Order Form, when a patient no longer requires supplies (modality change) or is deceased.

4. Home Hemodialysis patients will be trained to order supplies required for their treatment during their training. The process for using the Home Hemodialysis Supplies Order Form is reviewed with the patient to ensure that he/she is aware of the importance of the following procedure:
   a. Complete the Home Hemodialysis Supply Order Form as instructed.
      i. Write legibly in black ink. Do not cross out errors, use a new form.
      ii. Ensure the following information is included on your requisition:
         ▪ your name
         ▪ date you send in the order
         ▪ date supplies are required
         ▪ delivery address
         ▪ your telephone number
      iii. Fill the quantity requested; note the unit issue (i.e. EA or Box).
      iv. After supplies have been ordered, retain a copy.
   b. Order supplies regularly (i.e. every 6 weeks or patient specific).
   c. Orders should be sent 2 weeks in advance so HSC Supply and Distribution has 7 working days to process the order.
   d. No supplies having an expiration date of less than 3 months will be shipped to any patient.
e. Rotate stock (i.e. new supplies to the back of the shelf, old supplies to the front of the shelf).
f. Always check supplies when they arrive against what has been ordered. If supplies are missing or there are errors, notify the HSC Supervisor, Warehouse, Supply and Distribution Services (787-1043) within 1 – 2 working days regarding the discrepancies or concerns related to the supplies shipped.

5. Once supplies have been delivered and accepted into the patient’s home they may not be returned.

PROCEDURE:

1. Initial order process is performed with home patient trainee during the patient’s independence phase of his/her training.

2. The patient is then responsible for further ordering of dialysis supplies.

3. Completed Home Hemodialysis Script Order Form is sent to:
   Supply & Distribution Services
   MH 106
   Health Sciences Centre
   59 Pearl Street
   Winnipeg MB  R3E 3L7
   Phone: 204-787-1895
   Fax: 204-787-2737
# Script Order Form

**Appendix A**

**Manitoba Renal Program Home Hemodialysis**

## Scriptor Information:

- **Health Sciences Centre – GE643 - 820 Sherbrook St. Wpg, MB R3A 1R9, ph 204-787-8686**
- **Seven Oaks General Hospital -**

---

### Client Information

- **PHIN No.:**
- **DOB:** mm dd yyyy
- **Last:**
- **First:**

### Home Address

- **City/Town:**
- **Postal Code:**
- **Phone:**

### Delivery Address (If Different)

- **City/Town:**
- **Postal Code:**
- **Phone:**

### Gender

- **Male**
- **Female**

### Email Address

### Delivery

- **Courier**
- **Pick up**

### One Time Order

### Ongoing Order

<table>
<thead>
<tr>
<th># Per Month</th>
<th>Sequence Number</th>
<th>Unit of Issue</th>
<th>Description of Added Items</th>
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<td></td>
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<tr>
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</tr>
<tr>
<td>03</td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th># Per Month</th>
<th>Sequence Number</th>
<th>Unit of Issue</th>
<th>Description of Deleted Items</th>
</tr>
</thead>
<tbody>
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<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>04</td>
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### Instructions:

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**Home Hemodialysis Authorizing Signature**

---

**Date:** (mm/dd/yyyy)
<table>
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<th>SEQ. #</th>
<th>QTY</th>
<th>DESCRIPTION</th>
<th>SEQ. #</th>
<th>QTY</th>
<th>DESCRIPTION</th>
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<td>BX</td>
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<td>CS</td>
<td>DRAPE TOWEL POLY STER DISP</td>
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<td></td>
<td>CS/100</td>
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<td>CONCENTRATE ACID 3.0K STD PLT/30CS/4EA/5LT A1223</td>
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<td>224</td>
<td>EA</td>
<td>SYRINGE 3ML BOX / 100 EA</td>
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<td>EA</td>
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<td>EA</td>
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<td>1281</td>
<td>BG</td>
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<td>BX</td>
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<td>SYRINGE 10ML LL BOX/100EA</td>
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<td>NEEDLE BUT HOLE FIST 15G X 1IN. W/EYE BX/50</td>
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NAME: _____________________________________________________________

Return to:
Supply and Distribution
Health Sciences Center
MH106, 59 Pearl Street
Winnipeg, MB R3E 3L7
(204) 787-1895 / 787-2737 (fax) Rev. February 2/10
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NAME: ____________________________

ADDRESS: ____________________________

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PLEASE DELIVER BY: ____________________________

COMMENTS: ____________________________

Return to:
Supply and Distribution
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**MANITOBA RENAL PROGRAM**

<table>
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<th>SUBJECT</th>
<th>SECTION</th>
<th>30.70 Standards of Care</th>
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**AUTHORIZATION**
- Professional Advisory Committee, Manitoba Renal Program
- Nursing Leadership Council, St. Boniface General Hospital

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**PURPOSE:**

1. To establish criteria for discharge of hemodialysis patients from the dialysis unit.

**POLICY:**

1. Registered Nurses and Licensed Practical Nurses working in Dialysis are responsible for individual patient assessment prior to the patient's discharge post-treatment.

2. Medical authorization for discharge is required where the patient does not meet discharge criteria.

**PROCEDURE:**

**KEY POINT:**

- Notify the physician if criteria is not met.
- Verify bruit/thrill if prolonged bleeding from fistula needle puncture sites.

**A. The patient leaving the unit must meet the following discharge criteria:**

1. Vascular access hemostasis is achieved.

2. Blood pressure, pulse, respiration, temperature and weight readings are within acceptable post dialysis range for the individual patient.

3. No major inter or intradialytic problems which persist after discontinuation of dialysis.

**B. If the patient is hospitalized, the unit receiving the patient must be advised of:**

1. Any changes in physician’s orders.

2. Patient’s condition through a written and verbal report including:
   i. Assessment of vital signs, including fluid removal and relationship to dry weight.
   ii. Course of dialysis treatment.
PROCEDURE:  

C. When patient does not meet discharge criteria, the dialysis nurse will:
   1. Notify the nephrologist/physician on-call with relevant information.
   2. Provide a verbal and/or written report to the receiving area.

D. If a patient leaves the unit against medical advice:
   1. Notify the nephrologist/physician on-call.

DOCUMENTATION:
- Hemodialysis Treatment Record
- Integrated Progress Notes (as required)

REFERENCES:
PURPOSE:

1. To supplement oral intake to optimize nutritional therapy for dialysis patients.

POLICY:

1. Intradialytic Parenteral Nutrition (IDPN) can only be initiated after consulting with the nutrition support team.

2. Specific orders will be written and must be checked with the prescription in accordance to hospital Total Parenteral Nutrition (TPN) policy.

3. Registered Nurses and Licensed Practical Nurses may administer IDPN in the dialysis unit.

PROCEDURE:

A. Pre-Dialysis Bloodwork each treatment
   1. (* See IDPN bloodwork schedule)

B. Initiation of IDPN
   1. Dextrose and Amino Acid solution
      
      i. Use the administration set with a 0.22 micron downstream high pressure in-line filter.
      
      ii. Prime the tubing with the solution.
      
      iii. Attach the tubing to the medication port on the venous chamber and unclamp medication port.

   KEY POINTS:

   ▪ Following initiation of IDPN, **Physician will specify duration of bloodwork at all phases of IDPN.**
   
   ▪ The glucose/amino acid solution **must** be filtered.
   
   ▪ Solutions to be infused at prescribed rate.
   
   **NOTE:** Not to exceed 350 mL/hr (16% glucose)
PROCEDURE:

2. Dextrose and/or amino acid solution with a separate lipid bottle
   i. Use the approved Y-type administration set with a 0.22 micron in-line filter.
   ii. Prime the tubing side (air vent, no filter) with the lipid emulsion.
   iii. Prime the tubing side (0.22 micron in-line filter) with the glucose and/or amino acid solution.
   iv. Attach the Y-tubing to the medication port on the venous chamber.

KEY POINTS:

   Solution to be infused at prescribed rate.
   NOTE: Not to exceed 350 mL/hr (16% glucose)

3. Dextrose and/or amino acid solution with lipid: total nutrient admixture (TNA)
   i. Inspect bag for cracking or separation of solution.
   ii. Use the administration set with a 1.2 micron in-line filter.
   iii. Prime the tubing with the TNA emulsion.
   iv. Attach the tubing to the medication port on the venous chamber.

   The larger filter allows the larger lipid particles to be safely filtered.

   Solution to be infused at prescribed rate
   NOTE: Not to exceed 350 mL/hr (16% glucose)

C. Termination of Treatment

1. Discontinue IDPN when hemodialysis is terminated.

2. If dextrose concentration >16%, run 10% dextrose when dialysis IDPN is terminated as instructed on IDPN bag at same rate of infusion for 30 minutes.

   The 10% dextrose will taper glucose delivery to prevent reactive hypoglycemia. Physician may wave need for 10% dextrose.

3. Collect post dialysis bloodwork as per IDPN bloodwork protocol.

   Physician will specify duration/length of time of bloodwork at all phases.

DOCUMENTATION:

- Hemodialysis Treatment Record
- Integrated Progress Notes
- Renal Patient Kardex
- Medication Administration Record
*IDPN BLOODWORK SCHEDULE:*

1. **Initial and Monthly Bloodwork:**
   - CBC
   - INR, PTT
   - Na, K, Cl, total CO₂
   - Glucose, Urea
   - Cr, Ca, PO₄
   - Bilirubin, total and direct
   - Protein, Alb, Chol,
   - Triglycerides, Alk Phos, ALT(SGPT)
   - AST, GGT, Mg
   - Prealbumin
   - Zinc

2. **Ongoing monitoring for each treatment until discontinued by physician:**

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**REFERENCES:**


MANITOBA RENAL PROGRAM

SUBJECT
- Attachment of Twin Bag Transfer Set to Peritoneal Catheter

SECTION 30.80 Peritoneal Dialysis

CODE 30.80.01

AUTHORIZATION
- Professional Advisory Committee, Manitoba Renal Program
- Nursing Leadership Council, St. Boniface General Hospital

EFFECTIVE DATE September 2003

REVISION DATE September 2006

PURPOSE:

1. To attach the transfer set to the peritoneal catheter using sterile technique.

POLICY:

1. The transfer set is attached to the peritoneal catheter prior to the initiation of the peritoneal dialysis treatments.

2. The transfer set is changed routinely every six months and in the following situations:
   - the mini cap is missing
   - the transfer set has a crack
   - the transfer set has malfunctioned

3. The physician must be notified if the mini cap is missing or if a crack occurs in the soft silastic portion of the transfer set.

4. All registered nurses in the designated areas who have received education and training and have been approved by the educator/delegate may attach the transfer set to the peritoneal catheter.

EQUIPMENT:

- Peritoneal catheter dressing tray
- Betadine solution (10% povidone iodine)
- Sterile 5 x 5 cm gauze
- Sterile gloves
- Mini cap extended life PD Transfer Set
- Mini cap
- 3 mL syringe
- 0.9% NaCl (injectable)
- Alcohol swab
- Blunt fill needle
PROCEDURE:

1. Perform hand hygiene.

2. Gather supplies.

3. Wash hands for 15 seconds.

4. Open tray. Add povidone iodine, 3 mL syringe, transfer set, and mini cap.

5. Wipe top of 0.9% NaCl vial with alcohol swab.

6. Glove.

7. Displace air in transfer set:
   a. Holding vial with a 10 x 10 cm gauze, draw up 3 mL 0.9% NaCl into syringe.
   b. Remove sterility cap from the blue luer lock connection of the transfer set.
   c. Attach 3 mL syringe to blue luer lock connection of the transfer set and infuse 0.9% NaCl into transfer set to displace the air.
   d. Close twist clamp on transfer set, remove syringe, and apply mini cap to transfer set.

   ▪ May eliminate this step if there is fluid in the peritoneal cavity because the air will be displaced when the cavity is drained at the next bag exchange.

8. Pick up catheter with sterile gauze and apply sterile drape under catheter.

9. Scrub connection for 30 seconds with a 10 x 10 cm gauze moistened in povidone iodine solution while holding catheter with new dry gauze.

10. With a new 10 x 10 cm gauze moistened in povidone iodine, wipe catheter from connection site to half way to base of catheter.

11. Fold a new dry 10 x 10 cm gauze around connection site and catheter.

12. Clamp catheter.

   ▪ Ensure that a portion of the gauze is placed between the clamp and the catheter to protect the catheter from damage.

   ▪ Use a 10 x 10 cm gauze to maintain sterility of gloves.

13. Attach transfer set as follows:
   a. Remove old transfer set or white locking cap from catheter.
   b. Remove sterility cover from new transfer set.
   c. Luer lock new transfer set to catheter.
   d. Remove clamp.


   ▪ Transfer set and catheter immobilization prevents trauma and infection to the exit site and promotes healing of the exit site.
DOCUMENTATION:

- Patient Record and Renal Patient Kardex:
  - Date of transfer set change
  - Reason for change

REFERENCES:


PURPOSE:

1. To apply a titanium adaptor to a peritoneal catheter.

POLICY:

1. Sterile technique is used when applying the titanium adaptor.

2. The titanium adaptor is changed when the titanium adaptor becomes detached from the catheter or the catheter develops a crack or tear.

3. All registered nurses in the designated areas who have received education and training and have been approved by the educator/delegate may change the titanium adaptor on the peritoneal catheter.

EQUIPMENT:

- Peritoneal dressing tray
- Wrapped sterile container
- Betadine solution (10% povidone solution)
- Sterile gloves
- Sterile titanium adaptor and titanium luer lock sleeve
- Sterile scissors
- Sterile 20 mL syringe
- Transfer set
- Mini cap

PROCEDURE:  

1. Wash hands.

2. Gather equipment.

3. Wash hands for 15 seconds.
PROCEDURE:

4. Open dressing tray. Add 20 mL syringe, sterile container, sterile scissors, titanium adaptor and titanium luer lock sleeve, transfer set and mini cap. Pour povidone into large compartment of tray.

5. Glove.

6. Fill sterile container with povidone using the 20 mL syringe.

7. Pick up catheter with a sterile 10 x 10 cm gauze and apply sterile drape under catheter.

8. Place abdominal pad on drape under catheter.  \(\text{To absorb povidone that may spill.}\)

9. Scrub catheter connection site for 30 seconds with a 10 x 10 cm gauze moistened in povidone solution while holding with a new dry gauze.

10. Wipe midway down catheter with a new gauze moistened in povidone.

11. Fold a new 10 x 10 cm gauze around connection site and catheter.

12. Clamp catheter.  \(\text{Ensure that a portion of the gauze is placed between the clamp and the catheter to protect the catheter from damage.}\)

13. Disconnect transfer set from catheter and discard.  \(\text{Use a 10 x 10 cm gauze to maintain sterility of gloves.}\)

14. Immerse the area of the catheter that is to be cut in the povidone solution. Soak for 10 minutes.  \(\text{Soak at least 1 cm above area to be cut.}\)

15. Once soaking is complete, cut the silastic tubing of the peritoneal catheter with sterile scissors as close to the crack/base of the titanium adaptor as possible.  \(\text{If the titanium adaptor has become detached, cut only the top of the silastic tubing (approximately 1.5 cm).}\)

16. Slide the end of the peritoneal catheter through the new titanium luer lock sleeve.

17. Insert the new titanium adaptor male end into the peritoneal catheter.  \(\text{The catheter should fit securely up to the hub of the titanium and must not come off when pulled gently.}\)

18. Luer lock the titanium luer lock sleeve onto the titanium adaptor.

19. Attach a new transfer set to the peritoneal catheter and attach mini cap to transfer set if not already done.  \(\text{See Procedure 30.80.01 Attachment of Twin Bag Transfer Set to Peritoneal Catheter.}\)

20. Remove clamp.

21. Remove gloves.  \(\text{Transfer set and catheter immobilization prevents trauma and infection to the exit site and promotes healing of the exit site.}\)
22. Notify physician for antibiotic orders.
23. Wash hands.

**DOCUMENTATION:**

- Patient Record
  - reason for titanium change

**REFERENCES:**

MANITOBA RENAL PROGRAM

SUBJECT
- Instillation of Medication into Peritoneal Dialysis Solution

SECTION 30.80 Peritoneal Dialysis

CODE 30.80.03

AUTHORIZATION
- Professional Advisory Committee, Manitoba Renal Program
- Nursing Leadership Council, St. Boniface General Hospital

EFFECTIVE DATE September 2003

REVISION DATE September 2006

PURPOSE:
1. To provide for the sterile addition of medications to the peritoneal dialysate solution.

POLICY:
1. Medications are added as per physician order.
2. All registered nurses in the designated areas who have received education and training and have been approved by the educator/delegate may add medication to the peritoneal dialysis solution.

EQUIPMENT:
- Syringe(s)
- 21 gauge needles(s)/insulin syringe(s) with 1” needle
- Alcohol swabs
- Prescribed medication
- Dialysate solution

PROCEDURE:
1. Wash hands.
2. Gather equipment.
   - Ensure correct solution volume, dextrose concentration, solution type and temperature.
3. Wash hands for 15 seconds.
4. Draw up prescribed medication.
   - If medicating more than one bag, use a separate needle and syringe for each bag.
   - If preparing insulin, use an insulin syringe with 1” needle.
   - NOTE: When preparing insulin, heparin, potassium, a two nurse check is required.
5. Swab the medication port(s) on the dialysate bag(s).
   - Allow a 30 second contact time.
PROCEDURE:

6. Inject the medication by inserting the needle up to the hub to ensure that the needle surpasses the seal in the port thus avoiding medication becoming trapped in the port.

7. Tap port to ensure medication is not trapped in the port.

8. Gently rotate the dialysate bag back and forth to distribute the medication throughout the dialysate solution.

KEY POINT:

- Ensure clarity of solution, intact port cap and connector cover, and no leaks by squeezing bag prior to injecting medication into bag.

DOCUMENTATION:

- Medication Administration Record
- CAPD Record/ADP Record
- Medication Mixture Log Sheet (for 2 nurse check)

REFERENCES:

PURPOSE:
1. To cover the exposed end of the peritoneal catheter when the transfer set is removed or when a transfer set is not being utilized.

POLICY:
1. Sterile technique must be used when applying a locking cap to the peritoneal catheter.
2. All registered nurses in the designated areas who have received education and training and have been approved by the educator/delegate may apply a locking cap to the peritoneal catheter.

EQUIPMENT:
- Peritoneal dressing tray
- Betadine solution (10% povidone iodine)
- Sterile CAPD locking cap
- Sterile gloves
- Tape

PROCEDURE:  KEY POINT:
1. Wash hands.
2. Gather equipment.
3. Wash hands for 15 seconds.
4. Open dressing tray. Add povidone and sterile locking cap.
5. Glove.
6. Pick up catheter with a sterile 10 x 10 cm gauze and apply sterile drape under catheter.  • To protect sterility of gloves hold catheter with a 10 x 10 cm gauze while slipping drape under catheter.
PROCEDURE:

7. Scrub the connection for 30 seconds with a 10 x 10 cm gauze moistened in povidone while holding catheter with a new dry gauze.

8. With another 10 x 10 cm gauze moistened in povidone, wipe catheter from connection site to midway down catheter.

9. Hold catheter with a new dry 10 x 10 cm gauze.

10. Clamp catheter.

11. Disconnect CAPD line (or transfer set) from titanium adaptor.

12. Apply locking cap to titanium adaptor.

13. Remove clamp.

14. Anchor catheter securely to abdomen.

KEY POINT:

- Ensure that a portion of the 10 x 10 cm gauze is positioned between the catheter and the clamp to protect the catheter from damage.
- Use a 10 x 10 cm gauze to maintain sterility of gloves.
- Catheter immobilization prevents trauma and infection to the exit site and promotes healing of the exit site.

DOCUMENTATION:

- Patient Record
  - Reason for cap off.

REFERENCES:

PURPOSE:

1. To check the patency of the peritoneal dialysis catheter and to remove blood cells post catheter insertion and PRN.

POLICY:

1. The catheter is flushed as per physician order.

2. All Registered Nurses in the designated areas who have received education and training and have been approved by the educator/delegate may perform the flushing of the peritoneal catheter.

PROCEDURE:  

I. POST CATHETER INSERTION:

A. FLUSHES

   Equipment
   - 2 – Sterile 5 x 5 cm gauze
   - 2 – Povidone iodine swab
   - 2 – 0.9% NaCl (500 mL)
   - Heparin (1000 u/mL)
   - Tape
   - Forceps
   - IV pole
   - 2 – Alcohol swab
   - Towel/incontinence pad
   - Warming device
   - Blunt fill needle
   - 3 mL syringe

   1. Perform hand hygiene.

   2. Collect supplies.
PROCEDURE:

3. Place drain bag on clean surface, open roller clamp on Continuous Ambulatory Peritoneal Dialysis (CAPD) spike line to continue drainage from peritoneal cavity.

4. Once satisfied that drainage is complete, close the roller clamp on CAPD spike line and clamp above the connection port of drain bag with a forcep. Hang effluent bag on IV pole.

5. Remove the outer wrap from the new 0.9% NaCl bag and examine for:
   - Correct volume
   - Correct temperature
   - Clarity of solution
   - Expiry date
   - Condition of the bag by squeezing it to check for any tears or holes
   - Intact port protectors

6. Add heparin as ordered.

7. Hang NaCl bag on IV pole with port protector facing away from pole to prevent contamination of the port.

8. Remove the 5 x 5 cm gauze with iodine protective covering from the connection site of the effluent bag. Discard.


10. While maintaining sterility, remove port protector from the NaCl bag.

11. Remove spike from the effluent bag and insert spike into the connection port of the new NaCl bag.

12. Wrap protective barrier around for the connection site as follows:
   - Open 5 x 5 cm gauze package, unfold 5 x 5 cm gauze and lay flat on top of the inside of the 5 x 5 cm package.
   - Open povidone iodine swab, unfold and place on gauze.
   - Wrap around connection site and tape in place.

13. Open roller clamp and allow the NaCl to flow into peritoneal cavity.

14. Once infused, lay bag on floor on clean surface to allow for drainage from peritoneal cavity.

15. Repeat bag exchange (see Steps 4 – 14).

KEY POINT:

- Patient comes back from OR with a 500 mL 0.9% NaCl bag attached to the peritoneal catheter. This bag is infused and drained in the OR.

- The NaCl solution is warmed to body temperature prior to instillation.

- Dosage is 500 units heparin in 500 mL 0.9% NaCl bag.
PROCEDURE:

16. Once drainage complete, close roller clamp.

B. CAP OFF:

**Equipment**
- Peritoneal dressing tray
- Povidone iodine solution 10%
- Sterile gloves
- Locking cap
- 5 x 5 cm gauze
- Fabric tape (e.g. Hypafix)

1. Ensure roller clamp is closed.

2. Perform hand hygiene.

3. Remove gauze from catheter connection site.

4. Do a 15 second hand wash.

5. Open dressing tray and add povidone iodine solution, locking cap and 5 x 5 cm gauze.

6. Glove.

7. Pick up catheter with a sterile gauze and apply sterile drape under catheter.

8. Scrub connection for 30 seconds with a 10 x 10 cm gauze moistened in povidone iodine solution while holding catheter with a new dry gauze.

9. With a new 10 x 10 cm gauze moistened in povidone iodine iodine, wipe catheter from connection site to half way to base of catheter.

10. Fold a new 10 x 10 cm gauze around connection site and catheter.

11. Clamp catheter.

12. Disconnect CAPD spike line from titanium adaptor.

13. Apply locking cap to titanium adaptor and firmly lock into place.

14. Remove clamp.

15. Wrap 5 x 5 cm gauze around cap and catheter.

KEY POINT:

- Measure and record amount and colour of effluent from all 3 drain bags. If frank blood is noted in drain bag, notify nephrologist.
PROCEDURE:

16. Anchor catheter to abdomen with fabric tape.

Documentation

a. Continuous Ambulatory Peritoneal Dialysis
   - Amount of NaCl infused
   - Amount of heparin added to NaCl (record on Medication Administration Record)
   - Amount of effluent in drain bag
   - Clarity and color of effluent

b. Surgery Short Stay Nurses Notes
   - Flushes completed
   - Nasal swabs for staph aureus collected
   - Patient teaching
   - Supplies given to patient

c. Peritoneal Dialysis Patient Record
   - Patient response to procedure

II. FLUSH WITH TRANSFER SET

Equipment
- 1.5% dialysate (1500 mL)
- Heparin (1000 units/mL)
- Mini cap
- IV Pole
- Alcohol swab
- Towel or incontinence pad
- Clamps
- Graduated cylinder
- Blunt fill needle
- 3 mL syringe

1. Perform hand hygiene.

2. Gather supplies.

3. Remove twin bag dialysate solution from outer wrap.

4. Peel drain bag and line from solution bag.

5. Check solution bag for:
   a. Clarity of solution
   b. Intact port cap and connector cover
   c. Leaks by squeezing bag

6. Add heparin as ordered.

7. Hang new bag on IV pole and lay drain bag on floor on clean surface.

8. Ensure twist clamp on transfer set is closed.

PROCEDURE:

10. Remove connector cover from dialysate solution.

11. Holding transfer set securely, remove mini cap from set and discard cap.

12. Connect twin bag to transfer set.

13. Open twist clamp on transfer set to begin drain.

14. Close twist clamp on transfer set and apply clamp to drain line.

15. Break green seal on fill line.


17. Open twist clamp on transfer set to allow dialysate flow into the peritoneal cavity.

18. Once infusion of 1000 mL dialysate solution is complete, close twist clamp on transfer set.

19. Clamp fill line.

20. Open twist clamp on transfer set.

21. Remove clamp from drain line to allow for drainage from cavity.

22. Once drainage is complete, close transfer set twist clamp and apply clamp to drain line.

23. Perform hand hygiene.

24. Open mini cap package.

25. Disconnect twin bag from transfer set and apply sterile mini cap.

KEY POINT:

- Ensure sterility of the luer lock connector. If contaminated, discard bag and use new bag of dialysate solution.

If transfer set is contaminated do the following:

- **Dry Touch Contamination** (a contamination that is due to contact with a dry surface):
  - Apply a new mini cap to the transfer set for 15 minutes then remove cap and continue with procedure or reapply a new mini cap.

- **Wet Touch Contamination** (a contamination that is due to contact with a wet surface):
  - Apply a new mini cap to the transfer set for 15 minutes. **Notify Nephrologist for antibiotic orders.** Delay bag exchange until antibiotic orders received.

- **See Decision Tree for Managing Contamination** (Appendix).

- Expect little or no drainage (cavity empty).

- To flush air from the fill line. Do not allow more than 5 seconds to elapse before clamping line, otherwise too much dialysate will be lost in the drain bag. Flush before fill reduces the risk of contamination.

- **Allow only 1000 mL of dialysate inflow into the cavity (lowest volume available is 1500 mL).**
PROCEDURE:

26. Anchor transfer set to abdomen.

KEY POINT:

- Transfer set and catheter immobilization prevents trauma and infection to the exit site and promotes healing of the exit site.

Documentation

a. Medication Administration Record
   - Medication added
   - Date and time
   - Route

b. Continuous Ambulatory Peritoneal Dialysis Flow Sheet
   - Volume and concentration of dialysate infused
   - Colour, clarity and volume of effluent
   - Medication added

III. FLUSH WITH TRANSFER SET

Equipment

- CAPD solution transfer set with locking connection
- 5 x 5 cm gauze
- Povidone iodine swab
- Tape
- NaCl 0.9% (1000 mL)
- Heparin (1000 units/mL)
- Alcohol swab
- IV pole
- Towel/incontinence pad
- Peritoneal dressing tray x 2
- Sterile gloves x 2
- Povidone iodine solution
- Luer lock cap
- Blunt fill needle
- 3 mL syringe

A. Line Preparation:

1. Perform hand hygiene.

2. Remove outer wrap from NaCl bag and examine for:
   - Correct volume
   - Correct temperature
   - Clarity of solution
   - Expiry date
   - Condition of bag by squeezing it to check for tears or hole
   - The NaCl solution is warmed to body temperature prior to instillation

3. Add heparin to 0.9% NaCl bag as ordered.
   - 1000 units to 1000 mL

4. Hang NaCl bag on IV pole with port protector facing away from the pole to prevent contamination of the connection port.

5. Perform hand hygiene.
PROCEDURE:

6. Spike CAPD line into the bag of NaCl.

7. Displace air in line.

8. Make a protective covering for spiked connection site:
   - Open 5 x 5 cm gauze package, unfold gauze and lay flat on top of the inside of the package.
   - Open povidone iodine swab, unfold and place on gauze.
   - Wrap connection with povidone iodine swab and 5 x 5 cm gauze and tape into place.

9. Secure line on pole with easy reach.

B. Line Connection:

1. Remove gauze from the titanium.

2. Perform hand hygiene.

3. Open dressing tray and add povidone iodine solution.

4. Glove.

5. Apply drape under catheter cap and over exit site dressing.

6. Scrub catheter for 30 seconds with a gauze moistened in povidone iodine while holding catheter with a fresh 10 x 10 cm gauze.

7. Moisten another gauze in betadine and clean catheter from cap to midway down catheter.

8. Hold cap and catheter with a dry gauze and clamp catheter, positioning gauze between clamp and catheter to protect catheter from possible damage.

9. Remove cap from titanium adaptor.

   - Use a 10 x 10 cm gauze to maintain sterility of gloves.

10. Maintaining sterility of gloves connect CAPD spike line to titanium adaptor.

11. Remove clamp.

12. Wrap connection site with a gauze and tape in place (optional).

13. Remove drape.
**PROCEDURE:**

C. **Flush**

1. Infuse NaCl into peritoneal cavity.

2. Once bag infused, lay bag on clean towel to allow for drainage from peritoneal cavity.

3. Once drainage is completed, clamp line.

D. **Cap off**

**Equipment**
- Peritoneal dressing tray
- Povidone iodine solution 10%
- Gloves
- Luer lock cap
- 5 x 5 cm gauze
- Fabric tape (e.g. Hypafix)

1. Ensure roller clamp is closed.

2. Perform hand hygiene

3. Remove gauze from catheter connection site.

4. Do a 15 second hand wash.

5. Open dressing tray and add povidone iodine, luer lock cap and 5 x 5 cm gauze.

6. Glove.

7. Apply drape under catheter and over catheter exit site.  
   - Use a 10 x 10 cm gauze to maintain sterility of gloves.

8. Scrub connection for 30 seconds with a 10 x 10 cm gauze moistened in betadine solution while holding catheter with fresh dry gauze.

9. With a new 10 x 10 cm gauze moistened in povidone iodine, wipe catheter from connection site to half way to base of catheter.

10. Fold a dry 10 x 10 cm gauze around connection site.

11. Clamp catheter ensuring that gauze is positioned between clamp and catheter to protect catheter from possible damage.

12. Disconnect CAPD spike line from titanium adaptor.  
   - Use a 10 x 10 cm gauze to maintain sterility of gloves.
PROCEDURE:

13. Apply luer lock cap to titanium adaptor and firmly lock into place.

14. Remove clamp.

15. Wrap a 5 x 5 cm gauze around cap and catheter and tape into place.

16. Immobilize catheter by taping securely to abdomen.

Documentation

a. Integrated Progress Notes
   - Amount NaCl infused
   - Amount of Heparin infused (record on Medication Administration Record dose and route)
   - Colour, clarity and amount of effluent
   - Patient response to procedures

KEY POINT:

- Catheter immobilization prevents trauma and infection to the exit site and promotes healing of the exit site.

REFERENCES:


**MANITOBA RENAL PROGRAM**

**SUBJECT**
- Peritoneal Exit Site Care

**SECTION** 30.80 Peritoneal Dialysis

**CODE** 30.80.06

**AUTHORIZATION**
- Professional Advisory Committee, Manitoba Renal Program
- Nursing Leadership Council, St. Boniface General Hospital

**EFFECTIVE DATE** September 2003

**REVISION DATE** September 2007

**PURPOSE:**

1. To promote healthy exit site tissue and reduce colonization at the peritoneal catheter exit site.

**POLICY:**

1. The first dressing change is done one week post catheter insertion and weekly thereafter for 6 weeks. The dressing is changed more often if excessive bleeding or a large quantity of drainage is noted.

2. A sterile exit site procedure must be used in the following situations:
   - for a period of six weeks post catheter insertion
   - an unhealed wound
   - any dressing change in hospital
   - an infected site

3. Once healing has occurred, the dressing is done 2 – 3 times per week.

4. All registered nurses in the designated areas who have received education and training and have been approved by the educator/delegate may perform the peritoneal exit site care.

**EQUIPMENT:**

- Peritoneal dressing tray
- 0.9% Normal Saline or prescribed cleaning solution
- Sterile gloves
- Sterile 5 x 5 cm gauze
- Adhesive dressing

**PROCEDURE:**

1. Wash hands.

2. Gather equipment.
PROCEDURE:

3. Gently remove dressing from exit site.

4. Assess exit site and sinus for:
   - Pink or red skin ≥ 13 mm in diameter
   - Purulent or bloody discharge
   - Pain or tenderness
   - Hypergranulation ("proud flesh")
   - Crusting
   - Swelling

5. Palpate the subcutaneous catheter.

6. Wash hands for 15 seconds.

7. Open dressing tray and add 0.9% normal saline solution and a 5 x 5 cm gauze.

8. Glove.

9. Gently clean exit site.
   a. Holding catheter with a dry 10 x 10 cm gauze, apply normal saline to exit site using a cotton applicator.
   b. With a 2nd moist cotton applicator, remove any loose crusts.
   c. Clean abdomen with saline moistened gauze starting at exit site and moving away from exit site.
   d. Dry exit site with cotton applicator. Repeat if necessary to ensure exit site is dry.
   e. Dry abdomen with a 10X10 gauze starting at the exit site and moving away.

10. Clean incision, if present, utilizing a saline moistened gauze then dry thoroughly.

11. Cover incision with a folded 10 x 10 cm gauze.

12. Cover exit site by applying a 5 x 5 cm gauze over site and cover with adhesive dressing.

13. Remove gloves.

14. Ensure that the connection site is tight.

15. Immobilize catheter by taping securely to abdomen.

16. Wash hands.

KEY POINT:

- Gentle removal prevents exit site and tunnel trauma which can disrupt healing and cause infection.

- If incision present, assess at this time.

- If exudates present:
  o Culture the exudates (not the surrounding skin) and send for C&S and gram stain. Prior to swabbing for C&S and gram stain, cleanse the exit site of crusts and debris with normal saline.
  o Notify Home Care Dialysis Case Coordinator/dialysis unit/nephrologist immediately.
  o If exudate noted in sinus, apply gentle pressure near exit site to express exudate for culture.

- May omit if within the 1st week post insertion of catheter.

- To prevent trauma and infection, avoid pulling or undue movement of the catheter, vigorous exit site cleaning and forcible removal of crusts.

- Patient may shower once exit site completely healed (after 6 weeks). No tub baths allowed (do not submerge exit site in water).

- Transfer set and catheter immobilization prevents trauma and infection to the exit site and promotes healing of the exit site.
**DOCUMENTATION:**

- Patient Record
  - Condition of the exit site and any incision including:
    - Presence of drainage and type
    - Presence of crust
    - Presence of hypergranulation tissue (proud flesh)
    - Any pain or tenderness on palpation of subcutaneous catheter
    - Color (pink or red)
    - Swelling

**REFERENCES:**


PURPOSE:

1. To provide sterile drainage of effluent out of the peritoneal cavity and instillation of dialysate solution into the peritoneal cavity.

POLICY:

1. The Continuous Ambulatory Peritoneal Dialysis (CAPD) prescription is ordered by the physician and includes:
   - Volume of the dialysate exchange
   - The number of daily exchanges
   - The type of dialysate solution (i.e. glucose based, icodextrin based, amino acid based, bicarbonate based)

2. All registered nurses in the designated areas who have received education and training and have been approved by the educator/delegate may perform the CAPD bag exchange.

EQUIPMENT:

- Dialysate as ordered
- Medication if ordered
- Sterile mini cap package (check expiry date)
- 2 clamps
- IV pole
- Graduated cylinder
- Tape
- Towel/incontinence pad

PROCEDURE:

1. Wash hands.

2. Gather supplies.

KEY POINT:

- Ensure correct solution volume, dextrose concentration, solution type, temperature and expiry date.
PROCEDURE:

3. Remove twin bag dialysate solution from outer wrap.

4. Peel drain bag and line from solution bag.

5. Check solution bag for:
   a. Clarity of solution
   b. Intact port cap and connector cover
   c. Leaks by squeezing bag

6. Add medication as ordered.

7. Hang new bag on IV pole and lay drain bag on clean surface.

8. Ensure twist clamp on transfer set is closed.


10. Remove connector cover from dialysate solution.

11. Holding transfer set securely, remove mini cap from set and discard cap.

12. Connect twin bag to transfer set.

13. Open transfer set clamp to begin drain.

14. Once drain complete, close transfer set and apply clamp to drain line.

15. Assess effluent for colour, clarity and presence of fibrin.

16. Break green seal on fill line.

17. Open drain line clamp for 5 seconds. Re-clamp.

18. Open twist clamp to allow dialysate flow into the peritoneal cavity.

KEY POINT:

- If more than 2 teaspoons of fluid in outer wrap, discard bag.

- Dry bag prior to checking for leaks.

- See procedure 30.80.03 Installlation of Medication into Peritoneal Dialysis Solution.

- Ensure sterility of the luer lock connector. If contaminated, discard bag and use new bag of dialysate solution.

- If transfer set is contaminated do the following:
  - **Dry Touch Contamination (a contamination that is due to contact with a dry surface):**
    - Apply a new mini cap to the transfer set for 15 minutes then remove cap and continue with procedure or reapply a new mini cap. (Appendix)
  - **Wet Touch Contamination (a contamination that is due to contact with a wet surface):**
    - Apply a new mini cap to the transfer set for 15 minutes. [Notify Nephrologist for antibiotic orders. Delay bag exchange until antibiotic orders received.](Appendix)
  - See Decision Tree for Managing Contamination (Appendix).

- To flush air from the fill line. Do not allow more than 5 seconds to elapse before clamping line; otherwise too much dialysate will be lost in the drain bag. Flush before fill reduces the risk of contamination.
PROCEDURE:

19. Close transfer set twist clamp once infusion of dialysate solution is complete.

20. Clamp fill line.

21. Do a 15 second hand scrub.

22. Open mini cap package.

23. Disconnect twin bag from transfer set and apply sterile mini cap.

24. Immobilize transfer set.  

   • Transfer set and catheter immobilization prevents trauma and infection to the exit site and promotes healing of the exit site.

DOCUMENTATION:

• Medication Administration Record  
  o Medication added  
  o Date and time  
  o Route  

• Continuous Ambulatory Peritoneal Dialysis Flow Sheet  
  o Volume and concentration of dialysate infused  
  o Colour, clarity and volume of effluent  
  o Medication added

REFERENCES:


MANITOBA RENAL PROGRAM

SUBJECT
- Home Choice Cycler Set-Up: Initiation of Cycling and End of Treatment (utilizing a luer lock cycler set)

SECTION 30.80 Peritoneal Dialysis

CODE 30.80.09

EFFECTIVE DATE November 2002

REVISION DATE September 2006

AUTHORIZATION
- Professional Advisory Committee, Manitoba Renal Program
- Nursing Leadership Council, St. Boniface General Hospital

PURPOSE:
1. To provide peritoneal dialysis using the Home Choice automated peritoneal dialysis cycler.

POLICY:
1. The nephrologist will prescribe the total therapy time, total therapy volume, fill volume, last fill volume, type of dialysate solution and the dextrose concentration if using a dextrose based solution.

2. All Registered Nurses in the designated areas, who have received education and training and have been approved by the educator/delegate may perform the operation of the Home Choice automated peritoneal cycler.

EQUIPMENT:
- Prescribed dialysate
- Disposable cycler set
- Disconnect (mini) cap
- Drain bag(s)
- Home choice automated cycler
- Drain manifold
- Drain line (optional)

PROCEDURE:

A. Set-up

1. Perform hand hygiene.

2. Gather supplies.

3. Plug the power cord into the back of the machine. Plug the other end into a grounded outlet.

   KEY POINT:

   - Ensure correct solution volume, dextrose concentration and solution type.
   - If required, access the nurse’s menu by pressing and holding the hidden button to the left of GO when turning ON the Home Choice. The nurse’s menu allows the nurse to tailor the Home Choice System to meet a particular patient’s needs. To exit nurse’s menu turn machine OFF, then ON.
PROCEDURE:

4. Turn machine ON.

5. Remove solution bags from outer wrap and check for:
   - Leaks by squeezing bags
   - Intact port caps
   - Expiry date
   - Clarity of solution

6. Place a solution bag on heater cradle.

7. Place remaining dialysate bags on top of heater bag or beside the cycler if space available.

8. Select program parameters:
   a. Press DOWN arrow until CHANGE PROGRAM is displayed.
   b. Press ENTER.
   c. Select Program Parameters.

9. Press STOP.

10. Ensure that initial drain alarm is set appropriately under MAKE ADJUSTMENTS.

11. Press GO.

12. Load cassette.

13. Attach the organizer to the front of the cycler door.

14. Attach drain line to drain manifold and attach Y portion of drain manifold to drain bags.

15. Clamp all 6 clamps on organizer lines.

16. Press GO.

17. Perform hand hygiene for 15 seconds.

18. Remove the heater line with the red clamp from the organizer and luer lock to heater bag.

KEY POINT:

- ON/OFF button is located at the back of the machine. PLEASE WAIT displays on screen, followed by STANDARD MODE ON. Machine beeps x 2. Home Choice performs a self-test. PRESS GO TO START appears on the display when self test is complete. DO NOT PRESS “GO” AT THIS TIME.

- If medications ordered, add at this time. See procedure 30.80.03 Instillation of Medication into Peritoneal Dialysis Solution.

- Ensure solution bag is positioned on top of heater sensor.

- 500 mL above the total therapy volume is required to accommodate flush of solution, heater and final line.

- Set the parameters for the following settings:
  - Therapy type
  - Therapy volume
  - Therapy time
  - Fill volume
  - Last fill volume
  - Dextrose (this step is skipped if LAST FILL VOLUME = 0). If using a last fill with a different dextrose concentration or a different type solution (e.g. icodextrin) enter DIFFERENT otherwise leave as SAME.

- Home Choice will calculate and display the number of cycles and dwell time.

- Initial drain must never be set to OFF.

- Display will read LOAD THE SET.

- Ensure bar clamp is soft.

- Display reads SELF-TESTING. When the self-test is complete, the display changes to CONNECT BAGS.
PROCEDURE:

19. Luer lock remaining bags to white and blue clamp lines.

20. Open only the clamps on the lines connected to solution bags.

21. Open clamp on patient line.

22. Break seal on solution bags.

23. Press GO.

KEY POINT:

- If the LAST FILL requires a medication or different dextrose concentration or different type of solution (e.g. icodextrin, amino acid), use the blue clamp line for the last fill bag.

B. Patient Connection:

1. Ensure the twist clamp on transfer set is closed.

2. Perform hand hygiene for 15 seconds.

3. Remove patient line from organizer.

4. Remove pull ring from patient line; remove cap from transfer set and connect to patient line.

5. Open twist clamp on transfer set.

6. Press GO.

- Display will read PRIMING. When priming complete display will flash CONNECT YOURSELF and CHECK PATIENT LINE.
- If air is noted in patient line, reprime patient line as follows:
  - Press STOP
  - Arrow down to REPRIME PATIENT LINE
  - Press ENTER x 2

- Maintain sterility of patient line and transfer set. For management of contamination, see Decision Tree for Managing Contamination. (Appendix I)

C. End of Therapy:

1. Scroll down to obtain therapy information.

2. Press GO.

3. Close twist clamp on the transfer set, the clamps on the disposable set and drain line.

4. Press GO.

5. Perform hand hygiene.

6. Open mini cap package.

- Display reads END OF THERAPY.
- Post therapy information:
  - Initial Drain
  - Total Ultrafiltration
  - Dwell Time
  - Added/Lost Dwell

- Display reads CLOSE ALL CLAMPS.

- Display will read DISCONNECT YOURSELF.
PROCEDURE:

7. Disconnect the patient line from the transfer set.

8. Place mini cap on end of transfer set.

9. Anchor transfer set to abdomen.

10. Remove cassette from machine.

11. Press GO.

12. Turn machine OFF.

KEY POINT:

- Catheter immobilization promotes uninterrupted healing of the catheter exit site and prevents infection by avoiding trauma to the exit site and tunnel.

DOCUMENTATION:

- Automated Peritoneal Dialysis Record
  - Therapy Prescription
    - Total therapy volume
    - Total therapy time
    - Fill volume
    - Last fill volume
    - Type of solution used
    - Intraperitoneal medications added to solution
  - Post Therapy
    - Initial drain
    - Total ultrafiltration
    - Average dwell time
    - Lost or added dwell
    - Colour and clarity of solution

- Medication Administration Record
  - Intraperitoneal medication
  - Date and time

REFERENCES:

PURPOSE:
1. To check for catheter patency and to promote appropriate outflow from the peritoneal cavity

POLICY:
1. All Registered Nurses in the designated areas who have received education and training and been approved by the educators/delegate may flush the peritoneal catheter as per nephrologist order.

EQUIPMENT:
- 2 – 20 mL syringe
- 2 – 21 g needle or blunt cannula
- Sterile 0.9% normal saline
- Alcohol swab
- Sterile min cap package (if procedure done in dwell)
- Sterile opticap disconnect cap with povidone iodine solution

PROCEDURE:  
A. Continuous Ambulatory Peritoneal Dialysis (CAPD)
   1. Draw up 20 mL of sterile 0.9% normal saline into 2 – 20 mL syringes.
   2. Ensure twist clamp on transfer set is closed.
   3. Do a 15 second hand wash.
   4. Open opticap package and keep within easy reach.
   5. Disconnect CAPD line from transfer set (or remove mini cap from transfer set if procedure is done during dwell phase of exchange).

KEY POINT:
- The opticap package contains a mini cap and an opticap disconnect cap.
**PROCEDURE:**

6. Apply mini cap to exposed transfer set.

7. Apply opticap to exposed end of CAPD line.

8. Remove mini cap from transfer set.

9. Attach 20 mL syringe of sterile 0.9% normal saline to transfer set.

10. Open twist clamp on transfer set.

11. Using gentle pressure, infuse sterile 0.9% normal saline into the peritoneal cavity.

12. Gently attempt to aspirate. If unable to aspirate go to the next step.

13. Close twist clamp on transfer set.


15. Attach 2nd syringe to transfer set, open twist clamp and infuse normal saline.


17. Remove syringe.

18. Attach CAPD line (or mini cap if procedure done in dwell) to transfer set.

19. Open clamp on transfer set to resume drainage from cavity.

**KEY POINT:**

- Mini cap maintains sterility of the exposed end of the transfer set.

- Opticap maintains sterility of the exposed end of the CAPD line.

**B. APD Cycler:**

1. Draw up 20 mL 0.9% normal saline into 2 – 20 mL syringes.

2. Press “STOP”.

3. Close transfer set twist clamp.

4. Clamp cycler patient line.

5. Wash hands for 15 seconds.

6. Open opticap package and keep within easy reach.  ▪ The opticap package contains a mini cap and an opticap disconnect cap

7. Disconnect patient line of cycler from transfer set.

8. Apply mini cap to exposed end of transfer set.  ▪ Mini cap maintains the sterility of the exposed end of the transfer set.
PROCEDURE:

9. Apply opticap to exposed cycler patient line and place line in organizer.

10. Remove mini cap from transfer set and attach 20 mL syringe to transfer set.

11. Open twist clamp on transfer set.

12. Using gentle pressure, infuse sterile 0.9% normal saline into the peritoneal cavity.


15. Remove syringe.

16. Attach second syringe to transfer set, open twist clamp and infuse.

17. Close twist clamp on transfer set.

18. Remove syringe.

19. Remove opticap from cycler patient line and attach patient line to transfer set.

20. Open clamps on transfer set and patient line.


KEY POINT:

- Opticap maintains the sterility of the exposed end of the cycler patient line.

DOCUMENTATION:

- Integrated Progress Notes
  - Reason for flush
  - Result of flush

REFERENCES:

PURPOSE:
1. To remove hypergranulation tissue from the peritoneal catheter exit site.

POLICY:
1. Hypergranulation tissue is removed from the peritoneal catheter exit site as per physician order.
2. All registered nurses in the designated areas who have received education and training and have been approved by the educator/delegate may remove hypergranulation tissue from the peritoneal catheter exit site.

EQUIPMENT:
- Bacteriostatic water
- Syringe (3 mL)
- Alcohol swab
- 2 – Silver nitrate sticks
- Peritoneal dressing tray
- Sterile gloves
- Adhesive dressing
- 5 x 5 cm gauze dressing
- Normal saline 0.9%

PROCEDURE:
1. Wash hands.
2. Gather equipment.
3. Gently remove dressing from exit site.

KEY POINT:
- Gentle removal prevents exit site and tunnel trauma which can disrupt healing and cause infection.
PROCEDURE:

4. Wash hands for 15 seconds.

5. Open dressing tray and add 0.9% normal saline, 5 x 5 cm gauze and silver nitrate sticks. Draw up bacteriostatic water and add to tray.

6. Glove.

7. Gently clean exit site.
   a. Holding catheter with a dry 10 x 10 cm gauze, apply normal saline using a cotton applicator.
   b. With a second moist cotton applicator, remove any loose crusts.
   c. Clean abdomen with saline moistened gauze starting at exit site and moving away from exit site.
   d. Dry exit site with cotton applicator. Repeat if necessary to ensure exit site is dry.
   e. Dry abdomen with a 10 x 10 cm gauze starting at the exit site and moving away.

8. Dip the silver nitrate tip in bacteriostatic water.

9. Apply to granulation tissue.

10. Repeat, if necessary, with a new silver nitrate stick.

11. Cover exit site with a 5 x 5 cm gauze and apply an adhesive dressing over gauze.

12. Immobilize catheter by taping securely to abdomen.

DOCUMENTATION:

- In patient record:
  - Reason for application
  - Return follow-up appointment

REFERENCES:

Decision Tree for Managing Contamination

**Dry**
- **During a bag exchange procedure**
  - **Minicap off Twist clamp closed (time frame unknown)**
    - **Change Transfer Set**
      - **End**
        - Apply minicap for 15 minutes and continue with new solution bag
      - **Beginning**
        - Apply minicap for 15 minutes; replace with new minicap

**Wet**
- **Transfer Set**
  - **Clamp between hole and patient. Wrap povidone & gauze around hole & tape**
    - **End**
      - **Notify Nephrologist for Antibiotics**
    - **Beginning**
      - **Clamp between hole & patient using gauze Wrap povidone and gauze around hole and tape**

**Defective Twist Clamp**
- **Leakage of fluid**
  - **Change Transfer Set**
- **Notify Nephrologist for Antibiotics**
  - **Bag Exchange**
    - Close twist clamp, apply new minicap for 15 minutes
    - **End**
      - **Notify Nephrologist for Antibiotic Orders (delay bag exchange until order received)**
    - **Beginning**
      - **Notify Nephrologist for Antibiotic Orders**
        - **Time Frame unknown**
          - **Change Transfer Set**

**Minicap off Twist clamp open Exposed end in contact with unsterile surface**
- **Hole in drain line and/or drain bag**
  - **Transfer Set**
  - **Hole in catheter or Transfer Set**

**Leakage of fluid**
- **Change Transfer Set**
  - **Notify Nephrologist for Antibiotics**
  - **Bag Exchange**
    - Close twist clamp, apply new minicap for 15 minutes
    - **End**
      - **Notify Nephrologist for Antibiotic Orders (delay bag exchange until order received)**
    - **Beginning**
      - **Notify Nephrologist for Antibiotic Orders**
        - **Time Frame unknown**
          - **Change Transfer Set**

**Time Frame**
- **unknown**
  - **Notify Nephrologist for Antibiotics**
  - **Bag Exchange**
    - Close twist clamp, apply new minicap for 15 minutes
    - **End**
      - **Notify Nephrologist for Antibiotic Orders (delay bag exchange until order received)**
    - **Beginning**
      - **Notify Nephrologist for Antibiotic Orders**
        - **Time Frame unknown**
          - **Change Transfer Set**

*Notes: If CCPD treatment, hold cycler treatment and do a CAPD bag exchange for a 6 hour dwell to accommodate IP antibiotics*
OBJECTIVE:

1. To provide information to assist the Nurse in completing a patient assessment by:
   i. Reviewing the dialysis/ward chart prior to initiation of hemodialysis.
   ii. Trending patient responses to nursing interventions during treatments.
   iii. Development a complete patient treatment profile prior to initiation of treatment.

2. To provide information about the delivery system and patient station used during a specific treatment in relation to:
   i. Infection control.
   ii. Preventative and ongoing maintenance.

3. To provide the multidisciplinary team a complete evaluation of a patients’ hemodialysis treatment by:
   i. Providing a thorough recording of interdialytic vital signs and dialysis parameters for hemodialysis treatments.
   ii. Trending the patient’s response to treatment and relating such responses to changes in prescription.
   iii. Develop a complete and permanent record of a patient’s treatments.

STANDARDS:

1. The nurse is responsible for the treatment will fill out the Hemodialysis Treatment Record.

2. The Hemodialysis Treatment Record will be maintained for a period of 3 months, and then will be saved in medical records.

3. All pertinent and/or unusual patient related findings must be documented in the Progress Note in the patient’s chart.

4. Any nurse/Dialysis Care Technician (DCT) who places her/his initials on this document will then place their signature on the Renal Signature Sheet.

5. The Hemodialysis Treatment Record will be kept in the “Treatment Record” section of the patient’s chart.

6. The Treatment Record is double sided. The first side utilized as a guide for patient’s assessment and treatment regime. The other side to record patient response to treatment, i.e.: V.S., etc. Each treatment is recorded on a separate treatment record.
PROCESS:

SIDE ONE:

Date: The month, day and year will be written out (i.e. January 1, 2000).

Code Status: The nurse/DCT will transcribe the resuscitation level from the resuscitation level record. If the facility doesn’t use such a form, “No Code” or “Full Code” can be used. If the resuscitation status has not been ordered by a physician, leave the corresponding blank. Upon transferring patient to another facility, resuscitation status must be reviewed to reflect the receiving facilities guidelines.

In Patient: The nurse/DCT will indicate the unit the patient is admitted to hospital including Emergency or Observation.

Out Patient: The nurse/DCT will indicate with a check mark if the patient is an out-patient for the treatment.

On: Initial: The nurse/DCT will indicate the actual time the patient treatment was established and initial.

Off: Initial: The nurse/DCT will indicate the time the patient is due to come off Dialysis. If this time is changed during the treatment, the initial time will be crossed off and the revised time will be written in. When dialysis is discontinued the nurse/DCT will initial in the corresponding box.

Allergies: The nurse/DCT will indicate the patient’s known allergies. If no allergies NKA will be written.

Nurse Assigned to the Patient: The nurse assigned to the patient will print his/her name. If a second nurse takes over care, he/she will add their name on the line.

Physician Orders Checked: The nurse/DCT will indicate with a check in the yes box once the chart has been checked for new orders prior to establishing treatment.

A. DIALYSIS PRESCRIPTION/PARAMATERS:

Dialyzer: The nurse/DCT will transcribe the dialyzer as ordered for this treatment.

Hours Diffusion: The nurse/DCT will transcribe the hours of diffusion as ordered by the Nephrologist.

Sequential U.F.: The nurse/DCT will transcribe the volume/time of sequential fluid removal as ordered by the Nephrologist or determined by the nurse.

Dialysate K and Ca: The nurse/DCT will transcribe the potassium and calcium content of the dialysate as ordered by the Nephrologist.

Glucose: The nurse/DCT will transcribe the glucose content of the dialysate as ordered by the Nephrologist.

HCO₃: The nurse/DCT will transcribe the bicarbonate level of the dialysate as ordered by the Nephrologist.

SVS: The nurse/DCT will indicate which sodium profile (step, linear, exponential, none) has been used for this treatment.

SVS Time: The/DCT will indicate the length of time the SVS program is to run during the dialysis treatment.
**PROCESS:**

Sodium Start: The nurse/DCT will indicate the maximum sodium level ordered by MD.

Base: The nurse/DCT will indicate the lowest sodium level ordered by MD.

UF Profile: The nurse/DCT will indicate which fluid profile has been used for this treatment (indicate using a “#”).

Qd: The nurse/DCT will indicate the rate dialysate flow is to be set at as ordered by MD.

Temp: The nurse/DCT will indicate the temperature ordered by MD for dialysis treatment.

Target Kt/V: The nurse/DCT will indicate the target single pool Kt/V for that patient (unit specific) and IPN with his/her assessment of why if target not met, i.e. treatment time cut, poor blood flow etc.

Urea volume: The nurse/DCT will indicate the most current urea distribution volume for that patient.

**B. ANTICOAGULATION:**

Heparin Free: The nurse/DCT will put a check mark in the “yes” or “no” box corresponding with the Physician’s Order or the nurse’s assessment.

Flushes: The nurse/DCT will put a check mark in the “yes” or “no” box indicating if flushes are to be given.

Prime: The nurse/DCT will transcribe the heparin prime to be given for this treatment and initial once the prime has been given.

Hourly: The nurse/DCT will transcribe the hourly heparin pump infusion rate to be given over the treatment.

Infusion Time: The nurse/DCT will record the actual time, in hours and minutes, the heparin pump is to be infusing during the treatment.

**C. DELIVERY SYSTEM:**

Machine Unit Number: The nurse/DCT will indicate the delivery system unit number as identified on the system.

Station: The nurse/DCT will indicate the patient station number the treatment occurs in.

Unit: The nurse/DCT will indicate the unit of treatment i.e. SOGH, SCDU.

Dialysate (DCT): The DCT (if applicable) responsible for the treatment will initial this area after connecting the dialysate concentrates and verifying the contents with the “Dialysis Prescription”.

Chemical Residue: The nurse/DCT will identify the results of the chemical residual test of the delivery system as performed according to procedure and initial.

Conductivity Indep: The nurse/DCT will record the independent verification of conductivity as indicated by an approved independent conductivity testing unit according to procedure.
PROCESS:

System: The nurse/DCT will record the conductivity as indicated by the delivery system.

pH: The nurse/DCT will indicate with her/his initials after verification with independent test strip that the correct pH range has been achieved (range: 6.5-7.5).

Prechecks: Air detector; shunt door; dialysate flow; both tests; pressure, ven. line in clamp: The nurse/DCT will verify with her/his initials that these tests/procedures were performed and passed in accordance with procedure.

D. VASCULAR ACCESS:

1. Fistula:

AVF/AVG: The nurse/DCT will indicate the type and location of the fistula on the corresponding line.

Needles: The nurse/DCT will indicate the type of needles used to access the fistula.

Xylocaine 1%: The nurse/DCT will indicate with a check in yes or no if this is used.

# of Punctures: The nurse will indicate the number of punctures used to establish dialysis for this treatment and document in the progress note if more than two punctures required to establish dialysis.

Comments: The nurse will indicate if any problems are noted on the Kardex with regards to cannulation or site preparation.

2. Catheter:

Type: The nurse will indicate the type of catheter, ie. femoral catheter, internal jugular, temporary catheter, etc. and location.

Instillation Heparin Dose: The nurse will indicate the dosage of heparin per lumen post dialysis.

Other: The nurse will indicate what other anticoagulant is to be infused into each lumen if heparin is contraindicated.

Art./Venous: The nurse will indicate the arterial volume and the venous volume of each lumen.

Comments: The nurse will indicate if any problems are noted on the Kardex.

Dressing Change: The nurse will indicate with a check if a dressing change to the access site is required.

Access Site Assessment: The nurse will record what she/he observed at the catheter exit site or the fistula or graft site.

E. MEDICATIONS:

Medications: The nurse assigned to the patient will transcribe medications ordered for this treatment after checking the Medications Administration Records and Physician’s Orders in both dialysis and in-hospital charts.

F. NURSING ASSESSMENT:
**PROCESS:**

**Assessment:** The nurse will complete a full patient assessment each treatment that is individualized according to the patient's medical condition. The RN/LPN will review each system. The abnormal findings will be reported to the appropriate physician and multidisciplinary team member, i.e. Social Worker, Dietician, and Pharmacist.

**Plan:** The nurse will document the plan of care for this treatment based on his/her assessment.

**Initial:** The nurse assessing the patient and developing a plan of care will provide her/his initials.

**G. FLUID MANAGEMENT:**

**Pre-Weight:** The nurse or delegate will record the patient's actual pre-weight.

**Dry Weight:** The nurse will indicate the prescribed dry weight of the patient as ordered by the Nephrologist, as found in the Kardex.

**Target:** The nurse will record the target weight for the treatment based on a thorough nursing assessment and review of previous treatment information.

**Post Weight:** The Nurse will record the final post weight for the treatment.

**Weight Difference:** The nurse will calculate the difference between the target/dry weight and the pre weight and record it here.

**Fluid Intake:** The nurse will record the anticipated oral, IV intake and NS flushes in the corresponding line.

**Rinseback:** The nurse will calculate the amount of saline required to initiate and discontinue the treatment and record it here.

**Subtotal:** The nurse will add weight diff., fluid intake and rinseback.

**Replacement/Fluid:** The nurse will calculate the amount of fluid replacement (if applicable) anticipated during the treatment.

**UF Goal:** The nurse will record the actual amount of fluid he/she plans to remove based on assessment.

**H. BLOOD/SPECIMENS:**

**Blood/Specimens:** The nurse assigned to the patient will record the bloodwork and/or specimens ordered for this treatment after reviewing the bloodwork requisitions, the special test sheet, Physicians Orders from dialysis and in-hospital patient charts. On completion of obtaining the specimens, the nurse will use a check mark to indicate that the specimens were obtained.

**Glucose:** The nurse filling out the treatment record will circle the required tests: Pre, Mid, Post. The nurse obtaining results will record them on the space provided.

**I. DISCHARGED:**

**Home:** The nurse signing release criteria will indicate with a check mark if the patient was discharged home.

**Unit:** The nurse signing release criteria will indicate if the patient was transferred to a ward or unit post dialysis with a specific location, such as ER, 3BU4 or
PROCESS:

different facility.

Meets Criteria: The nurse assigned to the patient at the time of discharge will initial that the release was based on nursing assessment and according to Manitoba Renal Program Policy. He/She will place their initials where indicated.

See Progress Note The nurse will indicate with a check mark if a Progress Note was required.

Report Given: The nurse giving report will initial here and may record the name of the ward nurse receiving report.

J. NEXT TREATMENT/REMINDERS:

Next Treatment Reminders: The nurse will place pertinent information regarding patient care that does not require a progress note but requires assessment/reminder for the next treatment.

SIDE TWO:

Name: The name of the patient will be written on the line provided.

Date: The date of treatment will be recorded, with the month, day and year.

Post Checks(to be completed at time of initiation):

i. SVS On: The nurse/DCT will initial that the SVS is on (green light is on) or document N/A if no SVS program is used.

ii. UF On: The nurse/DCT will initial that the UF is on (green light is on) or document N/A if no UF program is used.

iii. Dialysate Flow On: The nurse/DCT will initial that the dialysate flow is on.

iv. Heparin Line Open/On: The nurse/DCT will initial that the heparin line is open and that the heparin pump is running (green light is on) or document N/A if heparin free.

Time: Enter the time of each recording.

BP/HR: The actual vital signs will be recorded in the appropriate columns and the row corresponding to the time. If the nurse determines by his/her assessment respirations are abnormal for that patient, they may be recorded in the comments area.

Qb: The blood flow obtained from the home screen on the delivery system at the time vital signs are obtained and will be recorded in the appropriate column.

AP/VP: The arterial pressure and venous pressure will reflect the AP/VP obtained from the delivery system at the time vital signs are obtained and will be recorded in the appropriate column.

TMP/UF Rate: The transmembrane pressure and ultrafiltration obtained from the delivery system at the time vital signs are obtained will be recorded in the appropriate column.

UF Removal: The total amount of ultrafiltration removed in ml obtained from the home screen will be recorded in the appropriate column.
PROCESS:

Heparin Infused: The heparin amount infused as indicated on the heparin screen will be recorded in the appropriate column.

KECN: The last available KECN will be recorded in the appropriate column.

RBV: The RBV value as indicated when using the blood volume monitoring option will be recorded in the appropriate column.

Comments: The nurse/DCT who is administering the treatment to the patient will record necessary care given at the time to the patient.

Initial: The nurse/DCT obtaining vital signs recording on the treatment record must initial at the corresponding time care is given in the appropriate column. The nurse initialling the treatment record must assure that there is a corresponding signature on the Signature Sheet.

A. N/S FLUSHES:

Time: The nurse will indicate the times the N/S flush are to be initiated.

Volume of Flushes: The nurse will indicate the volume of saline used for the flush.

Comments: The nurse will provide comments as to the condition of the fibres in relation to clotting of the dialyzer, venous or arterial chambers.

Initial: The nurse administering the flushes will initial when a flush is completed.

B. TREATMENT/REMINDERS:

Treatment/Reminders: The nurse will indicate any special instructions or reminders to be followed up during treatment (i.e. One can Ensure during dialysis).

Wound and Skin Care: The nurse filling out the treatment record will indicate with a check mark in the “yes” or “no” boxes if skin care or dressings are required as per the Kardex.

Bloodwork Review Done: The nurse will indicate with a check mark in the “yes” box once this is done.
OBJECTIVE:

1. To provide the multidisciplinary team with the ability to:
   i. Trend changes in the dialysis prescription over prolonged periods of time.
   ii. Trend the patient response to treatment and relating such responses to changes in prescription.
   iii. Trend variables within the treatment modality.
   iv. Monitor trends in patient’s weights and vital signs.
   v. Develop a permanent record of patient’s treatment and Heparin regime.

STANDARDS:

1. During and on completion of each treatment, the assigned nurse will transcribe the required information on to the Hemodialysis Flow Sheet.

2. The Hemodialysis Flow Sheet will include an accurate record of a total of 24 Hemodialysis Treatments.

3. All entries will be documented in ink.

4. The Unit Clerk will maintain one blank, addressographed form in the front of the Hemodialysis Flowsheet section of the patient’s chart.

5. Any nurse, who places his /her initials on this document, will then place their signature on the Renal Signature Sheet.

6. The initial column will be written in full. All subsequent entries may be indicated with a check mark where when data remains the same.

PROCESS:

1. Date: The nurse will indicate the date of each treatment entry. The month, day, and year must be indicated.

2. Unit of Treatment: The unit the patient is dialyzing in will be designated (i.e. SCDU, CDU, SOGH, SBGH, BRHC, etc.). If in-patient, may indicate unit of admission.
PROCESS:

3. **Vascular Access:** The nurse will indicate the vascular access used for that treatment using the key provided on the sheet.

4. **D.V.P 200 Qb:** If the access used is an AV Graft, the nurse will indicate the Dynamic Venous Pressure measured in the first 2-5 minutes of the treatment at a Qb of 200 ml/min.

5. **QB (Average):** The nurse will indicate the approximate average of the blood flows achieved during the treatment.

6. **Dialyzer:** The nurse will indicate the prescribed dialyzer.

7. **Dialysate Temp:** The nurse will record the prescribed dialysate temp.

8. **Dialysate:**
   - K⁺: The nurse will record the prescribed value of K⁺
   - Ca²⁺: The nurse will record the prescribed value of Ca²⁺

9. **Fluid Profiling:** The nurse will indicate which profile was used with the corresponding number or a / if not done.

10. **SVS Profile:** The nurse will indicate which profile used: “Lin, Exp, Step” or a / if none.

11. **Plasma Na (Pre):** The nurse will indicate the Pre Plasma Na recorded in the OLC data.

12. **SEQ. U/F:** The nurse will indicate the actual litres of fluid removed during sequential U.F. or / if not done. Prescribed hours of diffusion may be recorded here.

13. **Hours Diffusion:** The nurse will indicate the actual hours of diffusion time.

14. **Weight:**
   - **Dry:** The nurse will indicate the patient’s prescribed dry weight.
   - **Target:** The nurse will indicate the targeted weight for that treatment if different from dry weight or “/” if the same.
   - **Pre/Post:** The nurse will indicate the actual pre and post dialysis weights.

15. **Total U/F:** The nurse will indicate the UF goal amount.

16. **Heparin:** The nurse will indicate the total Heparin infused in mls. during the treatment, including Heparin Prime or a “HF” if patient Heparin Free.

17. **Blood Processed:** The nurse will indicate the total amount of blood processed during that treatment.

18. **Final Kt/V:** The nurse will indicate the single pool delivered Kt/V in the OLC data.

19. **Final RBV%:** If the BVM is used, the nurse will indicate the last RBV% value displayed at the end of the treatment or “/” if not done.

20. **PRE:**
    - **BP Supine (or sitting); BP Standing; Pulse; Temp/Resp:** The nurse will document actual Pre Hemodialysis Vital Signs in corresponding boxes. All Vital Signs will be assessed by the nurse and only indicate a / if not done and a corresponding Progress Note to indicate why not done, the first treatment. For example if patient is a double below knee amputation, standing BP will indicate a / and a note will be written in the Progress Note to indicate standing BP unable to be obtained for this reason.
PROCESS:

21. POST:
BP Supine (or sitting); BP Standing; Pulse; Temp; Resp:
The nurse will indicate the actual Post Hemodialysis Vital Signs in corresponding boxes. All Vital Signs will be assessed by the nurse and only indicate a / if not done and a corresponding Progress Note to indicate why not done the first treatment. For example if patient is a double below knee amputation, standing BP will indicate a / and a note will be written in the Progress Note to indicate standing BP unable to be obtained for this reason.

22. Glucose Pre/Post:
The nurse will record the pre and post blood glucose of the patient if taken. If not done mark box with “/”.

23. Initials:
The nurse assigned to the patient will be responsible for ensuring the flowsheet is complete and initialed.
OBJECTIVE:

To outline the current care plan for standard and individual care requirements for the hemodialysis patient.

The Nurse and Unit Clerk will document and maintain pertinent information on the Kardex using the standards set by the Manitoba Renal Program and the Kardex will become a mobile document to be used by the renal care team at the patient’s home unit as well as any dialysis unit within the provincial program receiving the patient either temporarily or permanently.

STANDARDS:

1. The Renal Kardex is initiated when a hemodialysis patient is deemed chronic.

2. The addressographed Kardex is kept in front of the patient’s dialysis chart or in designated binder as per unit policy.

3. The Kardex is to be reviewed by the Nurse assigned to the patients for that treatment and used to transcribe treatment orders to the hemodialysis treatment record.

4. The Kardex will be updated as necessary.

5. All sections of the Kardex will be completed in pencil unless otherwise indicated.

6. The information on the Kardex will be reviewed by the nurse every 3 months or whenever a transfer occurs.

PROCESS:

A. ADDRESSOGRAPH SPACE:

1. The Unit Clerk will addressograph the Kardex for all chronic hemodialysis patients and place in front of the chart.

B. CODE BLUE STATUS:

1. The Unit Clerk/Nurse will transcribe the resuscitation level from the resuscitation level record. If the facility doesn’t use such a form, “No Code” or “Full Code” can be used. If the resuscitation status has not been ordered by a physician, leave the corresponding blank. Upon transferring patient to another facility, resuscitation status must be reviewed to reflect the receiving facilities guidelines.
C. **ISOLATION:**
   1. The Nurse/Unit Clerk will write the type of isolation and reason for isolation.

D. **ALLERGIES:**
   1. All allergies will be written in red by the Nurse/Unit Clerk and if unknown - NKA written in the area.

E. **MEDICAL/SURGICAL HISTORY:**
   1. The Nurse/Unit Clerk will write in pen the primary diagnosis if known.
   2. The Nurse/Unit Clerk will write in pen the patient’s medical and surgical history.

F. **DIALYSIS HISTORY:**
   1. The Nurse/Unit Clerk will write in pen the place, type and date of first treatment.
   2. The date and receiving unit will be written in pen by the Nurse/Unit Clerk of any permanent transfers of patients that occur between HSC, SBGH, Home Dialysis, MLCDP SOGH, BRHA and Peritoneal Dialysis Program.

G. **DIET:**
   1. The patient’s diet and fluid restriction will be written once assessed by the Dietician.
   2. The volume of the 24 hr urine will be written along with the date of collection.
   3. Record patient height on initiation of dialysis.
   4. The patient’s initial weight on entry to the program will be recorded.

H. **TRANSPLANT:**
   1. The Nurse/Unit clerk will check “yes” or “no” in pen whether the patient has had a previous transplant.
   2. The Nurse/Unit Clerk will check “yes” or “no” in pen whether the patient is a transplant candidate.
   3. The Nurse and/Unit Clerk will check “yes” or “no” if the patient is on the transplant ready list.

I. **TRANSFUSION INFORMATION:**
   1. The Nurse/Unit Clerk will fill in the date of the last transfusion.
   2. The Nurse will indicate any blood reactions with a “yes” or “no”; if “yes” document in patient’s chart.
   3. The Nurse/Unit Clerk will indicate any known antibodies in pen.

J. **APPOINTMENTS/CONSULTS:**
   1. The Nurse/Unit clerk will indicate in “yes” or “no” box if PD consult has been completed.
   2. The Nurse/Unit Clerk will indicate if patient is candidate in “yes” or “no” box.
   3. The date of the last chest X-Ray and last EKG will be recorded.
   4. All upcoming appointments/consults will be recorded in the remaining space.
K. **DEMOGRAPHICS:**

1. The address and phone number of the patient will be filled in by the Nurse/Unit Clerk/Social Worker, immediately upon initiation of hemodialysis.

2. The name, address and phone number of the patient's next of kin will be filled in by the Nurse/Unit Clerk/Social Worker upon initiation of hemodialysis.

3. The name of the patient's family physician will be filled in by the Nurse/Unit Clerk.

4. The name of the pharmacies, their phone numbers and fax numbers will be filled in by the Nurse/Unit Clerk.

5. Transportation method, pickup time, and phone number will be written by the Nurse/Unit Clerk.

6. The primary language, interpreter will be filled in by the Nurse/Unit Clerk/Social Worker if applicable.

7. The treaty status will be filled in by the Nurse/Unit Clerk/Social Worker if applicable.

8. The Employment Income Assistance program number will be filled in by the Nurse/Unit Clerk/Social Worker if applicable.

9. Home Care services will be indicated by a "yes" or "no" check along with the name and phone number of the case coordinator or nurse.

L. **VACCINATIONS:**

1. The Nurse/Unit Clerk will write the dates of the complete hepatitis B series as scheduled.

2. The Nurse will record the date on the corresponding "given" line when the vaccination is given.

3. If a Booster dose is ordered, the date ordered and date given will be recorded.

4. The Nurse/Unit Clerk will transcribe the results and date of the Hepatitis screen as per policy.

5. The date of the last influenza vaccine will be recorded if applicable.

6. The date of the last two pneumococcal vaccines will be recorded if applicable.

M. **MISCELLANEOUS:**

1. The date of the Mantoux test will be recorded along with the result.

2. Record the date of the last I.V. Iron dose as necessary.

N. **NAME:**

1. Record the name of the patient.

O. **DIALYSIS PRESCRIPTION:**

1. The Nurse/Unit Clerk will transcribe the treatment schedule by circling the treatment days and time.

2. The Nurse/Unit Clerk will transcribe the dialyzer prescribed.

3. Indicate the number of diffusion hours and sequential ultrafiltration time on the appropriate line.

4. The Nurse/Unit Clerk will transcribe the prescribed K⁺, Ca ++, glucose and bicarbonate levels of the dialysate.

5. Transcribe SVS including starting Na⁺, base Na⁺, and SVS program time in hours.
6. The Nurse/Unit Clerk will transcribe the UF profile(s) used.

7. The dialysate flow rate and temperature will be transcribed on the appropriate line.

8. Record the calculated urea distribution volume on the Urea volume line and date of calculation. This should be reviewed annually and PRN.

9. Record the patient’s target KT/V.

P. ANTICOAGULATION:

1. The Nurse/Unit Clerk will indicate with a “yes” or “no” check if Heparin is given during treatment. If “no” the reason why and a date of reassessment if applicable will be indicated.

2. If flushes required the Nurse will check “yes” and indicate the frequency.

3. The Nurse/Unit Clerk will transcribe the heparin prime, hourly infusion rate in mls., and infusion time in hours.

4. Next to “Other”, the Nurse/Unit Clerk will transcribe any orders for anticoagulation other than Heparin if applicable.

5. The Nurse will chart the baseline ACT with the date and corresponding target ACT per facility policy.

Q. VASCULAR ACCESS:

1. The Nurse will indicate with a check (✓) if patient’s has either AVF or AVG and write the location.

2. The Nurse will indicate the type and size of needles used.

3. The Nurse will indicate the type of local anaesthetic if required by the patient.

4. The type of site care that is specially indicated for the patient i.e. Chlorhexidine, no povidone, Mefix.

5. The Nurse will indicate the type of bandage used post treatment for hemostasis and the time required to hold if greater than 10 minutes.

6. The Nurse/Unit Clerk will write the date fistula created and surgeon’s name.

7. The Nurse will write target date for possible first use of fistula.

8. The Nurse will draw a diagram of fistula using operative record if available and indicate flow path.

9. The Nurse will identify problem areas of fistula and write any helpful comments under comments section.

10. The Nurse will indicate the location of the catheter and with a check (✓) whether temporary or permanent. If second central line access present record in comments section.

11. Indicate the type of dressing and schedule for change.

12. The Nurse/Unit Clerk will process heparin instillation orders and date ordered. If instillation other than Heparin used, indicate next to “Other” i.e. Citrate, TPA.

R. FLUID MANAGEMENT:

1. The Nurse/Unit Clerk will transcribe ordered dry weight along with the date.

2. Indicate the rinseback volume.
3. The Nurse/Unit Clerk will record any the weight deductions, i.e. shoes, wheelchairs etc.

S. BLOOD SPECIMENS:

1. The Nurse/Unit Clerk will indicate frequency of glucose monitoring if applicable by circling appropriate intervals.

2. If patient on Coumadin therapy, indicate INR due date.

3. If other reoccurring non-routine tests ordered, indicate next to “Other”, i.e. Digoxin level q2weeks.

4. Required monthly lab work as per unit policy or non-reoccurring blood work, i.e. Phosphate level in 2 weeks.

T. WOUND MANAGEMENT:

1. Any skin and wound problems will be identified and dated. The date to be reassessed will be indicated.

2. Treatments for each problem will be written whether they are done at home or in the dialysis unit. Wound care instructions will be documented if done in unit.

U. TREATMENT REMINDERS/PATIENT CARE ISSUES:

1. The nurse will indicate any special instructions or reminders to be followed up during treatment (ie. One can Ensure during dialysis).

2. The nurse will indicate any specific patient care issues that need follow-up.
**MANITOBA RENAL PROGRAM**

<table>
<thead>
<tr>
<th>SUBJECT</th>
<th>CODE</th>
<th>EFFECTIVE DATE</th>
<th>REVISION DATE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hemodialysis Signature Sheet Standard</td>
<td>60.10.04</td>
<td>July 2003</td>
<td>June 2010</td>
</tr>
</tbody>
</table>

**AUTHORIZATION**

- Professional Advisory Committee, Manitoba Renal Program

**OBJECTIVE:**

1. To provide a space in the dialysis chart for the initials printed names, signatures and classifications of all health care providers documenting in the chart. Once their printed name and full signature is documented on the sheet; the health care providers may identify themselves by use of initials on dialysis worksheets and flow charts.

**STANDARDS:**

1. An Addressographed Signature Sheet will be at the front of each patient’s chart.

2. Each health care provider shall sign for patient care given with his or her initials. They shall document their initials, printed name, a full signature and classification on the signature sheet.

3. Each signature will be dated to indicate when the signature was added to the sheet.

**PROCESS:**

1. Unit Clerk will maintain an addressographed form on the dialysis chart.

2. The health care providers will document the date, their initials, printed name, signature and title the first time they document their initials to chart care provided.
MANITOBA RENAL PROGRAM

SUBJECT
- Hemodialysis Renal Medication Flow Sheet Standard

SECTION 60.10 Standards

CODE 60.10.05

AUTHORIZATION
- Professional Advisory Committee, Manitoba Renal Program

EFFECTIVE DATE May 2005

REVISION DATE June 2010

OBJECTIVE:

1. To ensure that the total medication profile is available in the Dialysis record on one flow sheet. This flow sheet will include both the In-Unit and Out-patient medications, as well as medications prescribed by a non-dialysis physician.

2. To decrease the possibility of medication errors.

3. To ensure medications are prepared and administered as ordered by the physician.

4. To trend any medication changes as they are ordered.

STANDARDS:

1. Addressographed Renal Medication Flow Sheets will be on each patient’s chart at the front of the Medication Section.

2. The Renal Medication Flow Sheet will be kept in the patient’s chart for five years.

3. Allergies will be recorded in red ink by the Nurse/Unit Clerk and if unknown NKA written in the area.

4. All current medications, In-patient, Out-patient including medications prescribed by non-dialysis physicians will have their dose, frequency and route listed on the Renal Medication Flow Sheet and co-signed by the Unit Clerk/Nurse processing the order (with the exception of stat and single dose medications, dialysate bath, vaccines, and PRN medications taken from the dialysis standing orders and given in dialysis). Anticoagulation therapy will be included on form with dosage information recorded on separate document i.e. Coumadin.

5. The Unit Clerk/Nurse will use an asterisk (*) placed below the date column, when transcribing the orders to indicate a drug review has been completed by the physician/pharmacist.

6. The nurse/pharmacist reviewing the medications with the patient will note on the Renal Medication Flow Sheet all discrepancies with medications taken by the patient. Any discrepancies should be reviewed with the pharmacist.

7. With each new addition of a column due to a new medication order, a medication review, or comments requiring medication clarification, a check off (√) below the date column next to the appropriate medication will be used to indicate that the nephrologists has not made any changes to that medication.
8. Medications taken by the patient will not be put on hold. The physicians will write a discontinue order for these medications.

9. The Unit Clerk/Nurse will draw a straight line through the discontinued medication order and write D/C in the corresponding space in relation to the date the medication was discontinued.

10. If medication profile exceeds allotted spaces on first page, continue profile on next available page (form is double-sided) and indicate page___ of ____ of current medication.

11. Once last column of form is utilized Nurse/Unit Clerk will recopy the Renal Medication Flowsheet with current medication information only.

12. Any change to medication orders or recopying of flowsheet will require an initial(s) as per facility policy in corresponding column.
OBJECTIVE:

1. To provide a single record of all vascular access sites, problems, interventions, outcomes and flow status for each hemodialysis patient in the Manitoba Renal Program.

2. To assist nephrologists, vascular surgeons, nurses and vascular access coordinators in the management of hemodialysis patients with regards to vascular access.

STANDARDS:

1. The Vascular Access Record will remain in the Manitoba Renal Program hemodialysis chart and not be “thinned” and sent to Medical Records.

2. The record will initiated at the point of entry into the hemodialysis program which may include the Renal Health Outreach Clinic.

3. The events that are to be recorded on the record will include: access creation, date of first use, significant problems as listed, surgical or radiological investigations or interventions, outcomes and recirculation values and/or access flow rates per facility policy.

4. The nurse responsible for the care of the patient at the time of the event or when a report is received, will record the information.

5. Each event will require a separate entry with a date and an initial in the corresponding column with the exception of the “date of first use” entry.

PROCESS:

A. ADDRESSOGRAPH SPACE:

1. The Unit Clerk will addressograph the Vascular Access Record for all chronic hemodialysis patients and place in the “Vascular Access” section of the chart.

B. DATE OF ENTRY/INITIALS:

1. The nurse will record the date of the event and enter initials in the space provided.
PROCESS:

C. ACCESS:

1. The nurse will record the description of the access by indicating the side; the site (using arterial and/or venous description); and type of fistula using anatomical description (e.g. Rt brachio-cephalic) or brand, length and type of central line (e.g. Rt IJ 19 cm Optiflow Perm). The entry for a new access will be recorded in red ink. Entries should all insertions including over the wire line changes.

D. PHYSICIAN INSERTING ACCESS/DATE:

1. The nurse will record the name of the physician performing surgery or procedure to insert create or revise the access along with the date in the space provided.

E. DATE OF FIRST USE:

1. The date of first use for each new access will be recorded using the same row as the recording of the access creation.

F. RECIRCULATION/ACCESS FLOW:

1. The recirculation studies results and/or access flow results will be recorded as per facility policy.

G. PROBLEM:

1. Using the corresponding number from the problem list on the document, the nurse will indicate any significant new problem affecting the integrity of the access or the efficacy of dialysis.

2. Definitions:

   i. Access aneurysm – the appearance of an aneurysm or pseudo-aneurysm on a graft or fistula on clinical assessment or fistulagram.

   ii. Inadequate flow – three or more treatments with inadequate QB and/or radiological evidence of poor fistula maturation.

   iii. Clotted AVF/AVG – absence of bruit and thrill.

   iv. Prolonged hemostasis – post-treatment hemostasis requiring greater than 15 minutes of compression for three consecutive treatments.

   v. Signs of infection – clinical signs of infection at any access site confirmed by physician diagnosis.

   vi. Steal syndrome – continuous signs of numbness, coolness or tingling with diagnosis confirmed by vascular surgeon.

   vii. Swelling hand/arm – sudden or gradual, unexpected swelling of fistula limb or post surgical swelling that does not diminish by 4-6 weeks.

   viii. CL patency – three or more treatments in two weeks requiring thrombolytic intervention.

   ix. Increased VP/DVP – increased venous or dynamic venous pressures with three consecutive treatments.

   x. Other - describe – Any significant vascular access problem not described above.

H. ACTION:

1. Using the corresponding number from the action list the nurse will record the action(s) taken.

2. Definitions:

   i. Angiogram – includes all radiological studies e.g. fistulagram, venogram, permacathogram.
PROCESS:

ii. **Angioplasty** – all angioplasty interventions with or without stent insertion.

iii. **Antibiotics started** – initiation of antibiotic therapy for infection related to access.

iv. **CL insertion** – any new central line insertion including new site or over guidewire.

v. **Removal of access** – all access removal including central lines, grafts and fistula ligation.

vi. **Surgical intervention** – any operative procedure to improve patency of any access.

vii. **Thrombolytic** – instillation of any thrombolytic agent.

viii. **Thrombectomy (Rad/Surg)** – any procedure to restore patency of fistula (specify if done radiology or surgery).

ix. **Vascular consult** – to indicate the initiation of a vascular surgery consult.

x. **Other** - describe – any significant intervention not described above.

I. **RESULTS OF ACTION/COMMENTS:**

1. The nurse will briefly describe the outcome of the action taken. This will include results of diagnostic imaging. The nurse may also use this space to explain data recorded in any of the other columns. If additional space required a Progress Note/Nurses Note may be also used. When recording central line insertion, include Lot # if known.
PURPOSE/BACKGROUND:

1. To provide a communication record between Manitoba Renal Program and Long Term Care facilities to ensure safety and continuity in patient care.

INITIATION:

1. This Manitoba Renal Program and Long Term Care Communication Record (WRHA Form # W-00273, # WR-16, and # CL0065-5) is initiated when a resident of a long term care facility receives renal replacement therapy requiring repeated transfers to a Manitoba Renal Program facility.

DEFINITIONS:

1. Not applicable.

USE OF THIS FORM

1. A reciprocal communication record used by nursing staff at each facility involved in a patient transfer.

COMPLETION

1. The sending LTC facility will ensure the record is stamped with the patient’s addressograph. When an addressograph is not used, the upper right hand corner of the form will be completed with the following information: Patient’s Surname and Given Name, Date of Birth, Manitoba Health Card Registration Number, Personal Health Identification Number (PHIN), Facility Health Record Number.

2. The LTC facility will complete PART 1 and fax the record to the receiving Manitoba Renal Program facility prior to transferring a patient:
i. **Unit/Facility** will be identified on the line provided.  
   **Exception:** Sending sites using Communication Records with a pre-printed site Logo will identify the Unit only.

ii. **Visit Date** will be identified on the line provided.

iii. **Changes Since Last Dialysis Treatment:**
   a. The nursing staff will provide and document patient status in the following categories:
      - Change in vascular access
      - Level of consciousness, vital signs, prolonged bleeding
      - Lab work or x-rays/imaging done with new findings
      - New Physician Orders
      - Transferred to Acute Care facility
      - Other (specify)
   b. An explanation shall be documented on the lines provided in this section each time an affirmative response is given in the check boxes provided.

iv. **Record of Documentation Included:**
   a. With each affirmative response in the provided check box the nursing staff will provide copies of documents in the transfer package in the following categories:
      - Medication Administration Record / Pyxis Medication List (include for each medication change)
      - Updated Advance Care Plan
      - Other (specify)
   b. An explanation shall be documented on the lines provided in this section each time an affirmative response is given in the check boxes provided.
   c. Other relevant documentation to enhance communication in providing safe patient care shall be included using the “other” check box.
   d. In the event where there is a significant change in the patient’s status, relevant portions of the health record will be faxed as supplemental information to that provided on the completed Communication Record.

v. **Nurse’s Signature, Printed Name, and Date Completed:**
   a. The Long term Care nurse’s signature and printed name and the date the form is completed are required on the lines provided.

3. The Manitoba Renal Program facility will complete **PART 2** and fax the form back to the LTC facility prior to transferring a patient:

i. **Unit / Facility** will be identified on the line provided.

ii. **Dialysis information:**
   a. The nursing staff will provide and document patient status in the following categories:
      - **# Hours** – line provided for documentation of the dialysis treatment length
      - **Dialyzer** – line provided for documentation of dialyzer type used
      - **Access** – line provided for documentation of dialysis access type
      - **Dry weight** – line provided for documentation of patient’s prescribed ideal weight
      - **Heparin** – check yes if administered or no if not
      - **Dialysate Solution** – line provided for documentation of K\(^+\) = Potassium level in mmol/L and Ca\(^+\) = Calcium level in mmol/L levels in the dialysate solution
      - **Vital Signs** - lines provided for documentation of Pre and Post Dialysis Treatment Weight, Temperature, Blood Pressure, Heart Rate
      - **Blood sugar** - line provided for documentation of Pre and Post Dialysis Treatment Blood sugar levels
      - **Blood work** - line provided for documentation of specific blood work drawn and sent for testing
      - **Blood products** – line provided for documentation of blood products administered during dialysis treatment
- **Antibiotics** - line provided for documentation of antibiotics administered during dialysis treatment
- **Blood cultures** – check yes if drawn or no if not

b. The nursing staff will provide details in the following categories:
   - Nephrologist consulted due to new issues and the Nephrologist’s name will be identified on the line provided.
   - New Physician Orders
   - Concerns

An explanation shall be documented on the lines provided in this section each time an affirmative response is given in the check boxes provided.

### iii. Record of Documentation Included:

a. The nursing staff will provide copies of documents in the transfer package in the following categories:
   - Medication Administration Record (include for each medication change)
   - Other (specify)

b. Other relevant documentation to enhance communication in providing safe patient care shall be included using the “other” check box. Any changes to the patient’s hemodialysis appointment times or locations shall be documented in this space as well.

c. An explanation shall be documented on the lines provided in this section each time an affirmative response is given in the check boxes provided.

d. In the event where there is a significant change in the patient’s status, relevant portions of the health record will be faxed as supplemental information to that provided on the completed Communication Record.

### iv. Nurse’s Signature, Printed Name, and Date Completed:

a. The Dialysis nurse’s signature, printed name and the date the form is completed are required on the lines provided.

### ROUTING/FILING OF COMPLETED COMMUNICATION RECORD:

i. The completed Communication Record will be faxed by the Dialysis Unit staff to the Sending Facility at the time the patient is being transferred back to the facility.

ii. The faxed completed Communication Record will replace the original form initiated by the Long Term Care site and will be filed the Progress Notes section of the Long Term Care facility health record.

iii. The Communication Record form initiated by the Long Term Care site and completed by the Dialysis Facility will be filed in the Progress Notes section of the Manitoba Renal Program facility health record.
This document reflects the current best practice plan for chronic dialysis vascular access in Manitoba. It is based upon information from the American National Kidney Foundation DOQI (Dialysis Outcomes Quality Initiative) consistent with recommendations from the Clinical Practice Guidelines developed by the Canadian Society of Nephrology (CSN), and input from members of the working group.

1. Access Type:
   - Access of choice is an autologous primary arterio-venous fistula (AVF) (radial-cephalic or brachio-cephalic). All patients with Serum Cr > 400 (Creatinine Clearance 15-20 mL/min) not definitively for Peritoneal Dialysis (PD) should have an AVF created. It should not be used for at least 1 month. If not developed after 8 – 12 weeks, a fistulogram should be considered.
   - Second choice is a transposed-basilic vein fistula.
   - Third choice is an arterio-venous graft (AVG) (either forearm looped brachial cephalic graft or upper arm straight graft) which should not be created greater than 6 weeks before it is needed. The graft should not be used until at least 2 weeks after placement and/or until swelling has subsided sufficiently to palpate the course of the graft.
   - The surgeon will provide a diagram for the dialysis record.
   - Tunneled Internal Jugular (IJ) catheters:
     - Only use if AVF or AVG not an option or high risk for limb ischemia.
     - If hemodialysis is required imminently, but not urgently (i.e. > 48 hours) and not a PD candidate; a plan for both tunneled catheter insertion and AVF creation should be made to allow adequate time for maturation of AVF.
     - If not a candidate for an AVF or AVG, should have tunneled catheter as primary access.
     - For a “bridging” access awaiting maturation of AVF, this may be a tunneled or non-tunneled catheter. Although the literature suggests tunneled catheters may be preferable, the utilization of particular non-tunneled catheter types may allow for better clearances. However, if maturation of AVF is anticipated to be protracted, a tunneled catheter should be used. If a tunneled catheter is inserted, this should be created in conjunction with AVF.
     - Tunneled catheter placement must be confirmed by diagnostic imaging.
     - Subclavian vein should only be used as last resort for temporary access.
   - If non-tunneled catheters are used:
     - A right IJ is the site of choice followed by left IJ.
     - Femoral catheters may be used if urgent for acute renal failure patients (and less than 3 weeks) or chronic as last resort.
     - Subclavian vein should only be used as last resort as a permanent access.
     - Non-tunneled catheter placement must be confirmed by diagnostic imaging excluding femorals.
2. Access Coordination:

- **Renal Health Clinics:**
  - All patients with Serum Creat equivalent > 400 umol/L not destined for a living related donor transplant or PD will be referred to Vascular Surgery. The surgeon will identify an arm (preferably non-dominant) for vascular access (AVF or AVG).
  - The patient should be instructed to protect arm from venipuncture and blood pressure measurement. Patient should have a Medic-alert bracelet.

- **Patients requiring urgent dialysis:**
  - If dialysis needed urgently (< 48 hour) or acute patient:
    - HSC – Interventional Radiologist will be available to introduce a non-tunneled jugular or femoral catheter provided by the dialysis program. If Interventional Radiologist not available, Nephrology will organize insertion.
    - SBGH/SOGH – Ultrasonographer will be available to introduce a non-tunneled jugular catheter provided by the dialysis program. If Ultrasonographer not available, Nephrology will organize insertion. SOGH catheter insertions will be done at SBGH.
    - BRHC – Radiologists under ultrasound guidance will insert all non-tunneled catheters at any time including weekends.

- **Patient list:**
  - Each site will maintain a prioritized list of patients requiring vascular access procedures.

- **Admissions:**
  - If necessary, the patient will be admitted under Vascular Surgery if access is the exclusive reason for admission or Medicine if no surgical bed.
  - All co-existent or new medical problems will be managed by Nephrology including transfer to Medical service if necessary.

3. Access Screening:

- **Preparatory (pre-insertion) Venography** is indicated when:
  - Edema or collateral veins in extremity for planned access.
  - Differential extremity size or previous trauma or surgery in venous drainage of planned access.
  - Current or previous subclavian catheter or transvenous pacemaker in ipsilateral arm.
  - Multiple previous accesses.
  - Duplex venous mapping should be done if contrast contraindicated (i.e. Renal Health).
  - If patient has clinically poor veins.

- **Renal Health patients** may have venography ordered using gadolinium.

- **AVF or AVG:**
  - Access surveillance should be done with early and prompt intervention.
  - A combination of non-invasive measures including:
    - physical exam,
    - access flow,
    - re-circulation measurements,
    - Dynamic Venous Pressures Monitoring (DVPM),
    - trended measured dose of hemodialysis.
  - Abnormal findings will be documented.
  - If there are three consecutive treatments with abnormal findings these will be reported to Nephrology and a fistulogram requested.
  - If in the opinion of Radiology the stenosis is amenable to angioplasty, said angioplasty will be arranged by Radiology either immediately or as soon as possible.
  - Angioplasty failure will be referred to the Vascular Surgeon by Interventional Radiologist.

- **Catheters:**
  - Non-functional or Qb < 250 that are decreasing will be treated with local thrombolytic per current protocol.
  - **Tunneled Catheter:** If thrombolytic therapy is required for 3 consecutive treatments, a permacathogram may be performed. Alternative treatment options include in order of preference:
    - Catheter change over guidewire: with or without sheath plasty
    - Catheter stripping
    - Warfarin low dose
  - **Non-tunneled Catheter:** After thrombolytic instillation on 2 consecutive treatments, Nephrology will arrange the catheter change over guidewire.

4. Clotted Access:

- Invasive Radiology and Vascular Surgery consulted immediately for urgent angiography and angioplasty.
- See algorithm – individual sites may modify to include specific individuals.
**ALGORITHM FOR THROMBOSED VASCULAR ACCESS**

**AUTOLOGOUS AV FISTULA**

- Notify Nephrologist
- Notify Vascular Surgeon to determine viability

If not viable, plan new permanent access plus:
* Non-tunneled IJ or femoral catheter OR
* Tunneled catheter

**TUNNELED CATHETER**

- Local thrombolytic therapy
- If fails, notify Nephrologist*
  - If fails, notify Vascular Surgeon to change catheter

**AV GRAFTS**

- First 6 weeks
  - Notify Nephrologist* & Vascular Surgeon
- After 6 weeks
  - Notify Nephrologist* & Vascular Surgeon
    - Before 1700
      - Unit notify Invasive Radiologist immediately
    - After 1700 & weekends
      - Unit notify Invasive Radiologist the next weekday morning

* If unable to immediately correct access, the nephrologist will determine the urgency of dialysis. Organization of access and type will be site dependent.
PURPOSE:

1. To ensure routine blood samples are collected on all renal patients who are potential candidates for transplantation and the blood samples are sent to the Transplant Immunology Laboratory where the blood will be tested for the presence of anti-Human Leukocyte Antigen (HLA) antibodies.

2. To ensure post blood transfusion blood samples are collected on all renal patients who are potential candidates for transplantation (even if not on the "Ready" transplant list) and the blood samples are sent to the Transplant Immunology Laboratory where the blood will be tested for the presence of anti-HLA antibodies.

KEY POINT:
Blood transfusions expose the recipient to the HLA antigens of the blood donor. If there are differences between the blood donor and the renal patient’s HLA antigens, then the renal patient may develop an antibody 14 days after exposure to the blood transfusion against the blood donor’s HLA antigens. If patients are being prepared for transplantation, the Transplant Immunology Laboratory tests for the presence of these antibodies. If a kidney becomes available through organ donation, the renal patient’s serum is checked for antibodies against the organ donor’s HLA antigens. This is called a cross-match.

POLICY:

1. The Transplant Immunology Laboratory Requisitions are sent out by Transplant Manitoba monthly or quarterly to the renal units for all patients who are on the transplant waiting list in order that serum samples are drawn and the samples are delivered to the Transplant Immunology Laboratory. Transplant Manitoba will mail these requisitions to those patients not on hemodialysis.
   - Monthly blood samples are collected on patients considered “Ready”, “Almost ready” & “Living Related Donor” on the transplant wait list.
   - Quarterly blood samples are collected on patients considered “Not ready Q1” & “Not ready Q3” on the transplant wait list.

2. All blood samples for the HLA antibody must be drawn peripherally whenever possible.

KEY POINT:
Samples from hemodialysis central line accesses yield unreliable results.
POLICY:

3. As indicated on the Immunology Lab Requisition # NS00288, the sample requirement for the HLA Antibody Screen is 1 x 8.5 or 9 mL SST serum tube. This is the routine requirement for patients on the Manitoba Renal Transplant List.

However, patients on additional waiting lists (e.g. Toronto, Minneapolis) require 3 x 8.5 or 9 mL SST serum tubes.

KEY POINT:

If these tubes are not available and it is necessary to use an alternate tube please ensure the amount collected is a minimum of 8.5 mL. All serum tubes that contain SST gel are acceptable replacements (e.g. red or gold top tubes). See the following table for equivalent numbers of tubes.

<table>
<thead>
<tr>
<th>Tube Requirements</th>
<th>Equivalent Tubes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 x 8.5 mL SST serum tube</td>
<td>2 x 5 or 6 mL serum tube</td>
</tr>
<tr>
<td>3 x 8.5 mL SST serum tube</td>
<td>6 x 5 or 6 mL serum tube</td>
</tr>
</tbody>
</table>

4. The serum tube should be labelled with a DSM Transplant Immunology Lab label.

5. The patient is at highest risk to develop an anti-HLA antibody **14 days following a blood transfusion**. It is important the sample **not be drawn prior** to 14 days, as the antibody may not be detectable. Similarly, the antibody may be transient and it is therefore important to draw the blood sample between 14 – 18 days. To ensure the blood samples are collected correctly the following steps must be taken:

   - When transfusing a unit of blood to a renal patient, the nurse must check whether the patient is a potential transplant recipient or not.
   - If the patient is on the transplant waiting list, the Recipient Coordinator must be notified by phoning the office and leaving a voice message noting the name of the patient and date of the blood transfusion.
   - The Recipient Coordinator will notify the lab that a post-transfusion sample is to be expected in 14 days. This will ensure a crosscheck is in the system.
   - The date of transfusion must be noted in the chart.
   - A Transplant Immunology Lab Requisition must be put on the chart for a serum sample to be drawn 14 days after the transfusion.
   - On the requisition, the nurse must note that this is a post-transfusion sample by checking the appropriate box labeled “post-transfusion sample”.

REFERENCES:

Information obtained from Transplant Lab at Canadian Blood Services in 2008.
PURPOSE:

1. To provide guidelines for Hepatitis B and Hepatitis C screening and Hepatitis B vaccination in patients with chronic kidney disease (CKD).

POLICY:

1. All patients with serum creatinine > 200 umol/L should be screened for Hepatitis B surface antigen, Hepatitis B antibody, and Hepatitis C antibody.

2. Patients should be screened for Hepatitis B surface antigen, Hepatitis B antibody, and Hepatitis C antibody prior to starting dialysis. Results of Hepatitis B virus testing should be known before the patient begins dialysis.

3. Hepatitis B vaccination is recommended for all patients who are susceptible to Hepatitis B (see under "Hepatitis B Screening"). The vaccine should be administered before the patient becomes dialysis-dependent, as response rates to the vaccine are better earlier in CKD. There is no vaccine available for Hepatitis C.

4. Patients with temporary acute renal failure should be screened for Hepatitis B and Hepatitis C as above when they begin dialysis. Patients with acute renal failure do not require Hepatitis B vaccination.

5. All patient Hepatitis screening results should be monitored and recorded in a designated section of the health record and in a designated log book.

DEFINITIONS:

- HBsAg: Hepatitis B surface antigen
- Anti HBs: Antibody to Hepatitis B surface antigen (also called HBsAb)
- Anti HCV: Antibody to Hepatitis C virus
- ALT: Alanine Aminotransferase
HEPATITIS B SCREENING:

There are three possible Hepatitis B patient categories:

1. Susceptible
2. Infected
3. Immune

1. **Susceptible Patients (HBsAg and Anti HBs negative):**
   All susceptible patients should receive Hepatitis B vaccine and follow-up testing to determine immune status. Refer to Appendix A: Algorithm for Hepatitis B Vaccination & Monitoring in Susceptible Patients.

2. **Infected Patients (HBsAg positive):**
   Follow Appendix B: Schedule for Routine Blood Testing for Hepatitis B & Hepatitis C Infections under “HBsAg positive (i.e. infected patients)”.

3. **Immune Patients (Anti HBs positive):**
   Follow Appendix B: Schedule for Routine Blood Testing for Hepatitis B & Hepatitis C Infections under “Anti HBs positive (≥10 mIU/mL)”.

HEPATITIS C SCREENING:

There are two possible Hepatitis C patient categories:

1. Susceptible
2. Infected

1. **Susceptible (Anti HCV negative):**
   All susceptible hemodialysis patients should be tested for ALT monthly (Note: ALT is already included in routine hemodialysis monthly blood work) and anti-HCV every six months. Follow Appendix B: Schedule for Routine Blood Testing for Hepatitis B & Hepatitis C infections under “Anti HCV negative”.

2. **Infected (Anti HCV positive):**
   Anti HCV positive patients are considered to have Hepatitis C infection. No further testing is necessary. Follow Appendix B: Schedule for Routine Blood Testing for Hepatitis B & Hepatitis C Infections under “Anti HCV positive”.

- Peritoneal Dialysis and Renal Health Clinic patients do not require due to the difficulties in arranging these screening tests at the correct times.
- There is no reliable method to determine if this infection is acute or chronic.

REFERENCES:


REVIEWED BY:

Dr. John Embil, Medical Director, Infection Prevention and Control Unit

Dr. Kelly Kaita, Director, Viral Hepatitis Investigative Unit, Section of Hepatology

Dialysis Infection Prevention and Control Working Group, WRHA and Manitoba Health, December 2007
Appendix A: Algorithm for Hepatitis B Vaccination & Monitoring in Susceptible Patients

Susceptible CKD Patient:
(1) sCr > 200 umol/L
(2) Anti HBs negative (< 10 mIU/mL)

Engerix-B® 40 mcg (20 mcg in each deltoid) I.M. x 4 doses at 0, 1, 2 and 6 months*

Test for Anti HBs 1-2 months after last dose of Engerix-B®.

**Alternate dosing schedule for PD & Renal Health Clinic patients:
Injection 2: 1-3 mo from 1st (month 0) injection
Injection 3: 1-3 mo from 2nd (month 1) injection
Injection 4: 2-4 mo from 3rd (month 2) injection OR 4 doses within 1 year.

- Anti HBs negative (<10 mIU/mL)
  - Revaccinate with Engerix-B® 40 mcg (20 mcg in each deltoid) I.M. x 4 doses at 0, 1, 2 and 6 months*
  - Test for Anti HBs 1-2 months after last dose

- Anti HBs weakly positive
  - Give Engerix-B 40 mcg (20 mcg in each deltoid) I.M. x 1 as booster.
  - Continue to test Anti HBs annually** [CDC recommendation]

- Anti HBs positive (>10 mIU/mL)
  - Consider patient immune
  - Retest Anti HBs annually**

- Anti HBs negative (<10 mIU/mL)
  - Note patient is a "nonresponder" in chart.
  - Retest HBsAg monthly (hemodialysis only).

- Anti HBs positive (>10 mIU/mL)
  - Consider patient immune
  - Retest Anti HBs annually**

**If Anti HBs on annual testing is negative (< 10 mIU/mL) OR weakly positive, give Engerix-B® 40 mcg (20 mcg in each deltoid) I.M. x 1 as booster shot.
- Continue to test Anti HBs annually [CDC recommendation]
PURPOSE: To provide standards and guidelines for dialysis nurses on standby in the provision of safe, quality care to patients requiring emergent hemodialysis for acute or end stage renal disease.

POLICY:

1. On the night shift, emergent treatments may be done in the PACU, MICU, SICU, IICU or PICU as decided by the charge nurse and on-call physician, after the prioritization and assessment of patient needs.

2. Dialysis nurses deemed competent by the Renal Educator to take dialysis call, will be available for call back when the dialysis units are closed.

3. When the on-call Nephrologist has assessed the patient and identified a need for emergent dialysis on a patient outside of regular working hours, the Nephrologist will notify the nurse on call and Nursing Supervisor.

4. The Nursing Supervisor will locate a bed and backup staff, if necessary, in one of the ICUs for emergent dialysis on a non-ICU patient. ICU patients require an ICU nurse. If more than one patient requires treatment at a time, the Nephrologist on-call must prioritise.

5. Dialysis orders must be given only by the Health Sciences Centre on-call Nephrologist or fellow to the dialysis stand-by nurse.

6. **End Stage Renal Disease:**
   Patients known to Dialysis, with an order to discharge post treatment will be discharged by the Hemodialysis nurse on-call. Patients without a discharge order will be returned to Emergency for further assessment and possible discharge.

   **Acute Renal Failure:**
   All patients not previously known to the dialysis program must have admitting documentation prior to dialyzing. If dialysis is required after hours or on Sunday, arrangements must be made by the Nursing Supervisor with one of the ICU’s to use a spot for Hemodialysis. As a last resort two dialysis nurses will be required to dialyze the patient in the Central Dialysis Unit (CDU).

7. The standby nurse will require the following information over the phone prior to arrival:

   a) Patient location - if an outpatient - place of admission and expected time of arrival.
   b) Vascular access established prior to standby nurse’s arrival at the Centre.
   c) Hemodialysis or Paediatric orders, including type of dialysate.
8. The nurse/patient ratio required to dialyze an acute patient is one to one in the SICU, MICU, PICU, IICU and PACU.

9. On-call lists are scheduled by the CDU Clinicians with each set of hours. On-call will be equitably distributed including weekend calls. There is 260 weeknight calls and 156-weekend call per year excluding Christmas and New Years. The amount of calls expected will be updated following the completion of each on-call workshop and adjusted accordingly.

10. Every attempt will be made to assign call following an evening shift. Requests may be made to the Manager of Patient Care to have call assigned when off the following day. Weekend calls will also be equitably distributed 1st, 2nd, and 3rd regardless if staff are off on Monday’s.

11. Nurses are required to switch their own “on-call” assignments with other staff members when conflicting with personal obligations. Changes in call assignments must be communicated immediately to the CDU Nurse Clinicians/Charge Nurse, so they can change the call list in CDU. It is the responsibility of the nurse on-call to notify the Nurse Clinician/Charge Nurse in CDU when they are ill and unable to take call. This is also true for weekend call unless the unit is closed, then the nursing supervisor is to be notified. If no one volunteers to take the call, it will be assigned to an evening staff on either site who has had the least recent call. This excludes the week after this date. Credit will be given to the nurse who took call and credit will be removed from the ill nurse and reassigned with next call list.

12. The Central Dialysis evening Charge Nurse will notify the paging office of the name of the nurse on-call, their phone number and the times for call prior to the end of the evening shift.

13. CDU charge nurse will make up a ticket with the nurse’s phone numbers and beeper number on standby for the night for the Staffing Office. She/he will take the keys to the Staffing Office and leave them with the Nursing Supervisor.

14. The Nursing Supervisor is the resource person for the standby nurse for assistance with issues regarding space or physician/nurse coverage. If, at the assessment of the dialysis nurse, she/he is unsafe to complete a treatment, the Nursing Supervisor may call a second dialysis nurse to continue the treatment. If this were to occur during weekend coverage, this option would be given to the next assigned nurse on call. He/she is not obligated to cover this call prior to their assigned time; therefore, the nephrologist would need to be notified.

15. The nurse will arrive at the hospital as soon as possible after receiving the call that the patient is ready with a functioning access.

16. Weekend call times are as follows: 1st - 2330 to 1030, 2nd - 1000 to 2100 and 3rd - 2030 to 0730. During weekend call, the first nurse will notify the second nurse on call and that they will need to come in for their assigned time. This is the same for second and third calls.

17. The keys to the dialysis unit will be picked up at the Nursing Systems office on GC206.

18. On weekdays and Saturday, the on-call nurse will be relieved by the CDU nursing staff at 0730 hours.

19. The stand-by nurse called in will leave written documentation (Treatment Flowsheet) with the patient’s name, unit, HSC number, patient diagnosis, and the unit the patient dialyzed in for the Nurse Clinician/CDU charge nurse.
MANITOBA RENAL PROGRAM

<table>
<thead>
<tr>
<th>SUBJECT</th>
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| CODE | 60.30.06 |

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<th>EFFECTIVE DATE April 2001</th>
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<tr>
<td>Nursing Practice Council, St. Boniface General Hospital</td>
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| REVISION DATE January 2008 |

PURPOSE:

1. The pre-printed *Chronic Hemodialysis Physician’s Order Sheet* (Form # W-00109) indicates the chronic hemodialysis patient will have ‘Initial and Monthly Lab tests per the Dialysis Panel’. The purpose of these guidelines are to:
   a. Provide direction to the Manitoba Renal Program (MRP) staff.
   b. Define what tests constitute the ‘Dialysis Panel’,
   c. Identify the frequency and schedule for lab tests.

POLICY:

1. Registered Nurses, Licensed Practical Nurses, Unit Clerks and Ward Clerks in the MRP may initiate the pre-printed *Chronic Hemodialysis Physician’s Order Sheet* for a patient starting chronic hemodialysis upon receipt of a nephrologist’s signature or a verbal order. The pre-printed *Chronic Hemodialysis Physician’s Order* includes initial and monthly lab tests that constitute the ‘Dialysis Panel’.

DIALYSIS PANEL:

A. BLOODWORK:

1. Initial blood work:
   - Pre-dialysis CBC, Differential, Reticulocyte Count
   - Pre-dialysis Na, K, Cl, CO₂ content, Urea, Creatinine, Ca, PO₄, Albumin, ALT, Alk. Phos, Glucose, AST, GGT, Bilirubin, Iron, TIBC, Ferritin, Uric Acid, Mg, Total protein, Lipase, PTH, CK, HBsAg, Anti HBs, Anti HCV, Cholesterol and Triglycerides; PT, PTT, INR, Vit B12
   - HgbAIC if patient is diabetic
   - Digoxin level if patient is on digoxin
   - TSH if patient is diabetic or on levothyroxine
   - Post-dialysis K
DIALYSIS PANEL:

2. Routine monthly blood work:
   - Pre-dialysis CBC, Differential, Reticulocyte Count
   - Pre-dialysis Na, K, CO₂ content, Urea, Creatinine, Ca, PO₄, Albumin, ALT, Alk. Phos, Glucose, Uric Acid, Mg, Lipase, AST, GGT, Bilirubin
   - Intradialytic Arterial, Venous, and Systemic Urea samples for recirculation calculations (to be calculated and documented by Registered Nurse or Licensed Practical Nurse). **NOTE:** Until Access Recirculation Software is available.
   - Post-dialysis K
   - Human Leukocyte Antigen (HLA) antibody levels if patient is a transplant or potential transplant candidate as per Protocol 60.30.03 *Human Leukocyte Antigen Antibody Testing and Routine Post Transfusion*.
   - PT, INR if patient is on warfarin
   - 24 hour urine for urea clearance if patient dialyzes 2 X week

3. In addition to routine monthly bloodwork, every 3 months:
   - PTH
   - Iron, TIBC, Ferritin
   - HgbAIC if patient is diabetic

4. In addition to routine monthly bloodwork and 3 month bloodwork, every 6 months:
   - HBsAg if patient is unvaccinated or if patient has received Hepatitis B vaccination but testing Anti HBs negative. (See Protocol 60.30.04 *Adult Patient Screening and Vaccination Protocol for Hepatitis B and Hepatitis C*.)

5. In addition to routine monthly bloodwork, every 12 months:
   - Total protein, Lipase, CK, HBsAg, HBsAb, Cholesterol, Triglycerides
   - TSH if patient is diabetic or on levothyroxine
   - Digoxin level if patient is on digoxin
   - Anti HBs if patient is testing Anti HBs positive after receiving Hepatitis B vaccination

B. EKG

   - Within one month of initiation of dialysis, prior to completing initial EKG, check the patient’s in-hospital chart. If EKG results are present in the in-hospital chart, obtain a copy for the MRP Health Record and hold initial EKG.
   - Every two years after initial EKG
   - Preoperative EKG for any surgical procedure per preoperative guidelines
   - PRN if patient experiences chest pain
**DIALYSIS PANEL:**

**C. CHEST X-RAY**

- Within one month of initiation of dialysis. Prior to completing initial chest x-ray, check the patient’s in-hospital chart. If chest x-ray results are present in the in-hospital chart obtain a copy for the MRP Health Record and hold initial chest x-ray.

- Every two years after initial chest x-ray

- Preoperative chest x-ray for any surgical procedure per preoperative guidelines

**REFERENCES:**

Kidney Diseases Outcomes Quality Initiative (KDOQI) 2006 Clinical Practice Guidelines
PURPOSE:

1. To provide guidelines to staff when hemodialysis patients with various infectious diseases are treated in the same dialysis unit.

DEFINITIONS:

AIRBORNE ISOLATION ROOM (formerly called negative pressure isolation room):
An airborne isolation room is a single-occupancy patient care room used to isolate persons with suspected or confirmed infectious airborne or airborne/contact disease. Environmental factors are controlled to minimize the transmission of infectious agents usually spread from person-to-person by droplet nuclei associated with coughing or aerosolization of contaminated fluids. Airborne isolation rooms should provide negative pressure in the room (so air flows into the room), an air flow rate of 6-12 air changes/hour, and direct exhaust of air from the room to the outside of the building or recirculation of air through a HEPA filter.

PRIVATE ROOM
A room separated from the open treatment area by walls and having its own entrance or doorway that can be closed.

POLICY:

A. Infection Prevention and Control precautions for dialysis patients who are HBsAg positive (HBsAg+)

1. HBsAg+ patients will be managed in a private room. If this is not possible, alternate arrangements will be made in consultation with the site infection control practitioner/designate.

2. When a private room is not available, HBsAg+ patients should be separated during treatment from HBV susceptible (HBsAg-) patients in an area geographically removed from the main stream of activity.

3. Dialyze HBsAg+ patients with dedicated equipment, instruments, supplies, and medications. Patients must receive dialysis with a machine dedicated to HBsAg+ patients.

4. Staff members should not care for HBsAg+ and HBsAg- patients during the same shift. When staff members are assigned to care for both HBsAg+ and HBV- immune patients on the same shift, there must be current serology to confirm the patient’s HBV immunity prior to assigning the two groups together.

5. At the completion of dialysis:
POLICY:

a. The delivery system (internal pathways and external surfaces) shall undergo cleaning and high-level disinfection as outlined in Procedure 30.20.01 Use of Fresenius 2008K Delivery System upon termination of treatment.

b. Following high-level disinfection, the delivery system is then covered with a clean sheet and the private room/area shall then undergo routine cleaning and disinfection with changing of bedside curtains. The bed/ chair, table, and television remote controls must be included in the cleaning and disinfection.

c. Reusable equipment and supplies are cleaned and disinfected before use on another patient.

d. If equipment requires servicing by a dialysis technologist, the delivery system must be disinfected as outlined above and the technologist shall be informed the equipment was used by a patient who is HBsAg+.

e. Patient Education: Upon initiation of precautions, the nurse will explain the protocol and the rationale to the patient and/or family.

B. Infection Prevention and Control precautions for dialysis patients with other infectious diseases

1. Isolate patients with the infectious diseases in a Private Room in the following order of priority:

   a. Dialysis Units without airborne isolation rooms should transfer patients with suspect/known infectious Mycobacterium tuberculosis to a unit with an airborne isolation rooms.

   b. For Measles and Varicella in units without airborne isolation rooms and where there are no susceptible, immunocompromised patients: if transfer is not feasible; consider using a private room with door closed.

   c. If the number of airborne isolation rooms is limited, priority for use of these rooms is determined according to the potential impact of airborne transmission in the unit and should follow:
      • Infectious tuberculosis, suspect or confirmed
      • Measles
      • Varicella
         o Chickenpox
         o Disseminated zoster
         o Extensive localized zoster

   d. Patients who are HBsAg+.

   e. Patients requiring isolation for Antibiotic Resistant Organisms (ARO).

   f. Patients transferred/traveling from outside Canada who have not been screened according to Policy 60.30.09 Traveling Dialysis Patients Screening for Hepatitis B, MRSA and VRE.

   g. Patients transferred/traveling from outside Manitoba who have not been screened according to Policy 60.30.09 Traveling Dialysis Patients Screening for Hepatitis B, MRSA and VRE.

   h. Patients with uncontrolled diarrhea/secretions that are not/can not be contained.

   i. Patients on Contact Precautions for other infectious diseases.

   j. Patients on Droplet Precautions.

2. When a private room is not available, patients with infectious diseases should be separated during treatment from susceptible/non-infectious patients in an area geographically removed from the main stream of activity.

3. Dialyze patients with infectious diseases with dedicated equipment, instruments, supplies, and
POLICY:

medications.

4. At the completion of dialysis:

   a. The delivery system (internal pathways and external surfaces) shall undergo cleaning and high-
   level disinfection as outlined in Procedure 30.20.01 Use of Fresenius 2008K Delivery System
   upon termination of treatment.

   b. The delivery system is then covered with a clean sheet and the private room/area shall undergo
   routine cleaning and disinfection with changing of bedside curtains. The bed/chair, table, and
   television remote controls must be included in the cleaning and disinfection.

   c. Reusable equipment and supplies are cleaned and disinfected before use on another patient.

   d. If equipment requires servicing by a dialysis technologist, the delivery system must be disinfected
   as outlined above and the technologist shall be informed the equipment was used by a patient
   with an infectious disease.

5. Patient Education: Upon initiation of precautions, the nurse will explain the protocol and the rationale
to the patient and/or family.

C. Management of dialysis patients on Additional Precautions

1. Dialysis patients requiring Additional Precautions shall be placed in a private room in compliance with
the Manitoba/regional/facility isolation guidelines.

2. If a private room is not available use the following management guidelines.

   a. Consult the site Infection Control Practitioner or designate for guidance.

   b. Manage patient bed space as isolation room; segregate patient or cohort with others with the
   same organism.

   c. Place privacy curtain around bed space to provide a barrier around the patient.

   d. Place Additional Precautions sign on curtain or bed.

   e. Handwashing sink should be available in bed space or nearby. If sink is not readily accessible,
   alcohol based hand rub with a minimum of 60% alcohol must be available.

   f. Clean and disinfect patient care equipment after each patient use, prior to removal from isolation
   space.

   g. Follow standard dialysis cleaning and disinfecation procedures for cleaning after treatment.
   Change privacy curtains for ARO positive patients after each shift. For patients on other
   Additional Precautions, change curtains when visibly soiled.

REFERENCES:

CDC MMWR April 27, 2001 / 50(RR05); 1-43 Recommendations for Preventing Transmission of Infections
Among Chronic Hemodialysis Patients.

PURPOSE:

1. To prevent the transmission of Hepatitis B, MRSA and VRE among dialysis patients by diagnostic screening of travelling patients.

POLICY:

1. Requests for transient dialysis in Manitoba from outside the province should be forwarded to the Manitoba Renal Program to ensure space can be accommodated prior to acceptance.

2. Requests for transient dialysis for outside the province from MRP patients should be made directly to the receiving unit.

PROTOCOL:

1. Once dates and space have been allocated a letter outlining the diagnostic screening and patient information required for the out of province transient patient will be sent to the sending dialysis unit. (Appendix A).

2. Once MRP patients have been allocated dates and space in a receiving unit, diagnostic screening and patient information will be sent as requested by the receiving unit.

A. Out of Province Transient Patients Receiving Dialysis in Manitoba

1. Transient patients who are HBsAg positive will not be electively accepted for treatment in the Manitoba Renal Program unless prior arrangements for an isolation room have been made.

2. The transient patients Hepatitis B results taken within the last month (1 month) must be received by the MRP receiving dialysis unit prior to the scheduled dialysis treatment. NOTE: Unauthorized transient patients, without known hepatitis status must be assessed and if dialysis is required they will be dialyzed in a private room on contact precautions.

3. The transient patients MRSA & VRE results taken 2 weeks prior to the scheduled dialysis treatment must be received by the MRP receiving dialysis unit. The results should include a list of antibiotics the patient has received 48 hours prior to culture. Patients with unknown results or who are MRSA or VRE positive will be considered for transient dialysis, but they must be placed on Contact Precautions.
The following swabs must be done within 2 weeks prior to the scheduled transient dialysis treatment:

**MRSA**
- Right and left nares (one swab each)
- All open wounds including catheter exit site.

**VRE**
- Rectum (or if colostomy or ileostomy, culture stoma site)

**B. Manitoba Renal Program Patients Receiving Transient Dialysis Outside the Province**

1. Out of province renal programs have their own requirements for screening transient dialysis patients prior to travel. Patients will be screened as requested and the diagnostic results and the patient information will be sent to the receiving unit.

2. MRP patients who are Hepatitis B susceptible (i.e. HBsAb negative), will be screened for HBsAg upon return to their unit.

3. Once MRP transient dialysis patients return from out of province, they must be swabbed for MRSA and VRE as outlined above. The patients shall be dialyzed using Contact Precautions (as per facility policy) until negative screening results are received.

**REFERENCES:**


**APPENDIX I**

Winnipeg Regional Health Authority    Office régional de la santé de Winnipeg
                                    Caring for Health    À l’écoute de notre santé

WRHA Manitoba Renal Program
2PD09 – 2300 McPhillips St.
Winnipeg, MB    R2V 3M3

Date:

Unit: Phone:

Unit Contact: Fax:

Patients Name:

We have received a request for a hemodialysis treatment on the following date(s):
in

Please provide a copy of this letter to the above named patient.

The number of patients accepted for transient dialysis and the duration of their stay in the
Manitoba Renal Program is limited. However, we will make every attempt to accommodate
three transient dialysis treatments when space is available. We require that the home dialysis
unit forward all of the necessary medical information to our dialysis unit as soon as possible.
Upon receipt of the information the MRP Medical Director will review the information to
determine acceptance for Hemodialysis in Manitoba.

Please be advised that acceptance is subject to cancellation of the dialysis treatment
with one week’s notice. Please contact our office approximately 3 days prior to departure
to confirm the time and place of the dialysis treatment.

Manitoba Dialysis units currently have VRE and MRSA positive patients who are on isolation.
To prevent patients from accidentally bringing resistant bacteria into Manitoba, we require that
your dialysis unit perform bacterial cultures (as per MRSA & VRE Screening Policy for Transient
Dialysis Patients) one week prior to treatment here. If these cultures show antibiotic-resistant
organisms, this patient will not be permitted to dialyze in Manitoba. We hope you understand
this policy is to protect all patients.

If your patient requires medications, including EPO (Erythropoietin), they are required to bring
these medications with them.

If you have any questions, please feel free to contact our office directly at (204) 632-3607 for
further information.

Yours sincerely,

Program Director,
Manitoba Renal Program
We have received a request for a hemodialysis treatment on the following date(s):

Please provide a copy of this letter to the above named patient.

The number of patients accepted for transient dialysis and the duration of their stay in the Manitoba Renal Program is limited. However, we will make every attempt to accommodate three transient dialysis treatments when space is available. We require that the home dialysis unit forward all of the necessary medical information to our dialysis unit as soon as possible. Upon receipt of the information the MRP Medical Director will review the information to determine acceptance for Hemodialysis in Manitoba.

Please be advised that acceptance is subject to cancellation of the dialysis treatment with one week's notice. Please contact our office approximately 3 days prior to departure to confirm the time and place of the dialysis treatment.

Manitoba Dialysis units currently have VRE and MRSA positive patients who are on isolation. To prevent patients from accidentally bringing resistant bacteria into Manitoba, we require that your dialysis unit perform bacterial cultures (as per MRSA & VRE Screening Policy for Transient Dialysis Patients) one week prior to treatment here. If these cultures show antibiotic-resistant organisms, this patient will not be permitted to dialyze in Manitoba. We hope you understand this policy is to protect all patients.

If your patient requires medications, including EPO (Erythropoietin), they are required to bring these medications with them.

If you have any questions, please feel free to contact our office directly at (204) 632-3607 for further information.

Yours sincerely,

Program Director,
Manitoba Renal Program
**COVERAGE:**

- This protocol is applicable to those areas providing peritoneal dialysis therapy to Stage V (last stage of renal failure) patients.
- Peritoneal dialysis (PD) is a therapy that requires instillation of a dialyzing solution into the peritoneal cavity via a peritoneal catheter.

**STATEMENT OF GUIDELINES:**

1. Continuous Ambulatory Peritoneal Dialysis (CAPD) exchanges are done 7 days a week.
2. The CAPD exchange is performed using aseptic technique.
3. Registered Nurses who have demonstrated competency to perform PD and patients trained for Home PD are responsible for doing the dialysate bag exchanges. While in hospital, patient trained for Home PD may perform CAPD with the nurse’s supervision.
4. Each CAPD exchange consists of a fill phase (i.e. infusion of dialysate solution into the peritoneal cavity), a dwell phase (i.e. a period of time during which the dialysate solution remains in the cavity to allow for the removal of solutes and fluid across the peritoneal membrane) and a drain phase (effluent containing wastes, electrolytes and excess fluid is removed from the cavity).
5. Patients are weighed on a daily basis. The goal is to maintain the patient at their target weight which is the weight with no signs and symptoms of fluid overload and no signs and symptoms of dehydration. The target weight is ordered by the physician.
6. The CAPD prescription is ordered by the physician. This includes:
   - Volume of the dialysate exchange solution
   - Number of daily exchanges
   - Type of dialysate solution (i.e. glucose based, icodextran based, amino acid based, bicarbonate dextrose based)
   - Dextrose concentration if ordering a dextrose based solution or a bicarbonate dextrose based solution
7. Home PD Registered Nurses and Deer Lodge Registered Nurses who have demonstrated competency to perform PD and patients trained for Home PD may alter the CAPD dextrose based dialysate in response to signs and symptoms of fluid overload or dehydration. All other nurses must obtain a physician’s order to alter dialysate solutions. CAPD therapy alteration is documented on the Integrated Progress Notes.

See attached for CAPD Fluid Management Guidelines.
STATEMENT OF GUIDELINES:

8. Registered nurses who have demonstrated competency may add medications to the dialysate solution as per physician order. Intraperitoneal (IP) medication administration is documented in the health record for all inpatients.

9. CAPD exchanges are documented on the Continuous Ambulatory Peritoneal Dialysis Record and includes the following:
   - Date and time of exchange
   - Medication added, if applicable
   - Amount of drained effluent
   - Daily weight
   - Fill volume
   - Type of dialysate solution
   - Comments related to the appearance of the effluent
   - Signature of nurse or patient performing therapy

10. A PD catheter that is sluggish or plugged may be irrigated with 20 mL of normal saline and repeated X 1 as ordered by the physician. If the PD catheter remains sluggish or plugged, the physician may order an abdominal x-ray.

11. PD Home Care will be notified prior to the patient's discharge. The PD Unit will also be telephoned to ensure a follow-up ACF Clinic appointment is booked.
## CAPD FLUID MANAGEMENT GUIDELINES

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<tr>
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<td>Below target weight</td>
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<td>0.5% dialysate</td>
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<td>Drink extra fluids</td>
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<td>Eat salty foods</td>
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</tr>
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<td>2.5% dialysate</td>
<td>2.5% dialysate</td>
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<td>1.5 – 1.9 kg above target weight</td>
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<td>2.5% dialysate</td>
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<td>2.5% dialysate</td>
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<td>(3.5 – 4 lbs)</td>
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<td>(4 – 6.5 lbs)</td>
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<td>(6.5 lbs and above)</td>
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*Adjustments will need to be made for 5 exchanges per day*
MANITOBA RENAL PROGRAM

SUBJECT
- Continuous Cycling Peritoneal Dialysis Protocol

SECTION 60.30 Protocols

CODE 60.30.13

AUTHORIZATION
- Professional Advisory Committee, Manitoba Renal Program
- Nursing Leadership Council, St. Boniface General Hospital

EFFECTIVE DATE March 2005

REVISION DATE

COVERAGE:
1. This protocol is applicable to those areas providing peritoneal dialysis (PD) therapy to Stage V (last stage of renal failure) patients.

2. Peritoneal dialysis is a therapy that requires instillation of a dialyzing solution into the peritoneal cavity via a peritoneal catheter.

STATEMENT OF GUIDELINES:
1. Continuous Cycling Peritoneal Dialysis (CCPD) therapy is done 7 nights per week and may require 1 or 2 daily manual CAPD exchanges.

2. The CCPD is performed using aseptic technique.

3. Registered Nurses who have demonstrated competency to perform PD and patients trained for Home PD are responsible for the set up of the automated machine, monitoring of the therapy, and the end of therapy disconnect procedure. While in hospital, patients trained for home PD may perform CCPD with the nurse’s supervision.

4. Each CCPD treatment consists of several automated exchanges. Each exchange involves a fill phase (i.e. infusion of dialysate solution into the peritoneal cavity), a dwell phase (i.e. a period of time during which the dialysate solution remains in the cavity to allow for the removal of solutes and fluid across the peritoneal membrane) and a drain phase (effluent containing wastes, electrolytes and excess fluid is removed form the cavity).

5. Patients are weighed on a daily basis. The goal is to maintain the patient at their target weight which is the weight with no signs and symptoms of fluid overload and no signs and symptoms of dehydration. The target weight is ordered by the physician.

6. The CCPD prescription is ordered by the physician. This includes:
   - Total therapy time
   - Total therapy volume
   - Dextrose concentration per litre
   - Fill volume
   - Last fill volume including type of dialysate solution and the dextrose concentration if using a dextrose based solution
STATEMENT OF GUIDELINES:

7. Home PD Registered Nurses and Deer Lodge Registered Nurses who have demonstrated competency to perform PD and patients trained for home PD may alter the CCPD dextrose based dialysate in response to signs and symptoms of fluid overload or dehydration. All other nurses must obtain a physician’s order to alter dialysate solutions. CCPD therapy alteration is documented on the *Integrated Progress Notes*.

See attached for CCPD Fluid Management Guidelines.

8. Registered nurses who have demonstrated competency may add medications to the dialysate solution as per physician order. Intraperitoneal (IP) medication administration is documented in the health record for all inpatients.

9. CCPD therapy is documented on the Automated Peritoneal Dialysis record and includes the following:
   - Date
   - Total therapy time
   - Total therapy volume
   - Dextrose concentration (per litre)
   - Fill volume
   - Last fill volume including type of dialysate solution and the dextrose concentration if using a dextrose based solution
   - Medication added, if applicable
   - Post therapy information which includes initial drain, total ultrafiltration, and the average dwell time
   - Comments related to therapy
   - Comments related to the appearance of the effluent
   - Pre and post signature of the nurse or patient performing the therapy

10. A PD catheter that is sluggish or plugged may be irrigated with 20 mL of normal saline and repeated X 1 as ordered by the physician. If the PD catheter remains sluggish or plugged, the physician may order an abdominal x-ray.

11. PD Home Care will be notified prior to the patient’s discharge. The PD Unit will also be telephoned to ensure a follow-up ACF Clinic appointment is booked.
### CCPD FLUID MANAGEMENT GUIDELINES

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<tr>
<th>WEIGHT</th>
<th>CYCLER</th>
<th>DAY BAG</th>
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<tbody>
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<td>Below target weight</td>
<td>1.5% dialysate</td>
<td>0.5% dialysate</td>
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<td>Last fill - hold Extraneal</td>
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<td>- use 0.5% or 1.5% dialysate</td>
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<td></td>
<td>Drink extra fluids</td>
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<td></td>
<td>Eat salty food</td>
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<tr>
<td>At target weight</td>
<td>All - 1.5% dialysate</td>
<td>1.5% dialysate or Extraneal</td>
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<td></td>
<td>Last fill - 1.5% dialysate or Extraneal</td>
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<tr>
<td>0.5 – 0.9 kg above target weight</td>
<td>Combination of 1.5% and 2.5% dialysate</td>
<td>1.5% dialysate or Extraneal</td>
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<tr>
<td>(1 – 2 lbs)</td>
<td>Last fill - 1.5% or 2.5% dialysate or Extraneal</td>
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<td>1 – 1.4 kg above target weight</td>
<td>All 2.5% dialysate</td>
<td>2.5% dialysate or Extraneal</td>
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<tr>
<td>(2 – 3 lbs)</td>
<td>Last fill - 2.5% dialysate or Extraneal</td>
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</tr>
<tr>
<td>1.5 – 1.9 kg above target weight</td>
<td>Combination of 2.5% and 4.25% dialysate</td>
<td>2.5% dialysate or Extraneal</td>
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<td>(3.5 – 4 lbs)</td>
<td>Last fill - 2.5% or 4.25% dialysate or Extraneal</td>
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<tr>
<td>2 – 3 kg above target weight</td>
<td>All 4.25% dialysate</td>
<td>2.5% dialysate or Extraneal</td>
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<tr>
<td>(4 – 6.5 lbs)</td>
<td>Last fill - 2.5% or 4.25% dialysate or Extraneal</td>
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<tr>
<td>3 kg above target weight</td>
<td>All 4.25% dialysate</td>
<td>4.25% dialysate or Extraneal</td>
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<tr>
<td>(6.5 lbs and above)</td>
<td>Last fill - 4.25% dialysate or Extraneal</td>
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MANITOBA RENAL PROGRAM

<table>
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<tr>
<th>SUBJECT</th>
<th>SECTION</th>
<th>CODE</th>
<th>EFFECTIVE DATE</th>
<th>REVISION DATE</th>
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<td>Peritonitis Protocol</td>
<td>60.30</td>
<td>60.30.14</td>
<td>March 2005</td>
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</tbody>
</table>

AUTHORIZATION
- Professional Advisory Committee, Manitoba Renal Program
- Nursing Leadership Council, St. Boniface General Hospital

COVERAGE:
1. This protocol is applicable to those areas providing peritoneal dialysis (PD) therapy to Stage V (last stage of renal failure) patients.

INDICATIONS FOR THE USE OF INTRAPERITONEAL (IP) ANTIBIOTICS:
1. The peritonitis protocol is indicated for the management of patients presenting with signs and symptoms of peritonitis (i.e. cloudy or hazy fluid, abdominal pain, fever, chills). Treatment will be initiated after the patient has been assessed by a physician.

STATEMENT OF GUIDELINES:
1. The physician must review and sign the pre-printed physician order sheets for either “Inpatients with Peritonitis” or “Outpatients with Peritonitis” for the nurse to follow.
2. The patient must be weighed in order to determine the dose of IP antibiotics.
3. The physician must indicate the volume of dialysate solution in litres and the percent concentration of dextrose on a pre-printed Physician Order Sheet.
4. Registered nurses who have demonstrated competency to perform PD may add IP antibiotics to the dialysate solution as per physician order.

ORDERS FOR INPATIENTS:
1. The first cloudy peritoneal effluent is sent for STAT gram stain, C&S, and cell count prior to initiation of antibiotic therapy.
2. Send blood for CBC, urea, electrolytes, creatinine before initiating antibiotic therapy.
3. Initial IP antibiotics are added to dialysate bag #1. The antibiotics added are Tobramycin 60 mg (40 mg if weight less than 50 kilograms) and Cefazolin 1.5 grams (1 gram if weight less than 50 kilograms) as per physician order. The antibiotics must remain in the peritoneal cavity for a minimum of 6 hours.
ORDERS FOR INPATIENTS:

4. **Subsequent** IP antibiotics are added to the CAPD night bag or if on CCPD added to the day bag with a minimum of a 6 hour dwell. The antibiotics added are Tobramycin 60mg (40 mg if less than 50 kilograms) and Cefazolin 1.5 grams (1 gram if less than 50 kilograms) as per physician order. The physician will order the number of days that IP antibiotics are required.

5. If allergic to cephalosporins/penicillins, page physician for alternate antibiotic orders.

6. Call Peritoneal Dialysis Unit and Renal Lab and leave message that patient has peritonitis.

ORDERS FOR OUTPATIENTS:

1. The first cloudy peritoneal effluent is sent for STAT gram stain, C&S, and cell count prior to initiation of antibiotic therapy.

2. Send blood for CBC, urea, electrolytes, creatinine before initiating antibiotic therapy.

3. **Initial** IP antibiotics are added to dialysate bag #1. The antibiotics added are Tobramycin 60 mg (40 mg if weight less than 50 kilograms) and Cefazolin 1.5 grams (1 gram if weight is less than 50 kilograms). The antibiotics must remain in the peritoneal cavity for a minimum of 6 hours.

4. **Subsequent** IP antibiotics are added to the hs CAPD bag or the CCPD day bag with a minimum of a 6 hour dwell. The antibiotics added are Tobramycin 60 mg (40 mg if less than 50 kilograms) and Cefazolin 1.5 grams (1 gram if less than 50 kilograms). The physician will order the number of days that IP antibiotics are required.

5. If allergic to cephalosporins/penicillins, page physician for alternate antibiotic orders.

6. Call Peritoneal Dialysis Unit and Renal Lab and leave message that patient has peritonitis.

7. During dialysis hours contact PD nurse to review patient’s technique/ability to give IP antibiotics.

8. After dialysis hours, if patient is well and able to do own PD, patient may be discharged home after initial dose of antibiotics.

9. Sufficient antibiotics are ordered to ensure coverage over the weekend.

10. Fax prescription to patient’s own pharmacy.

11. Encourage patient to return to Emergency and/or call PD Unit if no improvement in symptoms (effluent should start to clear after 2 days of antibiotic therapy).

12. Patient will be admitted if symptoms are severe and/or patient is unable to self treat.
MANITOBA RENAL PROGRAM

SUBJECT
- Care of Patient on Home Peritoneal Dialysis Protocol

SECTION 60.30  Protocols

CODE 60.30.15

AUTHORIZATION
- Professional Advisory Committee, Manitoba Renal Program
- Nursing Leadership Council, St. Boniface General Hospital

EFFECTIVE DATE March 2005

REVISION DATE

COVERAGE:

1. This protocol is applicable to those areas providing home training for Stage V (last stage of renal failure) patients who are receiving Continuous Cycling Peritoneal Dialysis (CCPD) or Continuous Ambulatory Peritoneal Dialysis (CAPD) or a combination of both.

STATEMENT OF GUIDELINES:

1. Patient Teaching:
   Patient teaching is based on the Home Peritoneal Dialysis Patient Education Manual.

2. Initiation of Home Peritoneal Dialysis (PD) Orders:
   The physician will order the following for CAPD Therapy:
   - Target weight
   - Type of PD regime (i.e. CAPD, CCPD or a combination of both)
   - Fill volume of dialysate solution
   - Number of bag exchanges per day
   - Type of dialysate solution (i.e. dextrose based, icodextran based, amino acid based, bicarbonate dextrose based)

   The physician will order the following for CCPD Therapy:
   - Target weight
   - Type of PD regime (i.e. CAPD, CCPD or a combination of both)
   - Total therapy time if CCPD
   - Total therapy volume if CCPD
   - Fill volume
   - Last fill volume
   - Fill volume of dialysate solution of CAPD day bag(s) if applicable
   - Type of dialysate solution (i.e. dextrose based, icodextran based, amino acid based, bicarbonate dextrose based)

3. The physician will record the date of the PD catheter insertion.

4. Prior to initiating home peritoneal dialysis training, the PD nurse will check the patency of the PD catheter by adding heparin 1,000 units to 1000 mL of 0.9% sodium chloride and flush the PD catheter.

5. PD catheters that are sluggish or plugged may be irrigated with 20 mL of normal saline and repeated X 1 as ordered by the physician. If the PD catheter remains sluggish or plugged, the physician may order an abdominal x-ray.
**STATEMENT OF GUIDELINES:**

6. If the PD catheter exit site appears infected, send swab for C&S. Notify physician.

7. If the PD effluent appears cloudy, send for C&S, gram stain and cell count. Notify physician.

8. Initial bloodwork and clinic bloodwork is done according to the Dialysis Panel.

9. Patients are referred to PD Home Care for follow-up.

10. Patients are given a clinic appointment to return in 4 – 6 weeks. Subsequent appointments will be approximately every 3 months and PRN.

11. Patients will return to the PD Unit in 4 – 6 weeks time after training for the Peritoneal Equilibrium Test (PET). The PET will determine the solute transport characteristics of the patient’s peritoneal membrane (i.e. dialysate to plasma ratio [D/P ratio] of urea, creatinine and glucose). The solute transport characteristics of the peritoneal membrane are used to determine the PD therapy (i.e. CAPD or CCPD) prescribed.

12. Patients will return twice per year for a KT/V test. The peritoneal KT/V (pKT/V) test determines the efficiency of solute clearance across the peritoneal membrane. The patient will be instructed to collect a 24 hour dialysate effluent sample. In addition to the pKT/V, a renal KT/V (rKT/V) will also be done if urine volume greater than 200 mL per 24 hours. The patient will be instructed to collect a 24 hour urine sample.

13. Guidelines for telephone advice are as follows:

<table>
<thead>
<tr>
<th>Problem/Issue</th>
<th>Questions Asked of Patients</th>
<th>Advice to Patient</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) Shortness of Breath (SOB):</td>
<td>• Does SOB occur at rest? &lt;br/&gt; • Is the patient experiencing increased weight and/or edema? &lt;br/&gt; • Does SOB occur only on exertion?</td>
<td>• Suspect pulmonary edema and instruct patient to use 4.25% dialysate for fluid removal. If symptoms persist after treatment, instruct the patient to call back to the PD unit or go to ER department. &lt;br/&gt; • Instruct patient to come to PD Unit for bloodwork (SOB may be due to ↓ Hgb). &lt;br/&gt; • If SOB severe or is accompanied by chest pain, instruct patient to go to ER department, nearest hospital or nursing station.</td>
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<td>b) Dizziness:</td>
<td>• Is the patient experiencing cramps, increased thirst, dry mouth and/or decreased weight? &lt;br/&gt; • Is the patient’s blood pressure low (if known)?</td>
<td>• Patient may be dehydrated. Instruct patient to use only 0.5% or 1.5% dialysate and to drink 500 mL of salty soup. If no improvement, instruct patient to come to the PD Unit, ER department, nearest hospital or nursing station. &lt;br/&gt; • If on antihypertensives, instruct patient to hold next scheduled dose. If no improvement, instruct patient to come to the PD Unit, ER department, nearest hospital or nursing station.</td>
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<td>Problem/Issue</td>
<td>Questions Asked of Patients</td>
<td>Advice to Patient</td>
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<td>c) Infection:</td>
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<td>i. Cloudy effluent</td>
<td>• Is patient experiencing any</td>
<td>• Instruct patient</td>
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<td>symptoms of peritonitis (i.e.</td>
<td>to go to the PD</td>
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<td>abdominal pain, fever, chills)?</td>
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<td>ii. Abdominal pain</td>
<td>• Is patient experiencing</td>
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<td>fever, chills, cloudy effluent)?</td>
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<td>iii. Exit site</td>
<td>• Is the exit site red in</td>
<td>• If there is</td>
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<td>appearance?</td>
<td>pain or</td>
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<td>discharge</td>
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<td>• Is there any pain or</td>
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<td>discharge associated with</td>
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<td>iv. Leakage from line</td>
<td>• Is the leakage occurring</td>
<td>• Instruct patient</td>
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<td>from the transfer set or</td>
<td>to clamp line</td>
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<td>Wrap povidone</td>
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<td>gauze and tape.</td>
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<td>v. Transfer set contamination</td>
<td>• Is it dry or wet</td>
<td>• Instruct patient</td>
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<td>to go to the PD</td>
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<td>set. Wait 15</td>
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<td>change mini</td>
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<td>cap again. Bag</td>
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<td>apply a new mini</td>
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<td>cap to transfer</td>
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<td>set. Wait 15</td>
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<td>done after 15</td>
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<tr>
<td>Problem/Issue</td>
<td>Questions Asked of Patients</td>
<td>Advice to Patient</td>
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<tr>
<td><strong>d) Effluent not draining:</strong></td>
<td>• Did patient check for probable causes (i.e. line clamped, kink in line, fibrin threads in catheter)?&lt;br&gt;• When did patient last have a bowel movement and is the patient taking the prescribed laxatives?</td>
<td>• If fibrin noted, instruct patient to “milk” the line as they were taught (with the flow of fluid).&lt;br&gt;• Review prescribed laxatives if patient not taking as instructed.&lt;br&gt;• Instruct patient to go to the PD Unit, ER department, nearest hospital or nursing station if drainage problem persists.</td>
</tr>
<tr>
<td><strong>e) Bloody effluent:</strong></td>
<td>• Was the patient participating in any strenuous activities or doing any heavy lifting?&lt;br&gt;• Is the patient menstruating?</td>
<td>• Instruct patient to flush one bag of dialysate in and out of the peritoneal cavity and repeat if effluent still appears to be bloody.&lt;br&gt;• Instruct patient to call PD Unit if not clearing.</td>
</tr>
<tr>
<td><strong>f) Patient ran out of medications:</strong></td>
<td>• Is patient taking medications as prescribed?</td>
<td>• If not, review medication prescription with patient.&lt;br&gt;• Instruct patient to call own pharmacy for refill.&lt;br&gt;• If no refill is available, instruct patient to ask his/her own pharmacy to fax “refill request” to nephrologist/physician.</td>
</tr>
<tr>
<td><strong>g) Equipment/supply problems:</strong>&lt;br&gt;  i. Dialysate solutions are low</td>
<td>• Is patient using the prescribed type of solution</td>
<td>• Review prescription with patient.&lt;br&gt;• Instruct patient to come to the PD Unit to pick up a 3 day supply of solution.&lt;br&gt;• Review with patient the importance of ordering adequate amounts of supply.</td>
</tr>
<tr>
<td>ii. Roller clamp on transfer set malfunctioning</td>
<td>• Is there flow of fluid when the roller clamp is closed?</td>
<td>• Instruct patient to go to the PD Unit, ER department, nearest hospital or nursing station for a transfer set change and antibiotics, if contamination has occurred.&lt;br&gt;• Instruct patient not to do any dialysis exchanges until the</td>
</tr>
</tbody>
</table>
### Problem/Issue

<table>
<thead>
<tr>
<th>iv. Cycler does not function</th>
<th>Questions Asked of Patients</th>
<th>Advice to Patient</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• Is there a specific problem or complication indicated on the digital display?</td>
<td>• If a systems problem, instruct patient to phone the 1 - 800 number on the machine. The machine may need to be replaced.</td>
</tr>
</tbody>
</table>

Advice given to the patient is documented in the patient record and the physician notified regarding clinical problems or issues.
MANITOBA RENAL PROGRAM

<table>
<thead>
<tr>
<th>SUBJECT</th>
<th>SECTION</th>
<th>60.30  Protocols</th>
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<tbody>
<tr>
<td>Care of the Patient on Home Hemodialysis Protocol</td>
<td>CODE</td>
<td>60.30.16</td>
</tr>
<tr>
<td></td>
<td>EFFECTIVE DATE</td>
<td>September 2007</td>
</tr>
<tr>
<td></td>
<td>AUTHORIZATION</td>
<td>Professional Advisory Committee, Manitoba Renal Program</td>
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<tr>
<td></td>
<td></td>
<td>Nursing Practice Council, St. Boniface General Hospital</td>
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<td>REVISION DATE</td>
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</table>

**COVEREAGE:**

1. This protocol is applicable to those areas providing home training and follow up to patients who perform self administered Home Hemodialysis.

**STATEMENT OF GUIDELINES:**

1. **Patient Teaching:**
   Patient teaching is based upon the Home Hemodialysis Patient Training Manual.

2. **Initiation of Home Hemodialysis Dialysis Orders:**
   The physician will order the following hemodialysis orders:
   - Dry weight (kgs)
   - Frequency of dialysis (days/week)
   - Length of dialysis treatment (hours)
   - Dialyzer
   - Heparin prime and hourly dose (PRN)
   - Dialysate solution
   - Sodium profiling
   - Fluid profiling

3. Initial bloodwork and clinic bloodwork is done according to the Dialysis Panel and as outlined in Protocol 60.30.06 Initial and Monthly Lab Tests for Chronic Hemodialysis Patients.

4. Patients are referred to Home Care for follow-up.

5. Patients are given a clinic appointment to return in 4 weeks. Subsequent appointments will be approximately every 2 months and PRN.

6. **Community Dialysis Office is open Monday to Friday 0800 to 1615: Phone 787-7950 or FAX 787-7038.**
   If the office is closed and the patient feels that he/she must dialyze as his/her weight or potassium is too high, he/she must go to Health Sciences Centre (HSC) ER or nearest hospital/nursing station for assessment.

7. Guidelines for telephone advice are as follows:
## Care of the Patient on Home Hemodialysis Protocol

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<th>Problem/Issue</th>
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<tbody>
<tr>
<td><strong>a) Shortness of Breath (SOB):</strong></td>
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<tr>
<td>• Does SOB occur at rest?</td>
<td></td>
<td>• Suspect pulmonary edema and ask patient to weigh himself.</td>
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<tr>
<td>• Is the patient’s weight higher than usual above his dry?</td>
<td></td>
<td>• If the patient is well enough to dialyze, advise to do so and aim for dry weight.</td>
</tr>
<tr>
<td>• Does the patient have edema?</td>
<td></td>
<td>• If symptoms persist after treatment or if patient is unable to dialyze, instruct the patient to call the Community Dialysis Office.</td>
</tr>
<tr>
<td>• Are the patient’s blood pressures elevated?</td>
<td></td>
<td>• Instruct patient to contact the Community Dialysis Office for bloodwork. (SOB may be due to ↓ Hgb).</td>
</tr>
<tr>
<td>• Does SOB occur only on exertion?</td>
<td></td>
<td>• If SOB severe or is accompanied by chest pain, instruct patient to go to HSC ER department, or nearest hospital/nursing station.</td>
</tr>
<tr>
<td><strong>b) Dizziness:</strong></td>
<td></td>
<td><strong>If patient is dialyzing, and BP is low:</strong></td>
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<tr>
<td>• Is the patient on dialysis?</td>
<td></td>
<td>• Instruct patient to press MIN UF and infuse 100 mL of normal saline. Recheck BP.</td>
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<tr>
<td>• Is the patient’s blood pressure (BP) low?</td>
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<td>• If BP still low, infuse normal saline in 100 mL increments to a maximum of 500 mL. Re-check BP after each 100 mL.</td>
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<tr>
<td>• Was the patient’s pre dialysis BP low?</td>
<td></td>
<td>• If BP still low, press rinse back and discontinue dialysis. If patient unable to discontinue dialysis or if BP still low after discontinuing dialysis, instruct to call 911 (or local emergency services) for help.</td>
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<td></td>
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<td>• IF BP improves, instruct the patient to press the UF ON button, decrease weight loss by .5 kg and continue dialysis.</td>
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<td>• Instruct the patient to call Community Dialysis office during working hours to discuss future fluid removal requirements.</td>
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<td>• If on antihypertensives, instruct patient to take antihypertensive medications post dialysis on his dialysis days.</td>
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</table>
### Care of the Patient on Home Hemodialysis Protocol

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<tr>
<td></td>
<td>• Is the patient taking anti-hypertensives as prescribed?</td>
<td>• If not taking as prescribed, review anti-hypertensive medications.</td>
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<td><strong>If the patient is not dialyzing and BP is low:</strong></td>
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<td>• Instruct the patient: Do not take BP meds until BP normal and call Community Dialysis to have meds reviewed.</td>
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<tr>
<td>c) Patient ran out of medications:</td>
<td>• Is patient taking medications as prescribed?</td>
<td>• If not, review medication prescription with patient.</td>
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<td></td>
<td></td>
<td>• Instruct patient to call own pharmacy for refill.</td>
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<td>• If no refill is available, instruct patient to ask his/her own pharmacy to contact Community Dialysis.</td>
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<td>• If after hours and the medication cannot wait until Community Dialysis is open, contact the nephrologist on call for a repeat prescription and fax to the patient’s pharmacy (or 24 hour pharmacy if patient’s pharmacy closed). Notify the patient where to pick up.</td>
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<tr>
<td>d) Equipment/supply problems:</td>
<td>• Is patient dialyzing according to patient’s dialysis prescription?</td>
<td>• Review dialysis prescription with patient.</td>
</tr>
<tr>
<td>i. Dialysis supplies are low</td>
<td>• Does patient have enough supplies for his next dialysis treatment?</td>
<td><strong>If patient does not have enough supplies:</strong></td>
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<tr>
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<td>• Instruct him to go to the closest Dialysis Unit if outside of Wpg (HSC in Wpg) to pick up adequate supplies for his next dialysis treatment.</td>
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<td></td>
<td>• Contact the Community Dialysis Office to arrange order and delivery of supplies.</td>
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<tr>
<td>ii. Machine problems and/or machine alarms</td>
<td>• Is patient on dialysis at the time of the call?</td>
<td>• Review with patient the importance of ordering adequate amounts of supply.</td>
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<td></td>
<td></td>
<td>• Transfer the call to the Community Dialysis office.</td>
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<td>• If after hours, transfer the patient’s call to the dialysis technician’s on-call cell phone 223-0026, Monday – Friday 1600-2330 or Saturday 0800-2330.</td>
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<td></td>
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<td>• If the patient calls during off</td>
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</table>
### Care of the Patient on Home Hemodialysis Protocol

<table>
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</table>
| e) Chest Pain | • Is the pain mild or severe?  
• Is the pain associated with any other symptoms?  
• Does the patient have any medication for chest pain?  
• Is the patient on dialysis? | hours 2330-0800 or on Sunday, instruct the patient not to dialyze and to contact the dialysis technician during their on call hours.  
• If the patient must dialyze as he feels his weight or potassium is too high, he must go to HSC ER or nearest hospital/nursing station for assessment.  
• The dialysis technician will troubleshoot the machine problem/alarm situation utilizing the Belco Operator's Manual as a resource.  
• If the patient has nitro prescribed, instruct the patient to self-administer. Repeat every 5 minutes to a maximum of 3 doses if necessary.  
**If pain is severe or does not resolve after nitro administration (3 doses) then:**  
• Instruct the patient to call 911 (or local emergency services) and immediately go to HSC ER or nearest hospital/nursing station.  
• If the patient is on dialysis instruct to call 911, discontinue dialysis and give blood back.  
• If the patient is on dialysis, ask the patient to check the dialysate temperature and follow the troubleshooting guide if the temperature is above the value set.  
• If the patient has a central line for vascular access, instruct the patient to complete dialysis and go to HSC ER or nearest hospital/nursing station to assess for septicemia.  
• If fever is mild, less than 1 degree above normal and less than 37.5, and the patient has acetaminophen ordered instruct to take 2 tabs and call Community Dialysis during office hours. |
| f) Fever and/or chills | • What is the patient’s temperature?  
• What is the patient’s usual temperature?  
• Is the patient on dialysis?  
• What type of vascular access does the patient have?  
• Does the patient have any sources of infection (e.g. wounds, urinary tract infection Symptoms)? |
## Care of the Patient on Home Hemodialysis Protocol

<table>
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</table>
| g) Unable to use vascular access. | • What type of vascular access does the patient have?  
• If the patient uses CVC was he/she able to remove the instillation from last dialysis?  
• What is the usual blood flow (QB)?  
• What is the blood flow this dialysis?  
• What are the arterial pressure (AP) and venous pressure (VP)?  
• How often are there venous or arterial pressure alarms? |  
  - If the fever is/or becomes 1 degree above normal or greater than 37.5 instruct the patient to go to HSC ER or nearest hospital/nursing station.  
  - If the patient has a central venous catheter:  
    - If unable to remove instillation from last dialysis:  
      - Instruct the patient to get up and walk around, cough and retry removing the instillation.  
      - If still unable to remove the instillation, instruct the patient to instill heparin with minimal force and continue with dialysis procedure.  
    - If the patient must use considerable force to instill the heparin, then stop the instillation and instruct the patient to call the Community Dialysis office. If after hours and the patient feels he/she must dialyze as his/her weight and/or potassium are too high, he/she should go to HSC ER or nearest hospital/nursing station.  
    - If arterial pressures are > – 200 and/or the venous pressures are > 250 and the blood flow is < 200, instruct the patient to switch the bloodlines.  
    - If there is no improvement in the VP/AP and QB, instruct the patient to continue dialysis unless the QB drops below 180 mL/min, then stop dialysis and return the blood. Instruct the patient to call Community Dialysis. If after hours and the patient feels he/she must dialyze as his/her weight and/or potassium are too high he should go to HSC ER or nearest hospital/nursing station. |
## Care of the Patient on Home Hemodialysis Protocol

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</table>
|               | • If fistula/graft, is there a change in the quality of the bruit? | **If the patient has a fistula/graft:**  
  • If there is no bruit, instruct the patient to call Community Dialysis. If after hours and the patient feels he/she must dialyze as his/her weight and/or potassium are too high, he/she should go to HSC ER or nearest hospital/nursing station.  
  • If the bruit is diminished and the BP is low follow Section b) Low Blood Pressure. Instruct the patient to re-check the bruit once the BP is normal.  
  • If the bruit is diminished and the BP is normal, instruct the patient to call Community Dialysis. If after hours and the patient feels he/she must dialyze as his/her weight and/or potassium are too high he/she should go to HSC ER or nearest hospital/nursing station.  
|               | • What is the patient’s Blood pressure? |                    |
|               | • Was the patient able to puncture the fistula/graft? | **If there was a venous interstitial needle:**  
  • Instruct the patient to insert another venous needle proximal to the blow.  
  • If unable to insert the needle proximal to the blow instruct the patient not to dialyze. Ice the blow to prevent swelling and retry dialysis tomorrow.  
|               | | **If there was an arterial interstitial needle:**  
  • Instruct the patient to insert another arterial needle either proximal or distal to the blow.  
  • If unable to insert another needle instruct the patient not to dialyze. Ice the blow to prevent swelling and retry dialysis tomorrow.  
  • If the blood is very dark in color |
<table>
<thead>
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</thead>
<tbody>
<tr>
<td></td>
<td>• What color is the blood in the flashback of the needle?</td>
<td>instruct the patient to check the quality of the bruit and if diminished, instruct the patient to call Community Dialysis. If after hours and the patient feels he/she must dialyze as his/her weight and/or potassium are too high he/she should go to HSC ER or nearest hospital/nursing station.</td>
</tr>
</tbody>
</table>

The advice given to the patient is documented in the patient health record and the physician is notified and a voice message is left on the Community Dialysis office phone regarding clinical problems or issues.
COVERAGE:

1. This protocol is applicable to those areas providing peritoneal dialysis (PD) therapy to Stage V (last stage of renal failure) patients.

2. Peritoneal dialysis is a therapy that requires instillation of a dialyzing solution into the peritoneal cavity via a peritoneal catheter.

STATEMENT OF GUIDELINES:

1. Continuous Cycling Peritoneal Dialysis (CCPD) therapy is done 7 nights per week using aseptic technique.

2. Home Care Attendants (HCA) who have received training and have demonstrated competency in administering CCPD are responsible for setting up the automated machine, initiating treatment, and discontinuing treatment.

3. Each CCPD treatment consists of several automated exchanges. Each exchange involves a fill phase (i.e. infusion of dialysate solution into the peritoneal cavity), a dwell phase (i.e. a period of time during which the dialysate solution remains in the cavity to allow for the removal of solutes and fluid across the peritoneal membrane) and a drain phase (effluent containing wastes, electrolytes, and excess fluid is removed form the cavity).

4. Patients are weighed on a daily basis. The goal is to maintain the patient at their target weight, which is the weight with no signs and symptoms of fluid overload and no signs and symptoms of dehydration. The target weight is ordered by the physician (nephrologist).

5. The CCPD prescription is ordered by the physician (nephrologist) and includes:
   - Total therapy time
   - Total therapy volume
   - Dextrose concentration per litre
   - Parameters to follow when altering the dextrose concentrations in response to the patient’s daily weight
   - Fill volume
   - Last fill volume including type of dialysate solution and the dextrose concentration if using a dextrose based solution
STATEMENT OF GUIDELINES:

6. HCAs who have received training and who have demonstrated competency in administering CCPD may alter the dextrose based dialysate in response to the patient’s daily weight. These alterations must fall within the parameters of the Peritoneal Dialysis Prescription (Appendix A) ordered by the physician.

If the patient’s daily weight falls outside of the parameters of the peritoneal dialysis prescription, the HCAs can take direction from the Peritoneal Dialysis Home Care Coordinator (PD HCC) or the Seven Oaks General Hospital (SOGH) PD nurse to alter the dextrose based dialysate. The direction provided by the PD HCC or the SOGH PD nurse to the HCA must fall within the parameters of the CCPD Fluid Management Guidelines (Appendix B).

If the patient’s daily weight falls outside of the parameters of the CCPD Fluid Management Guidelines (Appendix A), the PD HCC or the SOGH PD nurse will assess the individual patient situation, consult the nephrologist, and provide direction to the HCA.

Any alterations to the CCPD therapy must be documented by the HCA on the Delegated Nursing Task HCA Sign Off Sheet.

In situations where the patient’s weight has fallen outside of the parameters of the CCPD Fluid Management Guidelines, the PD HCC will complete a home visit the following working day. Findings from the home visit and the patient assessment and the plan of care will be documented in the patient’s file and renal health record. All patient information must be communicated between the PD HCCs, SOGH PD nurses, and the nephrologist.

Alterations to the patient’s PD regime that fall outside of the parameters of the PD prescription and the parameters of the CCPD Fluid Management Guidelines require a physician’s order.

7. Only PD HCCs and Registered Nurses who have demonstrated competency may add medications to the dialysate solution as per physician order. Intraperitoneal (IP) medication administration is documented on the health record.

8. CCPD therapy is documented on the Delegated Nursing Task HCA Sign Off Sheet.
   - Date/Time
   - Weight
   - Blood pressure
   - Initial drain
   - Total UF
   - Average dwell time
   - Comments related to therapy
   - Comments related to the appearance of the effluent
   - Initials (signature verification form must be signed)

9. A PD catheter that is sluggish or plugged may be irrigated by a PD HCC with 20 mL of normal saline and repeated X 1 as ordered by the physician. If the PD catheter remains sluggish or plugged, the physician may order an abdominal x-ray.

10. The HCA, the PD patient, and the designated support person for the patient should contact the following resource persons (in descending order) to intervene and solve problems when the need arises. See Telephone Algorithm for HCA Assisted PD Concerns (Appendix C).
    - PD HCCs from Monday to Friday inclusive, 08:00 – 16:00 hours.
    - Clinical Resource Nurse or Peritoneal Dialysis Nurses at Seven Oaks General Hospital if Peritoneal Dialysis Home Care Coordinators are not available during the above days and times.
    - Seven Oaks Hemodialysis Unit from Monday to Friday, 16:00 – 23:30 hours, and Saturday 08:00 – 23:30 hours.
    - HealthLinks from Monday to Sunday, 23:30 – 08:00 hours, and Sunday 08:00 – 23:30 hours.

11. The resources persons listed above will provide telephone advice to the HCA, patient, and/or designated support person in the community. This advice must be documented in the patient’s file and/or renal health record. The physician (nephrologist) must be notified regarding clinical problems or issues.
Guidelines for providing telephone advice to the HCA, designated support person or patient are as follows:

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<tr>
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</tr>
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<tbody>
<tr>
<td>a) Home Care Attendant does not show up as scheduled:</td>
<td>• Does the patient have a support person available to provide assistance with peritoneal dialysis?</td>
<td>• If no one is available to assist the patient, instruct the person calling to follow the telephone algorithm (Appendix C).</td>
</tr>
</tbody>
</table>
| b) Shortness of Breath (SOB): | • Does SOB occur at rest?  
  • Is the patient experiencing increased weight and/or edema?  
  • Does SOB occur only on exertion? | • Patient may be fluid overloaded. Refer to the patient’s prescription and the CCPD Fluid Management Guidelines (Appendix B) and then instruct HCA accordingly. If symptoms persist after treatment, instruct HCA to notify PD HCC. The PD HCC will provide a home visit and assess the patient’s fluid status.  
  • If SOB is severe or is accompanied by chest pain, instruct HCA that patient must go to SBGH ER department. |
| c) Dizziness: | • Is the patient experiencing cramps, increased thirst, dry mouth and/or decreased weight?  
  • Is the patient’s blood pressure low (if known)? | • Patient may be dehydrated. Refer to the patient’s prescription and the CCPD Fluid Management Guidelines (Appendix B) and then instruct HCA accordingly. If symptoms persist after treatment, instruct HCA to notify PD HCC. The PD HCC will provide a home visit and assess the patient’s fluid status.  
  • Instruct HCA to notify the PD HCC. The PD HCC will provide a home visit and assess the patient’s fluid status.  
  • If no improvement in patient’s symptoms of dizziness, instruct HCA to send patient to SBGH ER department. |
| d) Infection:  
  i. Cloudy effluent | • Is patient experiencing any symptoms of peritonitis (i.e. abdominal pain, fever, chills)? | • Instruct HCA to send patient to the SOGH PD Unit, SBGH ER department, or the nearest hospital or nursing station for treatment and to bring the drained cloudy bags with them. |
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</thead>
<tbody>
<tr>
<td>ii. Abdominal pain</td>
<td>• Is patient experiencing symptoms of peritonitis (i.e. fever, chills, cloudy effluent)?</td>
<td>• Instruct HCA to send patient to the SOGH PD Unit, SBGH ER department, or the nearest hospital or nursing station for treatment and to bring the drained cloudy bags with them.</td>
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<tr>
<td>iii. Exit site</td>
<td>• If the exit site is exposed, is it red in appearance?</td>
<td>• If there is pain or discharge, instruct HCA to send patient to the SOGH PD Unit, SBGH ER department, or the nearest hospital or nursing station to have the exit site swabbed.</td>
</tr>
<tr>
<td></td>
<td>• Is there any pain or discharge associated with the redness?</td>
<td>• Instruct HCA to tell the patient not to shower until exit site has been assessed.</td>
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<tr>
<td></td>
<td>• Is the exit site dressing moist or bloody?</td>
<td></td>
</tr>
<tr>
<td>iv. Leakage from line</td>
<td>• Is the leakage occurring from the transfer set or from the permanent catheter?</td>
<td>• Instruct HCA to clamp line between the patient’s PD catheter exit site and the area of leakage (i.e. crack in line). Wrap povidone swab over the area followed by a 5 x 5 cm gauze and tape.</td>
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<tr>
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<td>• Instruct HCA to send patient to the SOGH PD Unit, SBGH ER department, or the nearest hospital or nursing station to have the PD catheter repaired or the transfer set changed and to receive antibiotics.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Instruct HCA not to perform any dialysis until the PD catheter is repaired or transfer set changed.</td>
</tr>
<tr>
<td>v. Transfer set contamination</td>
<td>• Is it dry or wet contamination?</td>
<td>• If a dry contamination, instruct the HCA to apply a new mini cap to the transfer set, wait 15 minutes and change mini cap again. Peritoneal dialysis may be initiated after 15 minutes.</td>
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<td></td>
<td></td>
<td>• If a wet contamination, instruct HCA to apply a new mini cap to the transfer set, wait 15 minutes and change mini cap again. Instruct HCA not to perform any dialysis.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• If a wet contamination, the nephrologist needs to be notified for prophylactic antibiotic treatment. Instruct</td>
</tr>
<tr>
<td>Problem/Issue</td>
<td>Questions Asked</td>
<td>Advice to HCA, Patient or Designated Support Person</td>
</tr>
<tr>
<td>---------------------------------------</td>
<td>---------------------------------------------------------------------------------</td>
<td>-----------------------------------------------------</td>
</tr>
<tr>
<td></td>
<td></td>
<td>HCA to follow the <em>Telephone Algorithm for HCA Assisted PD Concerns</em> (Appendix C). The nephrologist will need to be notified.</td>
</tr>
<tr>
<td>d) Effluent not draining:</td>
<td>• Did HCA check for probable causes (i.e. line clamped, kink in line, fibrin threads in catheter)?&lt;br&gt;• When did patient last have a bowel movement and is the patient taking the prescribed laxatives?</td>
<td>• If fibrin noted, instruct HCA to “milk” the line as they were taught (with the flow of fluid during drain phase).&lt;br&gt;• If telephone advisor has access to the patient medication record, review the laxative prescription with the patient if he/she is not taking as instructed.&lt;br&gt;• Instruct HCA to send the patient to the SOGH PD Unit, SBGH ER department, or the nearest hospital or nursing station if drainage problem persists.</td>
</tr>
<tr>
<td>e) Bloody effluent:</td>
<td>• Was the patient participating in any strenuous activities or doing any heavy lifting?&lt;br&gt;• Is the patient menstruating?</td>
<td>• Instruct HCA to continue to observe effluent.&lt;br&gt;• If the effluent does not clear, instruct the HCA follow the <em>Telephone Algorithm for HCA Assisted PD Concerns</em> (Appendix C). The nephrologist will need to be notified.</td>
</tr>
<tr>
<td>f) Patient ran out of medications:</td>
<td>• Is patient taking medications as prescribed?</td>
<td>• If telephone advisor has access to the patient medication record, review the prescriptions with the patient.&lt;br&gt;• Instruct HCA to have patient call own pharmacy for refill.&lt;br&gt;• If no refill is available, instruct HCA to have patient ask his/her own pharmacy to fax “refill request” to the nephrologist.</td>
</tr>
<tr>
<td>g) Equipment Problems</td>
<td></td>
<td></td>
</tr>
<tr>
<td>i. Twist clamp on transfer set malfunctioning</td>
<td>• Is there flow of fluid when the twist clamp is closed?</td>
<td>• Instruct HCA to send patient to SOGH PD Unit or to SBGH ER department for transfer set change and antibiotic administration if wet contamination has occurred.&lt;br&gt;• Instruct HCA not to perform any dialysis until the transfer set has been replaced.</td>
</tr>
<tr>
<td>Problem/Issue</td>
<td>Questions Asked</td>
<td>Advice to HCA, Patient or Designated Support Person</td>
</tr>
<tr>
<td>-------------------------------------</td>
<td>------------------------------------------------------------</td>
<td>---------------------------------------------------</td>
</tr>
<tr>
<td>ii. Cycler does not function</td>
<td>• Is there a specific problem or complication indicated on the digital display?</td>
<td>• If SYSTEM ERROR is displayed on the digital display, instruct HCA to phone the 1 - 800 number on the machine. The machine may need to be replaced.</td>
</tr>
<tr>
<td>h) Alarms</td>
<td>• Display reads:</td>
<td>• Instruct HCA to check for kinks, closed clamps, fibrin blockage, and empty dialysate bags. • Once the problem is identified, instruct HCA to correct problem and the alarm should reset itself. • If alarm does not reset itself, instruct HCA to press STOP, correct the problem (listed above), and press GO.</td>
</tr>
<tr>
<td></td>
<td>Check Drain Line</td>
<td></td>
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<td></td>
<td>Check Final Line</td>
<td></td>
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<tr>
<td></td>
<td>Check Heater Line</td>
<td></td>
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<td></td>
<td>Check Patient Line</td>
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</tr>
<tr>
<td></td>
<td>Check Supply Line</td>
<td></td>
</tr>
<tr>
<td>• Display reads:</td>
<td>• Instruct HCA to press STOP and check all lines and bags for kinks, closed clamps or fibrin blockage • Once problem is corrected, instruct HCA to press GO.</td>
<td></td>
</tr>
<tr>
<td>Check Lines and Bags</td>
<td>• Display reads:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Load a New Set</td>
<td>• Instruct HCA to press STOP, remove and discard the disposable set. • Use a new disposable set and new solution bags (if they were already connected to the old set). • Load the cassette and press GO and follow the setup instructions in the display.</td>
</tr>
<tr>
<td></td>
<td>Load New Set and Bags</td>
<td></td>
</tr>
<tr>
<td>• Display reads:</td>
<td>• Instruct HCA to have patient change body position. Changing positions should move the catheter and allow more fluid to drain. • Instruct HCA to check for kinks in the patient line and correct them. • The alarm should reset itself. If it does not, instruct HCA to press STOP, change body position again or lower the cycler machine by 6 inches, and press GO.</td>
<td></td>
</tr>
<tr>
<td>Low Drain Volume</td>
<td>• Display reads:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Low Drain Volume</td>
<td>• Instruct patient/support person to press STOP and follow the Telephone</td>
</tr>
<tr>
<td>i) If problems occur during the night that cannot be resolved.</td>
<td>• Instruct patient/support person to press STOP and follow the Telephone</td>
<td></td>
</tr>
<tr>
<td>Problem/Issue</td>
<td>Questions Asked</td>
<td>Advice to HCA, Patient or Designated Support Person</td>
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<td>--------------</td>
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</tr>
<tr>
<td></td>
<td></td>
<td><em>Algorithm for HCA Assisted PD Concerns</em> (Appendix C). The nephrologist will need to be notified.</td>
</tr>
</tbody>
</table>
Appendix A

PERITONEAL DIALYSIS PRESCRIPTION
### CCPD FLUID MANAGEMENT GUIDELINES

<table>
<thead>
<tr>
<th>WEIGHT</th>
<th>CYCLER</th>
<th>DAY BAG</th>
</tr>
</thead>
</table>
| Below target weight | 1.5% dialysate  
Last fill - hold Extraneal  
- use 0.5% or 1.5% dialysate  
Drink extra fluids  
Eat salty food | 0.5% dialysate |
| At target weight | All - 1.5% dialysate  
Last fill - 1.5% dialysate or Extraneal | 1.5% dialysate or Extraneal |
| 0.5 – 0.9 kg above target weight  
(1 – 2 lbs) | Combination of 1.5% and 2.5% dialysate  
Last fill - 1.5% or 2.5% dialysate or Extraneal | 1.5% dialysate or Extraneal |
| 1 – 1.4 kg above target weight  
(2 – 3 lbs) | All 2.5% dialysate  
Last fill - 2.5% dialysate or Extraneal | 2.5% dialysate or Extraneal |
| 1.5 – 1.9 kg above target weight  
(3.5 - 4 lbs) | Combination of 2.5% and 4.25% dialysate  
Last fill - 2.5% or 4.25% dialysate or Extraneal | 2.5% dialysate or Extraneal |
| 2 – 3 kg above target weight  
(4 – 6.5 lbs) | All 4.25% dialysate  
Last fill - 2.5% or 4.25% dialysate or Extraneal | 2.5% dialysate or Extraneal |
| 3 kg above target weight  
(6.5 lbs and above) | All 4.25% dialysate  
Last fill - 4.25% dialysate or Extraneal | 4.25% dialysate or Extraneal |
Appendix C

TELEPHONE ALGORITHM FOR HCA ASSISTED PD CONCERNS

The HCA, patient and the designated support person should contact the following resource persons (in descending order) to intervene and problem-solve when the need arises.

*The Home Care PD Coordinators will fill in the appropriate phone numbers once the patient is discharged home from training.*

<table>
<thead>
<tr>
<th>For all problems (with the exception of the HCA not showing up) contact the following people:</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Monday-Friday 8:00 am – 4:00 pm contact:</strong></td>
</tr>
</tbody>
</table>
| PD Home Care Coordinators  
Phone # |
| **If the HCA does not show up, contact the following people:** |
| **Monday-Friday 8:00 am – 4:00 pm contact:**  |
| PD Home Care Coordinators  
Phone # |
| The PD HCCs will notify the HC Resource Coordinator who will find a replacement |

| If Home Care Coordinators not available during above days and times contact:  |
| Seven Oaks General Hospital  
PD Unit  
Phone # 632-3454 |
| **Monday-Friday 4:00 pm – 11:30 pm and Saturday-Sunday contact:**  |
| Home Care After-Hours  
Phone # 940-2300  
Home Care After - Hours will find a replacement. |

| Monday-Friday 4:00 pm – 11:30 pm  
Saturday 8:00 am – 11:30 pm contact:  |
| Seven Oaks General Hospital  
Hemodialysis Unit  
Phone # 632-3467 |
| **If Home Care After-Hours fails to find a replacement contact:**  |
| St Boniface General Hospital  
Phone # 237-2053 and ask for the nephrologist On-Call |

| Monday-Sunday 11:30 pm – 8:00 am  
Sunday 8:00 am – 11:30 pm contact:  |
| Health Links  
Phone # |

For those problems that indicate a Nephrologist must be contacted call:  
St. Boniface General Hospital  
Phone # 237-2053 and ask for the nephrologist On-Call
MANITOBA RENAL PROGRAM

SUBJECT
- Guidelines for Permanent Transfer of Patients between Dialysis Units within the Manitoba Renal Program

SECTION 60.40 Guidelines

CODE 60.40.01

AUTHORIZATION
- Professional Advisory Committee, Manitoba Renal Program
- Nursing Leadership Council, SBGH

EFFECTIVE DATE January 2000

REVISION DATE August 2007

PURPOSE:

1. To ensure that pertinent patient information is prepared, transferred, and communicated between the dialysis units within the Manitoba Renal Program (MRP) prior to permanent transfer of patients.

POLICY:

1. Patient information (refer to Appendix) must be communicated between the sending and receiving dialysis units prior to the patient transfer.

2. The receiving unit’s Nephrologist is responsible for accepting or declining the patient based on the information communicated to the receiving unit from the sending unit.

3. The Clinical Resource Nurse, Charge Nurse or assigned Registered Nurse or Licensed Practical Nurse is responsible for ensuring complete and accurate patient information is present in the patient’s health record prior to the health record and/or patient transfer.

A. GUIDELINES FOR SELECTING DIALYSIS PATIENTS FOR PERMANENT TRANSFER WITHIN WINNIPEG:

1. Patient Selection

   a. All Renal Health Clinic patients residing in Winnipeg will be informed that upon initiation of peritoneal or hemodialysis, they may be transferred to any of the Manitoba Renal Program (MRP) sites including Seven Oaks General Hospital (SOGH), Health Sciences Centre (HSC) or St. Boniface General Hospital (SBGH).

   b. Priority for any Winnipeg site will be given to those with postal codes in close proximity to that site.

   c. Patients high on the list awaiting transfer to a Local Centre should be given priority for transfer to HSC.

   d. Patients from the same personal care home should be dialyzed at the same Winnipeg site to facilitate communication and transportation.
e. The most stable patients should be reviewed and considered for transfer to the Sherbrook Centre Dialysis Unit (SCDU).

f. In the absence of the above patients, the most recently initiated dialysis patient will be transferred to where dialysis capacity exists. Unless deemed by the site team to be detrimental to the patient, the patient will not be given the choice of declining the transfer. An ad hoc appeal process will be instituted, if necessary.

g. An updated case summary (completed within the last year) per MRP template must be present in the patient’s MRP Health Record. The case summary must include all pertinent information as indicated in the template. Details of bloodwork and dialysis is optional if the same information is available elsewhere in the MRP Health Record. If the case summary was done prior to dialysis initiation, the date and circumstances of the initiation must be added. Any additions or modifications, if minor, may be hand written in order to facilitate prompt transfer.

h. A Patient Transfer List will be maintained at each site. The Clinical Resource Nurse and the Unit Nephrologist, based upon above criteria, will review the Patient Transfer List. Once a patient has been selected for transfer, the sending unit’s Nephrologist will review that patient’s case summary to ensure the information is current and accurate. If it is not, it is the physician’s responsibility to ensure it is updated (either by updating it himself/herself or allocating appropriately).

i. Prior to the patient’s transfer, the MRP Health Record (including all the patient information) will be sent to the receiving unit to be reviewed by the nephrologist. To ensure prompt return, this will be coordinated by the CRN and based upon the nephrologist’s availability. For transfers within Winnipeg, the receiving unit cannot reject the patient. If the nephrologist has concerns about the medical information, he/she should contact the Nephrologist from the sending unit directly.

2. Medical Criteria
   a. No active major infections.
   b. No active bleeding.
   c. No active unresolved acute medical problems.
   d. Patients considered for transfer should not require ongoing complex care, and not be frequent ER visitors.
   e. Must have working vascular access. If temporary catheter, should have plan including date for permanent access.
   f. The most stable patients in Winnipeg should be transferred to SCDU.

B. GUIDELINES AND SITE RESPONSIBILITIES FOR A PATIENT TRANSFER TO A LOCAL CENTRE/PERITONEAL DIALYSIS

1. Transfer of Patient to Local Centre (LC)
   a. The transfer of an established hemodialysis patient to HSC (CDU) and then to a planned LC includes a trial period of up to 30 days. The LC Unit receiving the patient may request an extension beyond 30 days for extenuating circumstances (e.g. hospitalization).
   b. If the patient fails the LC trial period (prior to 30 days), the patient will be transferred back to his/her originating site. If the originating site has no capacity, they will transfer a patient out to create capacity.
   c. If the patient fails the LC trial period (after 30 days), the patient returns to HSC regardless of his/her originating site.
   d. Items A. 1. g. and A. 1. h. above also apply to LC transfers.
2. Transfer of Patients to Peritoneal Dialysis (PD)

   a. The transfer of an established hemodialysis patient to a MRP site for PD, from another MRP site, includes a trial period of up to 30 days. The PD site receiving the patient may request an extension beyond 30 days for extenuating circumstances (e.g. hospitalization). If PD fails during this time, patient returns to originating hemodialysis site.

   b. After 30 days, should PD fail, the patient should remain at that MRP site and commence hemodialysis. Items A. 1. a. and A. 1. b. above apply to this patient.

   c. If PD is primary modality, and it fails, that MRP site will be responsible for initiating hemodialysis regardless of duration of time the patient has been on PD unless alternate arrangements are made. A pre-dialysis patient/renal health patient accepted for PD will become the responsibility of that MRP site even if the patient ultimately declines PD.

3. Exceptions for both patient groups

   a. If the patient requests to return to a specific site, every effort will be made to accommodate that.

   b. Acute medical condition(s) requiring care not available at the patient’s current site.
**PURPOSE:**

1. These guidelines are applicable to Registered Nurses and Licensed Practical Nurses who administer heparin and monitor the adequacy of heparinization during hemodialysis treatments. Anticoagulation with heparin is the usual method of preventing clotting extra corporeal systems. The heparin dose is initially prescribed on the *Chronic Hemodialysis Physician’s Order Sheet* (Form # W-00109A) by the physician.

**STATEMENT OF GUIDELINES:**

1. **Routine heparin prescriptions are for patients who are at a normal risk for bleeding:**
   
   a. Patient’s specific variables that influence requirements would include presence of congestive heart failure, malnutrition, neoplasms, blood transfusion and comorbid coagulopathies (e.g. warfarin therapy).
   
   b. Use of other medications in combination with heparin may increase a patient’s risk of bleeding. These medications include warfarin, antiplatelet drugs (e.g. aspirin, clopidogrel), nonsteroidal anti-inflammatory drugs (e.g. ibuprofen, naproxen), or low molecular weight heparins (e.g. dalteparin, enoxaparin). In addition, a patient’s heparin requirements may increase with the use of erythropoietin stimulating agents (e.g. darbepoetin, epoetin alfa) due to the resultant increase in hemoglobin and hematocrit with these medications.
   
   c. Adverse effects of heparin include hyperkalemia, osteoporosis, hyperlipidemia, heparin-induced thrombocytopenia, and risk of bleeds.

2. **Heparin can be prescribed in various amounts depending on the patient’s needs and physician orders. There are two methods of heparin coagulation:**
   
   a. Systemic: Initial bolus with continuous dose per hour (ordered by physician).
   
   b. Tight: Tight heparin is ordered for patients who are at risk for bleeding. Lower dose than usual as initial bolus followed by a decreased constant infusion.

3. **Heparin Free Dialysis – there are two indications and methods for Heparin free dialysis:**
   
   a. Patients who are actively bleeding or at a high risk of bleeding should not have systemic heparin but may have heparin lock instilled in central lines (see Procedure 30.10.03 *Providing Hemodialysis Without Heparinization*).
   
   b. Patients with Heparin Induced Thrombocytopenia (HIT) or suspected HIT cannot have heparin
STATEMENT OF GUIDELINES:

systemically or instilled in the lines. A physician’s order is needed for alternate installation solution.

4. **Standard infusion time:**


   b. Arterio-venous fistula or graft – Heparin must be discontinued a minimum of 30 minutes prior to treatment end.

5. **Assessing anti-coagulation therapy prior to administration of heparin:**

   a. The patient should be assessed regarding the events or changes in condition that have occurred since last dialysis treatment.

   b. Any signs of bleeding or potential risk of bleeding. Examples of these events include any open or closed injuries, falls, bruising, contusions, haemorrhage, including eye, surgical, dental, or invasive procedures that have been performed or will be performed and pericarditis. This information should be documented and communicated to the physician.

   c. Visual inspection of the dialyzers is important in assessing the effects of anti-coagulation. Signs of clotting in the system include extremely dark blood, shadows of black streaks in the dialyzer and clot formation in the drip chambers, and the headers of the dialyzer.) Kt/v and Kecn will also be decreased. Changes can also be seen in the arterial and venous pressures may also occur depending upon where the clotting is occurring in the set-up. The amount of clotting in the dialyzer post treatment should be assessed. A few clotted fibres or some clotting in the headers are not unusual but large amounts of clotting would indicate a need for increased heparin requirements.

   d. For International Normalized Ratio blood samples refer to Procedure 30.70.01 *Obtaining Blood Sample for International Normalized Ratio from Central Venous Catheter*.

6. **Any changes to heparin dosages must be discussed with a physician before implementing.** If clotting is observed, a physician order for increases of 500 units of prime or increasing the hourly dosage (see Adult Parenteral Drug Monograph – Heparin) may be obtained. Alternatively, if there are problems with bleeding post-dialysis, a physician order may be obtained for discontinuing the heparin infusion earlier in the treatment or to decrease the hourly dosage.

**DOCUMENTATION:**

- Hemodialysis Treatment Record
- Integrated Progress Notes
- Medication Administration Record

**REFERENCES:**


Health Sciences Centre Pharmacology Reference Manual for Nursing: Adult Parenteral Drug Monograph - Heparin
PURPOSE:

1. To prevent hypophosphatemia in patients receiving nocturnal/long daily hemodialysis treatments.

POLICY:

1. The Home Hemodialysis team will use the following guidelines and procedures to manage phosphate levels in patients receiving nocturnal/long daily hemodialysis treatments.

2. Registered Nurses, Licensed Practical Nurses in hemodialysis may add the sodium phosphate enema to the acid concentrate upon a physician’s order.

3. A qualified hemodialysis nurse will teach Nocturnal/long daily hemodialysis patients the procedure. The patient must demonstrate an understanding of the protocol. Documentation is to be included on the patient chart.

GUIDELINES:

1. Target phosphorus concentrations:
   a. Pre-dialysis phosphorus concentrations should be maintained between 1.4 – 1.78 mmol/L.
   b. Post-dialysis phosphorus concentrations should be maintained between 1 – 1.4 mmol/L.

2. When pre-dialysis phosphate levels are <1.4 mmol/L and/or post-dialysis phosphate levels are <1 mmol/L:
   a. Eliminate phosphate binders sequentially
   AND
   b. Liberalize dietary phosphate intake (in consultation with a renal dietitian)

3. If, despite implementation of Step 2, pre-dialysis phosphate levels are ≤1.2 mmol/L and/or post-dialysis phosphate levels are ≤0.8 mmol/L initiate phosphate supplementation:
   a. Add 15 mL sodium phosphate enema to the 5L dialysate acid concentrate jug (physician’s order required). Repeat pre- and post-dialysis phosphate levels in 1 week or sooner if any symptoms of hypophosphatemia.
   b. If phosphorus concentration is below target, increase dose of sodium phosphate enema by 15 mL per 5L acid concentrate jug (physician’s order required). Repeat pre- and post-dialysis phosphorus levels 1 week later or sooner if any symptoms of hypophosphatemia.
   c. If phosphorus concentration is within target, continue with the same volume of sodium phosphate enema every dialysis treatment. NOTE: Some patients may be instructed not to add sodium phosphate enema to their acid concentrate the first nocturnal/long daily hemodialysis after a night off,
GUIDELINES:

as phosphate may have accumulated during their extended time off dialysis.

d. Ongoing monitoring of pre- and post-hemodialysis phosphate levels should be performed with monthly blood testing.

NOTE: Patients may be instructed not to add sodium phosphates (Fleet Enema®) to their acid concentrate the first nocturnal/long daily hemodialysis after a night off, as phosphate may have accumulated during their extended time off dialysis.

EQUIPMENT:

- Adult sodium phosphate enema [Fleet Enema® (Johnson & Johnson) or Life Brand Enema® (Shoppers Drug Mart)]
- Contain 1.38 mmol phosphorus (P)/mL
- Each 15 mL will increase the final dialysate phosphorus (P) concentration by 0.092 mmol/L.
  (Calculations: 1.38 mmol P/mL x 15 mL = 20.7 mmol P/5L acid concentrate = 4.14 mmol/L/45 x dilution = 0.092 mmol/L)
- Acid concentrate jug – 5L (45x dilution)

PROCEDURE:

1. Open prescribed acid concentrate jug.
2. Remove protective cap from the sodium phosphate enema tube. Measure prescribed dose using a medication cup and add to the acid concentrate jug.
3. Replace cap on acid concentrate jug and mix thoroughly to ensure that the enema solution has dissolved.
4. Apply medication sticker to acid concentrate jug.
5. Proceed with machine set-up.
6. Schedule bloodwork for phosphorus every week x 3, then PRN as directed by physician.

KEY POINT:

- Serum phosphorus concentrations may change rapidly with the addition of the sodium phosphate enema.
- Bloodwork for phosphorus may be ordered sooner than 1 week if patient has symptoms of hypophosphatemia.

GUIDELINE DEVELOPERS:

- Paul Komenda, MD, Nephrologist, Manitoba Renal Program
- James Zacharias, MD, Nephrologist, Manitoba Renal Program
- Judy Olson, RN, Home Dialysis Nurse, Manitoba Renal Program
- Lori Wazny, Pharm.D., Clinical Pharmacist, Manitoba Renal Program

REFERENCES:

Personal communication Johnson & Johnson/Merck Medical Information Department (phosphorus concentration)
Licensed Natural Health Products Database, Health Canada website (Natural Product Number (NPN) 02231170 for generic sodium phosphate enemas ingredients and NPN 00009911 for Fleet Enema
PURPOSE:
1. To ensure accurate ordering and returning of dialysis supplies for Local Centre Dialysis Units.

POLICY:
1. The first time a dialysis supply order is placed, the newly formed Local Centre Dialysis Unit will have supplies ordered by a Community Dialysis Nurse at Health Sciences Centre, Local Centre Dialysis Nurse or delegate.

2. Following the initial order, the Local Centre Dialysis Unit and Local Centre Materials Management staff will be collaboratively responsible for the ordering and returning of dialysis supplies.

GUIDELINES:
1. Local Centre staff, during their orientation to the Local Centre Dialysis Unit, will be instructed in the process of ordering and returning dialysis supplies.

2. The Local Centre will receive a copy of the initial order.

3. Orders for dialysis supplies are forwarded/faxed to:
   Supervisor, Warehouse
   Supply & Distribution Services
   HSC MH106
   59 Pearl Street
   Winnipeg MB R3E 2L7
   FAX: 204-787-2737

4. Supplies are to be ordered every 4 weeks as per schedule (unless alternate arrangements are made with the Supervisor, Warehouse, HSC). Orders are to be received in HSC Supply & Distribution Services 7 working days prior to being required.

5. Supplies are checked against what has been ordered when they arrive at the Local Centre. If supplies are missing or if there are discrepancies, the Supervisor, Warehouse Supply & Distribution Services at HSC will be notified within 1 – 2 working days (phone 204-787-1040).

1. The Local Centre Dialysis Unit staff are responsible for rotating stock and checking expiry dates.
POLICY:

2. Supplies with an expiration date of less than three months will not be shipped to Local Centre Dialysis Units.

3. Dialysis supplies can be returned to the HSC Warehouse provided that the following criteria are fulfilled:
   a. Supplies must be in good condition.
   b. Supplies being returned must be in original boxes (i.e., returned supplies must be easily and readily identified).
   c. The cost of returning wrong or defective products will be managed by the HSC Warehouse Supervisor and Community Dialysis Unit, HSC.
   d. The Local Centre Dialysis Unit and Local Centre Material Management staff will seek authorization from the HSC Supervisor, Warehouse, Supply & Distribution Services or delegate (204-787-1040) prior to returning dialysis supplies.

4. If the criteria listed in Step 8 of this policy are met and authorization is received, supplies can be returned to:
   Supervisor, Warehouse
   Supply & Distribution Services
   HSC MH106
   59 Pearl Street
   Winnipeg, MB R3E 2L7
MANITOBA RENAL PROGRAM

SUBJECT

- Contacting a Patient who does not Attend a Hemodialysis Treatment

SECTION 60.40 Guidelines

CODE 60.40.05

AUTHORIZATION

- Professional Advisory Committee, Manitoba Renal Program
- Nursing Leadership Council, St. Boniface General Hospital

EFFECTIVE DATE January 2007

REVISION DATE February 2010

PURPOSE:

1. To ensure patient safety when hemodialysis treatments are missed.

POLICY:

1. Upon initiation of hemodialysis or transfer between Manitoba Renal Program (MRP) facilities or upon patient or MRP facility request or needs, the patient will be clearly informed about his/her hemodialysis treatment schedule including frequency and time.

2. The patient has the responsibility to follow the schedule.

3. If a patient does not present for a routinely scheduled hemodialysis treatment, the charge nurse or designate will attempt to contact the patient or caregiver once by phone.

GUIDELINE:

1. The charge nurse or designate is responsible for placing the phone call.
   a. If able to speak directly with the patient or caregiver, the charge nurse or designate will remind patient or caregiver of missed dialysis appointment and confirm date and time of next dialysis appointment.
   b. If unable to speak directly with the patient or caregiver, the charge nurse or designate will leave a message and phone number for the patient to contact the dialysis unit.
   c. If unable to leave phone message, the charge nurse or designate will document same.

2. The charge nurse or designate is responsible for documenting the outcomes of actions taken in Procedure 1 in the Integrated Progress Notes of the patient’s health record.

3. The nephrologist will be notified by the next dialysis day.

DOCUMENTATION:

- Integrated Progress Notes
REFERENCES:

MANITOBA RENAL PROGRAM

SUBJECT
- Bellco (Formula 2000)—Delivery System; Use of

SECTION 60.50 Home Hemodialysis

CODE 60.50.01

AUTHORIZATION
- Professional Advisory Committee, Manitoba Renal Program

EFFECTIVE DATE November 2009

PURPOSE:
1. To control and monitor the blood flow through the extracorporeal circuit.
2. To control and monitor the dialysate flow through the dialysate flow path.
3. To maintain a pathogen free blood circuit.

POLICY:
1. Registered Nurses (RN)/Licensed Practical Nurses (LPN) as per facility that received instruction and who have demonstrated competency to the Renal Educator, or delegate, may operate the Formula 2000.
2. Home Hemodialysis Nurse Patient Educators, who have previously demonstrated competency with use of the Formula 2000, may instruct patients to perform independent hemodialysis with the Formula 2000.
3. Rinse is performed between every patient use, if different individual.
4. Acid Clean is performed at the end of the treatment day.
5. Heat Disinfect is performed at the end of the treatment day.
6. Chemical Full (Bleach) is performed at least once per week or per Unit guidelines and following a blood leak (Blood Leak Alarm: responding by a nurse in Dialysis).
7. A 2-litre rinse is required for dialyzers when a nursing assessment determines that the biocompatibility of the dialyzer is an issue.

EQUIPMENT:
- Bellco blood lines
- Dialyzer per physician’s order
- Acid concentrate and bicart (or bicarbonate concentrate) per physician’s order
- Independent conductivity test supplies
- Independent pH test supplies
- Heparin Sodium 1000USP units/ml
- 2 or 3 –1 litre 0.9% NaCl
1 – 20 ml syringe with needle
- Forceps
- Recirculating line (Bellco)
- Vinegar
- Bleach (if scheduled)
- Chemical residue test supplies

**PROCEDURE:**

**A. Set up of Formula:**

1. Start the RO (Aquaboss EcoRO Dia 702)
   Once the 2nd line of the display on the RO reads OPERATION start the Formula.

2. Press the MAIN SWITCH on the back of the Formula to the on position.

3. Press the POWER BUTTON on the front of the monitor to turn on the machine.

4. The auto test will run for a few minutes:
   - Ensure the Formula reads RUNNING AUTO TEST on the monitor. (2-3 min).
   - Ensure the Formula reads RINSING/SELTSTEST in the upper left status bar once rinsing has started (5 min).
   - DO NOT CONNECT THE TRANSDUCEUR PROTECTORS OR HEMOX TUBING until after the auto test is complete.

**B. Rinsing the dialyzer:**

1. Hang 2 liters of Normal saline on the IV pole.

2. Place the dialyzer in the holder venous end up and put on the dialysate port caps.

3. Remove the venous bloodline from the package ensuring all the end caps and connections are tight.

4. Hang the drain bag on the back hook of the IV pole.

5. Place the venous drip chamber in the holder:
   - Ensure the top of the filter is just below the bottom edge of the holder.
   - DO NOT PLACE THE VENOUS LINE IN THE AIR DETECTOR OR THE LINE CLAMP AT THIS TIME.

6. Peal off the blue tab on the end of the bloodline with the blue cap and connect to the venous end of the dialyzer.

**KEY POINTS:**

- See procedure USING THE AQUABOSS EcoRO Dia 70.
- Ensure the Formula is connected to an appropriate electrical source and drain.
- The LED lamp will turn from orange to green.
- These tests **must** be done. The tests ensure the Formula is functioning and will provide a safe dialysis.
- The **auto test** is complete when SELECT PRIMIMG appears on the right hand side of the monitor screen.
PROCEDURE:

7. Place the venous tubing in the blue line holder, which is to the left of the transducer ports.

8. Slide the T line clamp on the venous bloodline close to the bloodline and clamp.

9. Remove the arterial bloodline from the package ensuring all the end caps and connections are tight.

10. Place the expansion chamber in the holder at the top left of the Formula, and clamp the medication line on the top of the expansion chamber.

11. Insert the clear plastic segment below the expansion chamber into the Hemox ensuring it clicks into place.

12. Remove the spike from the arterial tubing and attach the arterial tubing to the drain bag.

13. Load the Blood Pump:
   - Open the blood pump door. Insert the RED tagged side of the blood pump segment into the bottom of the blood pump.
   - Press the up key on the heparin pump control to automatically turn the blood pump to load the tubing, close the blood pump door.

14. Place the arterial tubing in the red line holder, which is to the left of the transducer ports.

15. Press the arterial tubing below the blood pump and arterial chamber into the optical blood sensor and tubing guide below the blood pump. Clamp the medication port on the arterial chamber.

16. Connect the arterial pressure monitor line to the red transducer port above the arterial chamber. Ensure the line remains unclamped.

17. Connect the venous pressure monitoring line to the blue transducer port above the venous drip chamber. Ensure the line remains unclamped.

18. Peal off the red cap on the arterial line and connect the bloodline to the arterial end of the dialyzer. When complete, ensure the venous end of the dialyzer is up.

19. Attach the Saline administration set to the 1-liter saline bag:
   - Slide the clamp on the arterial T line
   - The formula heparin pump is calibrated for a 20
PROCEDURE:

closer to the bloodline do not clamp at this time.

20. Prepare the heparin infusion in a 20 ml syringe.

21. Attach the heparin syringe to the heparin line.

22. Insert the Heparin Syringe in the Heparin pump:
   - Line up the heparin syringe with the numbers facing outwards.
   - Hold the flange of the syringe at the level of the clips under the syringe barrel holder.
   - Adjust the syringe plunger on the heparin pump with the up and down arrow keys beside the heparin pump until the syringe barrel and plunger slide into the mount.
   - Make sure the flange on the plunger of the syringe is secure in the slit on the plunger holder of the heparin pump.
   - Make sure the flanges on the barrel are secure in the flange holder.
   - Tighten the screw on the bottom of the syringe plunger.

23. Press the up arrow on the heparin pump control until 1 ml of Heparin fills the heparin line.

C. Preparation of the Dialysate:

Once the Rinse has finished (5min), an audible alarm will sound and the SELECT DIALYSIS button is available:

1. Press RESET to stop the audible alarm.

2. Press SELECT DIALYSIS.

3. Ensure the BICARBONATE. (Or BIDRY) button is highlighted.

4. Ensure DOUBLE NEEDLE is highlighted.

5. Press OK to verify.

6. Make sure the acid concentrate and the bicarbonate concentrate as prescribed.

7. A) Connect the Bicarbonate cartridge:
   - Rotate the locking bracket to release the upper piercing connector.
   - Disconnect the upper piercing connector
PROCEDURE:

from the mobile bypass.
  ▪ Lift the mobile bypass.
  ▪ Place the bottom of the cartridge into the lower piercing connector.
  ▪ Press the upper piercing connector onto the top of the cartridge.
  ▪ Insert the upper connector into the upper clip support.

OR

7. B) Connect the Bicarbonate concentrate:
  ▪ Place the bicarbonate concentrate on the left side of the concentrate shelf on the front of the machine.
  ▪ Insert the blue concentrate wand.
  ▪ Attach the blue concentrate line to the concentrate wand.

8. Connect the Acid Concentrate:
  ▪ Place the Acid concentrate on the right side of the concentrate shelf.
  ▪ Insert the red concentrate wand.
  ▪ Attach the red concentrate connector to the concentrate wand.

9. **DO NOT PRESS DIALYSATE PREPARATION at this time.**

D. Priming the Dialyzer:

1. The Formula should display PRIMING DN in the top right hand display bar. If it does not then:
   ▪ Press SELECT PRIMIMG on the left side of the monitor screen.
   ▪ Press DOUBLE NEEDLE if not already green.
   ▪ Press OK to verify.

2. Back fill the saline administration set and arterial bloodline:
   ▪ Open the clamp on the saline administration set and T line.
   ▪ Fill the patient end of the arterial blood tubing to the drain bag.
   ▪ Clamp Y tubing of drain bag attached to the arterial tubing.

3. Set the blood pump speed to **150 ml/min** by turning the blood flow regulator knob to the
PROCEDURE:

right. Press the BLOOD PUMP key at the bottom of the monitor to turn on the blood pump.

4. Follow the flow of saline from the administration set drip chamber to the expansion chamber.

5. Fill the expansion chamber:
   - Remove the arterial expansion chamber from the holder and turn upside down.
   - Allow the chamber to fill 1/3, and then turn right side up and place back into the holder.
   - Ensure the clamp on the medication line on top of the chamber is clamped.

6. Fill the venous drip chamber:
   - When the Saline reaches the venous drip chamber (1-2 min), loosen the cap on the medication line on the venous chamber.
   - Allow the chamber to fill to the fill line.
   - Retighten the cap.
   - Clamp the medication line.

7. Insert the venous line into the air detector below the drip chamber.
   - Make sure that the line is installed in the clip behind the line clamp device. The clamp will automatically open once the saline is at the correct level in the drip chamber.
   - NOTE: If the line is not placed in the air detector or the clamp an alarm will sound at the beginning of dialysis preventing dialysis until these steps are completed.

8. Insert the venous line into the venous line clamp.

9. Rotate the dialyzer to aid in air removal. You may also clamp and release the venous bloodline to create pressure surges to aid in air removal.

10. The blood pump will stop automatically once 800 mls have primed the dialyzer:
    - The status bar at the bottom of the screen will turn red and read PUMP OFF.
    - If you wish to continue priming for air removal press the BLOOD PUMP key to turn on the blood pump.
    - Once you have finished priming the dialyzer press the BLOOD PUMP off again.
    - Attach a new 1 L bag of saline to the administration set as required.
    - The blood pump will no longer stop automatically until you press it off.
    - NOTE: Delay changing NS bag until level detector test complete, as this test will cause saline to back up into bag.
    - Ensure the saline drip chamber is no more than ½ full. This will allow you to check that the new
PROCEDURE:

11. Close the clamp on the drain bag.

12. Open the clamp on the Y of the drain bag attached to the arterial bloodline.

13. Increase the blood flow to 400 ml/min and press the blood pump on. Make sure the roller clamp on administration set is open.

E. **Testing the level detector:**

1. Test the level detector by pressing the arrow down key on the front of the monitor until the level falls below the level detector.

2. Make sure the Formula performs the following functions:
   - The alarm lamplights.
   - The status bar becomes red and reads **BLOODLEVEL**.
   - The blood pump stops.
   - The venous line clamp closes.

3. Raise the level in the venous drip chamber by pressing the up arrow on the front of the monitor.

4. Press the RESET key to reset the air detector.

F. **Setting the treatment parameters:**

1. Complete pre-hemodialysis nursing assessment.

2. If not at the Main Menu then press RETURN. If the screen does not return to the Main Menu, press RETURN until at the Main Menu.

3. If using a **user profile** for sodium and/or fluid profiling then activate the profile:
   - Press **SEE/MOD PARAMETERS**
   - Press **PROFILES**
   - Press **USER PROFILES**
   - Press **USER PROFILES** again
   - Press **PROFILE NAME**
   - Select the profile by using the up and down arrows to find your profile in the green box.
   - Press **TOT CONDUCTIVITY**; ensure the key turns blue.
   - Press **UF PROFILE**; make sure the key

KEY POINTS:

saline bag remains full of the fresh saline and saline from the dialyzer and lines has not backed up into the bag.
PROCEDURE:

4. Set remaining treatment parameters:
   - Press SEE/MOD PARAMETERS
   - Press DIALYSATE
   - Press TREATMENT TIME and use the up and down arrows to set your dialysis time prescribed.
   - Press WEIGHT LOSS and use the up and down arrows to set desired goal.
   - Press BICARBONATE CONDUCTIVITY and use the side arrow keys to set the bicarbonate conductivity.
   - If not previously set with a prescribed profile, press TOTAL CONDUCTIVITY and use the side arrow keys to set the total conductivity prescribed.
   - Press OTHER PARAMETERS:
     - Press TEMPERATURE and use the up and down arrow keys to set the prescribed dialysate temperature.
     - Press FLOW and use the side arrow keys to set the flow rate to 800 ml/min.
   - Press OK to verify the treatment parameters.

5. Set the Heparin parameters:
   - If not at the Heparin screen press RETURN to go back to Main Menu.
   - Press SEE/MOD PARAMETERS.
   - Press HEPARIN.
   - Press HEPARIN PRESTOP. Use the side arrow keys to set the time that the heparin is prescribed to stop before the end of dialysis.
   - Press HEPARIN INFUSION then use the side arrow keys to set the rate per hour.
   - Press SYRINGE CAPACITY then use the side arrow keys to set the syringe to 20 mls.
   - Press OK
   - Press HEPARIN ON so the heparin will start automatically when the machine enters dialysis. It will be grayed out and read HEPARIN SET.

6. Set the UF so the UF program will start automatically when the machine enters

KEY POINTS:

- The setting for standard Bicarbonate conductivity (35 mmol/L) is 3.1

- IF you do not press OK the settings will not take effect.

- The formula is calibrated for a 20 ml BD syringe.

- There will be an alarm at the start of dialysis if this step is forgotten.
PROCEDURE:

dialysis mode:
- Press UF ON.
- The button will be grayed out and will then read UF SET.

G. Preparing the dialysate side of the dialyzer:

1. Press DIALYSATE PREPERATION.

2. If using bicarbonate cartridge, ensure BIDRY FILL-UP ON appears while the cartridge is filling. The Formula will read BICARBONATE –PREP. (or if using bicarbonate cartridge BID + STD A Conc-PREP).

3. Turn the dialyzer arterial end up.

4. Attach the dialysate lines to the dialyzer:
   - Attach the RED line to the arterial end of the dialyzer.
   - Attach the BLUE end to the venous end of the dialyzer.

5. Press the BYPASS key to take the Formula out of bypass mode.

6. Change the saline bag:
   - Clamp administration line prior to removing old bag.
   - Attach new bag.
   - Unclamp administration line.

7. Facilitate deaeration of the dialysate compartment by slightly turning the dialyzer so that the arterial dialysate port is up.

8. Once the air is removed on the dialysate side. (about 30 sec) turn the dialyzer VENOUS END UP.

H. Recirculation of the Dialyzer with Saline and Dialysate:

1. Ensure the blood pump is on at 400 ml/min.

   - The Formula will automatically set the UF (ultra filtration rate) to .2 ml/hr.

   The DIALYZER RINSE OFF key will turn blue. If this key is turned off, the UF rate will decrease to .1 ml/hr.

   When the total priming volume has decreased to .4 liters from 19.9 liters, the blood pump will stop automatically after every 150 mls pumped.

2. If the blood pump shuts off, then restart by pressing the blood pump key.

   - The status bar on the upper left corner of the monitor will read BID+STD A CONC-FILTER. (BIDRY-PREP if using bicarbonate cartridge).

   - The Total Conductivity will reflect the starting sodium (eg. 15.0 for sodium 150).

   - The Formula will go into bypass mode.

   - BYPASS will be shown in the bar at the bottom of the screen.

   - The yellow LED light beside the bypass button at the bottom of the monitor will light.
PROCEDURE:

3. Continue to recirculate the dialyzer for a minimum of 10 min.
4. Verify independent conductivity and pH.
5. Complete the safety check list.

I. Initiating Hemodialysis:

1. Ensure the UF SET button has appeared. If the UF ON button is evident, press the button so the UF SET appears.
2. Press the blood pump button to stop the blood pump.
3. If normal saline bag has not been changed, hang a new bag at this point. If the bag was previously changed and the saline drip chamber is full, the saline from the dialyzer may have backed up into the saline bag. Therefore this bag will need to be changed as well.
4. Clamp the Y line attached to the venous (blue) bloodline on the drain bag.
5. Open the clamp on the drain bag.
6. Ensure the saline is replaced from the T line to the drain bag.
7. Clamp the Y line attached to the arterial bloodline on the drain bag.
8. Clamp the arterial bloodline.
9. Open the clamp on the Y line attached to the venous bloodline on the drain bag.
10. Ensure the clamp on the venous bloodline is open.
11. Set the blood pump to 300 ml/min and then press the blood pump button on, allowing 300-500 mls of saline to enter the dialyzer.
12. Press the blood pump off.
13. Make sure the following clamps are closed:
   - Drain bag.
   - Y line attached to the venous (blue) bloodline on the drain bag.
   - Y line attached to the arterial (red) bloodline on the drain bag.
   - Make sure the saline is running in the administration set drip chamber. If air enters the saline administration set from bubbles in the drip chamber, decrease the blood pump speed.
   - There should be 7 clamps closed.

KEY POINTS:

- If the bag was previously changed and the saline drip chamber is full, the saline from the dialyzer may have backed up into the saline bag. Therefore this bag will need to be changed as well.
PROCEDURE:

- Venous bloodline.
- Arterial bloodline.
- Saline 'T' line.
- Administration set.

14. Turn the Dialyzer arterial end up.

15. Connect the bloodlines to patient access as per unit protocol and unclamp the venous bloodline and vascular access.

16. Start the blood pump at 100-120 ml/min.

17. Unclamp the arterial bloodline and access.

18. Press the blood pump on.

19. Make sure the needles (Or dialysis catheter) are taped securely.

20. Increase Blood pump to dialyzing speed.


KEY POINTS:

- When blood is detected at the arterial sensor below the arterial chamber, the blood pump will stop, an alarm will sound and the alarm bar will read CLAMP ON. The top right status bar will read CONNECT DN

Once blood is detected in the venous chamber, the right top bar will read DIALYSIS DN (double needle).

- If blood is not detected 60-90 sec after it is detected in the arterial line a BLOOD LEVEL alarm will sound.

- Correct the problem then Press the RESET key to restart the blood pump.

- When DIALYSIS DN appears in the right top corner of the monitor the following will automatically occur:
  - The treatment Clock will begin counting down.
  - BIC/BID+STD CONC.-PROG (or PROF) will appear in the top left corner of the monitor.
  - The alarm limits will automatically set around the Venous and Arterial pressure.
  - The Heparin key will be blue and will read HEPARIN OFF (this means that the key will turn the heparin off).
  - The UF key will be blue and will read MIN UF (this key will turn the UF off).
  - The RINSEBACK button appears and the status bar at the bottom of the screen will read PRESS RINSEBACK TO COMPLETE DIALYSIS.

If the UF ON key was not activated, there will be an alarm. UF NOT ACTIVATED press UF ON.
PROCEDURE:

22. Take a blood pressure reading.

J. Setting the automatic Blood Pressure Monitor:

1. If not at the Main Menu press RETURN.

2. Press SENSORS.

3. Press SPHYGMO.

4. Press AUTO BP ON, the button should turn blue.

5. Press SEE/MOD PARAMETERS.

6. Press MAX SYST THRESHOLD and set the limit.

7. Press MIN SYST THRESHOLD and set the limit.

8. Press MAX DIA THRESHOLD and set the limit.

9. Press MIN SYST THRESHOLD and set the limit.

10. Press MEASURE INTERVAL and set the time between BP readings.

11. Press WARNING ON (this should change to read warning off).

12. Press OK to verify.

13. The SPHYGMO MEASURE button on the main screen will be GREEN if the automatic BP monitor is set.

K. Setting Hemox alarm limits:

1. Press SENSORS. ▪ Use of the Hemox is optional.

2. Press SEE/MOD PARAMETERS.

3. Press MAX VL THRESHOLD.

4. Set the desired VL maximum by using the side arrow keys. ▪ The maximum VL will be different for individual patients. The value is determined by monitoring patient trends and identifying the value where patient’s tolerance to fluid removal would be questionable, requiring the operator’s close attention.

5. Press WARNING ON. ▪ The key will turn blue and read WARNING OFF.
PROCEDURE:

6. SO2 and Hct thresholds may be set in the same manner at the operator’s discretion.

L. Discontinuing Hemodialysis with a fistula:

1. Ensure there is at least 500 ml of Saline attached to the arterial T line.
2. Document the total amount of heparin administered on the hemodialysis flowsheet:
   - Press SEE/MOD PARAMETERS.
   - Press HEPARIN.
   - Note amount of heparin infused. Also check the syringe to see how much heparin has been infused over this dialysis.
   - Press RETURN to get to the main menu.
   - Add the amount of Heparin infused to the amount of Heparin prime.
3. Press RINSEBACK.
4. The blood pump will automatically STOP and the blood flow rate will be decreased by ½. Set pump speed at 150-200 ml/min.
5. Clamp the arterial bloodline and arterial needle.
6. Ensure the saline administration set and T line are clamped.
7. Attach the saline administration set to one of the ends of the recirculation line.
8. Disconnect the arterial bloodline from the arterial needle and connect the arterial bloodline to the other end of the recirculation connector.
9. Use the cap from the recirculation connector to cover the open port of the T line.
10. Attach a syringe containing saline to the arterial needle and flush the needle. Re-clamp the arterial needle extension.
11. Unclamp the arterial bloodline and start the blood pump at 150-200 ml/min.
12. Clamp and release the bloodlines to help remove the blood stuck to the sides of the tubing.

KEY POINTS:

- When Dialysis time is complete, an alarm will sound and END UF will appear in the status box.
- A message box on the screen will say DO YOU WANT TO START RINSEBACK. Press YES. (Once rinse back has been verified, you will not be able to return to dialysis.)
- When there is saline at the venous drip chamber the blood pump automatically stops and the rate is decreased by 1/3.
PROCEDURE:

13. Ensure the patient is stable prior to disconnecting from the vascular access.

14. Attach the venous bloodline to the venous drip chamber medication line to ensure a closed system for disposal.

15. Press the ? (Help) key at the top right corner of the monitor until the PARAMETERS DIALYSIS button appears at the top right of the main screen.

16. Press PARAMETERS DIALYSIS button and dialysis information will be displayed.

17. Document the amount of TOTAL WEIGHT LOSS, and BLOOD PROCESSED, on the hemodialysis flowsheet.

M. Discontinuing Hemodialysis with a CVC:

1. Ensure you have at least 500 ml of Saline attached to the arterial T line.

2. Document the total amount of heparin administered on the hemodialysis flowsheet.
   - Press SEE/MOD PARAMETERS.
   - Press HEPARIN.
   - Note amount of heparin infused. Also check the syringe to see how much heparin has been infused over this dialysis.
   - Press RETURN to get to the main menu.

3. Press RINSEBACK.

4. The blood pump will automatically STOP and the blood flow rate will be decreased by ½. Set pump speed at 150 ml/min.

5. Clamp the arterial bloodline.

6. Open the clamps on the arterial T line and on the saline administration line.

7. Start the pump for 10 seconds to allow any air bubbles or clots to run AWAY from the patient, holding the dialyzer side of the blood line up.

8. Stop the blood pump.

9. Open the clamp on the arterial bloodline and allow the saline to flush back blood in the arterial bloodline until it is clear.

KEY POINTS:

- When Dialysis time is complete, an alarm will sound and END UF will appear in the status box.
- A message box on the screen will say DO YOU WANT TO START RINSEBACK. Press YES. (Once rinse back has been verified, you will not be able to return to dialysis.)
- Ensure that no air is allowed to run into the arterial access.
PROCEDURE:

10. Clamp the arterial bloodline clamp and the arterial lumen of the catheter.

11. Make sure the blood pump is set to 150-200 ml/min and start the blood pump.

12. Clamp and release the bloodlines to help remove the blood adhering to the sides of the tubing.

13. When the blood pump stops as the venous drip chamber clears, press the blood pump on again. The bottom status bar will read BLOOD LINES EMPTYING. Return as much saline as required to clear the bloodlines, and then press the blood pump off.

14. Clamp venous blood line and the venous lumen of the catheter.

15. Ensure patient is stable prior to disconnecting from the vascular access.

16. Attach the venous bloodline to the venous drip chamber medication line to maintain a closed system for disposal.

17. Press the ? (Help) key at the top right corner of the monitor until the PARAMETERS DIALYSIS button appears at the top right of the main screen.

18. Press PARAMETERS DIALYSIS button and the dialysis information will be displayed.

19. Document the amount of TOTAL WEIGHT LOSS, and BLOOD PROCESSED, on the hemodialysis flowsheet.

N. Discarding bloodlines/dismantling equipment:

1. Ensure BICARB-BLUE CON appears at the top of the screen.

2. Empty the dialyzer:
   - Turn the dialyzer BLUE END UP.
   - Remove the BLUE dialysate line from the dialyzer.
   - Connect the BLUE dialysate line to the connector on the Formula.
   - The dialyzer will automatically drain.
   - BICARB-EMPTYING will appear at the top of the screen.
   - When the dialyzer is empty BICARB-BLUE appears again.
   - Remove the RED dialysate line from the dialyzer.
   - Connect the RED dialysate line to the
PROCEDURE:

connector on the Formula.

3. Remove the blood tubing and dialyzer from the Formula from left to right and throw away.
   - When removing the blood pump segment, open the blood pump door remove the red segment end from the blood pump and use the arrow keys beside the heparin pump to make the blood pump unload the tubing.
   - Once the tubing is removed from the blood pump, turn the blood pump dial to maximum. Close the blood pump door.

   This will cause the venous line clamp to open so you can remove the venous bloodline from the clamp.

4. A) For Bicarbonate cartridge removal:
   - Press BIDRY DRAIN ON.
   - Pull the top of the cartridge outward and remove the top cap.
   - Leave the bottom of the cartridge in place.
   - Set the cartridge upright again.
   - The message on the top left of the screen reads BIDRY-EMPTING.
   - When the cartridge is empty the screen reads BIDRY-BLUE CONN.
   - Remove the cartridge and discard.
   - Replace the upper connector to close the cartridge holder.

OR

4. B) For Liquid Bicarbonate:
   - Attach the BLUE concentrate line to the BLUE connection on the front of the machine.

5. Attach the RED concentrate line to the RED connection on the front of the machine.

O. Disinfection of the Formula:

1. Press EARLY DISINFECT.

2. Press YES when the formula asks operator to confirm early disinfect.

3. Press DISINFECT on the right side of the monitor.

4. Press MANUAL DISINFECT.

5. Press CHEMICAL STD (vinegar) or CHEMICAL FULL (bleach).

6. Press AGENT.
   - Use the up and down arrow keys to select ACETIC A. (Vinegar) or USER (bleach).
7. Press OK to verify.

8. Place the yellow disinfecting wand in the Acetic acid (vinegar) or Bleach.

9. Attach the connector the yellow disinfecting connector on the front of the Formula to the yellow disinfecting wand.

**PROCEDURE:**

- Set 2nd HEAT disinfection and automatic off: (35 min) once the acetic acid rinse has started. Press SECOND DISINFECTION at the top of the disinfection screen.
  - Press HEAT.
  - Press AUTOMATIC OFF at the bottom right of the disinfect screen.
  - Press the up and down arrow key once so ENABLE is seen in the box.
  - **Press OK to verify.**

- Once the disinfection mode changes to the second segment (blue) of the chemical procedure you may move the disinfect connector to the port on the front of the Formula.

12. When using Bleach you must test for residual chlorine once the User disinfect cycle has completed:
  - Use a 10 ml syringe to withdraw a 10 ml sample of fluid from the port on the drain line of the Formula.
  - Empty the sample into a clean dry test tube.
  - Remove one test strip from the chlorotest bottle and replace the cap.
  - Place the test area of the strip into the

**KEY POINTS:**

- The Formula will rinse for a few minutes and will read WITHIN FEW MINUTES THE MACHINE WILL START THE DISINFECTION PROGRAMED.

Once the rinse has completed and the disinfection mode has started the disinfection screen will appear. The left side of the monitor will read:

- DISIN.-CHEMICAL STD (or FULL) in the status bar at the top.
- ACETIC ACID (or USER) will appear in the chemical agent box.
- The 2nd disinfection box will read (not set).
- The 3rd box will display the water temperature.
- The 4th box will display the disinfection time.
- The status bar at the bottom of the screen will display WAIT FOR DISINFECTION END.

- If using bleach do not set second disinfection or automatic off until bleach is completed and residual test is negative.
PROCEDURE:

- sample in the test tube and move back and forth for 30 seconds.
- Remove test strip from sample and compare to color chart on the bottle.

KEY POINTS:

- Any change in color of the chlorotest test strip indicates that bleach is still present in the delivery system. Recheck in 5 minutes. If still positive, you may try to use a new bottle of chlorotest; if still positive, turn the Formula off at the back of the machine and then turn the Formula on to force a re-rinse of the delivery system. Once the rinse is complete, re-check chlorotest. If still positive, DO NOT UTILIZE THE FORMULA, NOTIFY DIALYSIS TECHNOLOGIST.

13. Once the Heat disinfection is complete the Formula will turn itself off.

14. Turn off the Water.

15. Rinse the disinfect wand under running water and replace in the holder on the side of the Formula.

P. Cleaning the exterior of the Formula 2000:

1. Wipe the machine with the approved cleaning solution and a soft cloth. Take handling precautions as indicated on the label:
   - Make sure the cloth is not so wet that it drips over or into the machine.
   - Once the machine is dry it is ready for the next dialysis.

2. Clean the concentrate wands once a week by:
   - Soaking in a 1:100 bleach solution for 20 min.
   - Rinse under running water for 5 min.
   - Ensure the water has run through the inside of the wands.

DOCUMENTATION:

- Hemodialysis Treatment Worksheet
- Hemodialysis Flowsheet
- IPN to patient record as required

REFERENCES:

Formula ™ 2000 PLUS Information Binder, BHC Medical, 2855 Argentia Road, Unit 2, Mississauga, ON L5N 8G2; www.bhcmedical.ca.

PURPOSE:
1. To prevent hypophosphatemia and manage phosphate supplementation in patients receiving nocturnal/long daily hemodialysis treatments.

POLICY:
1. Registered Nurses and Licensed Practical Nurses in Home Hemodialysis may add the sodium phosphates enema to the acid concentrate upon a physician’s order.

2. A Home Hemodialysis patient educator or delegate will teach nocturnal/long daily hemodialysis patients the procedure. The patient must demonstrate competency in the procedure and will have documentation on the patient chart confirming successful certification in this procedure.

PROCEDURE:
1. Target phosphorus concentrations:
   a. Pre-dialysis phosphorus concentrations should be maintained between 1.2 – 1.8 mmol/L.
   b. Post-dialysis phosphorus concentrations should be maintained between 0.8 – 1.4 mmol/L.

2. When pre-dialysis phosphate levels are <1.2 mmol/L and/or post-dialysis phosphate levels are <0.8 mmol/L, as per physician’s order:
   a. Eliminate phosphate binders sequentially.
   b. Liberalize dietary phosphate intake (in consultation with a renal dietitian).

3. If, despite implementation of Step 2, pre-dialysis phosphate levels remain ≤1.2 mmol/L and/or post-dialysis phosphate levels are ≤0.8 mmol/L initiate phosphate supplementation:
   a. Add 15 mL sodium phosphates enema to the 5L dialysate acid concentrate jug (physician’s order required). Repeat pre- and post-dialysis phosphate levels in 1 week or sooner if any symptoms of hypophosphatemia.
   b. If phosphorus concentration is below target, increase dose of sodium phosphates enema by 15 mL per 5L acid concentrate jug (physician’s order required). Repeat pre- and post-dialysis phosphorus levels 1 week later or sooner if any symptoms of hypophosphatemia.
   c. If phosphorus concentration is within target, continue with the same volume of sodium phosphates enema every dialysis treatment.
   d. Ongoing monitoring of pre- and post-hemodialysis phosphate levels should be performed with monthly blood testing.

NOTE: Patients may be instructed not to add sodium phosphates to their acid concentrate the first
PROCEDURE:
nocturnal/long daily hemodialysis after a night off, as phosphate may have accumulated during their extended time off dialysis.

EQUIPMENT:
- Adult sodium phosphate enema 130 mL. Drug Identification Number (DIN): 02239056
  - Contains 1.38 mmol phosphorus (P)/mL
  - Each 15 mL of will increase the final dialysate phosphorus (P) concentration by 0.092 mmol/L.
    (Calculations: 1.38 mmol P/mL x 15 mL = 20.7 mmol P/5L acid concentrate = 4.14 mmol/L/45 x dilution = 0.092 mmol/L)
- Prescribed acid concentrate jug – 5L (45x dilution)

PROCEDURE:
1. Open acid concentrate jug as prescribed for patient.
2. Remove protective cap from the sodium phosphates enema tube. Measure prescribed dose using a medication cup and add to the acid concentrate jug.
3. Replace cap on acid concentrate jug and mix thoroughly to ensure that the enema solution has dissolved.
4. Apply medication sticker to acid concentrate jug.
5. Proceed with machine set-up.
6. Schedule bloodwork for phosphorus every week x 3, then PRN as directed by physician.

KEY POINT:
- Serum phosphorus concentrations may change rapidly with the addition of the sodium enema.
- Bloodwork for phosphorus may be ordered sooner than 1 week if the patient is symptomatic with phosphatemia.

GUIDELINE DEVELOPERS:
- Paul Komenda, MD, Nephrologist, Manitoba Renal Program
- James Zacharias, MD, Nephrologist, Manitoba Renal Program
- Judy Olson, RN, Home Dialysis Nurse, Manitoba Renal Program
- Lori Wazny, Pharm.D., Clinical Pharmacist, Manitoba Renal Program

REFERENCES:

Personal communication Johnson & Johnson/Merck Medical Information Department (phosphate content of Fleet Enema®).
PURPOSE:

1. Calcium chloride may be added to the acid concentrate to control and/or treat hypocalcemia in chronic (2-3x/week) hemodialysis patients who have recently undergone a parathyroidectomy or are hypocalcemia due to some other cause. Calcium chloride additive is also used in patients who receive nocturnal hemodialysis in order to maintain a high normal serum calcium concentration and prevent development of hyperparathyroidism.

POLICY:

1. Registered Nurses and Licensed Practical Nurse in hemodialysis may add the calcium chloride powder to the acid concentrate upon a physician’s order.

2. Home hemodialysis (nocturnal or 3x/week) patients will be taught the procedure by a qualified Hemodialysis Nurse Educator. The patient must demonstrate an understanding of the protocol, and have documentation included on the patient chart confirming successful certification in this procedure.

GUIDELINES:

1. All new patients receiving nocturnal hemodialysis should be prescribed a 1.5 mmol/L calcium bath as the standard bath. Continuation of low dose calcitriol to promote calcium (and phosphate) absorption from the gastrointestinal (GI) tract should also be considered.

2. Target corrected calcium concentrations:
   a. Pre-dialysis corrected calcium concentrations should be maintained between 2.3 – 2.4 mmol/L (upper limit of normal serum calcium).
   b. Post-dialysis corrected calcium concentrations should be maintained between 2.5-2.8 mmol/L (mildly hypercalcemic).
   c. Liberalize dietary calcium intake in consultation with a renal dietitian if corrected calcium concentrations drop below the targets listed above.
   d. Calcium chloride supplementation to the acid concentrate should be considered if liberalization of dietary calcium has occurred and patient is already receiving a 1.5 mmol/L calcium bath.

3. Recommended initial dose of Calcium Chloride additive is 1 vial added to 5L dialysate acid concentrate jug (raises dialysate calcium concentration by 0.12 mmol/L).

4. Repeat pre- and post-dialysis calcium and albumin concentrations 1 week following the liberalization of dietary calcium intake or initiation of calcium chloride supplementation. Bloodwork may be ordered sooner if there are any concerns regarding hypercalcemia.
GUIDELINES:

5. If repeat corrected calcium within target range, continue with same amount of additive to every dialysis treatment.

6. If repeat correct calcium below target range, increase dose of Calcium Chloride additive by 1 vial in each 5L acid concentrate jug (0.12 mmol/L) and repeat pre- and post-dialysis calcium and albumin 1 week later.

EQUIPMENT:

- Calcium chloride powder 3.78 g/vial [from Haemotec Inc DIN: 02268930].
- Brand Name: Calcium Chloride Additive 0.13-4.5L
- Supplier: Haemotic Inc
- Drug Identification Number (DIN): 02268930
- Each vial of calcium chloride 3.78 g added to 5L of acid concentrate will increase the final calcium (Ca) concentration by 0.12 mmol/L (e.g. patient currently on 1.5 mmol/L Ca bath + 0.12 mmol/L added = final Ca concentration 1.62 mmol/L).
- Acid concentrate jug – 5L

PROCEDURE:

1. Open acid concentrate jug as prescribed for patient.
2. Open calcium chloride container(s) and add prescribed dose to the acid concentrate jug.
3. Replace cap and mix thoroughly to ensure that powder has dissolved.
4. Apply medication sticker to acid concentrate jug.
5. Proceed with machine set up.
6. Arrange bloodwork for serum calcium and albumin q weekly x 3 then prn as directed by physician.

KEY POINT:

- Hypocalcemic patients should be receiving a Ca 1.5 mmol/L bath.
- Serum calcium concentrations may change rapidly with the addition of the Calcium Chloride additive.
- Bloodwork for calcium and albumin may be ordered sooner than 1 week if physician concerned that patient could develop hypercalcemia.

GUIDELINE DEVELOPERS:

- Paul Komenda, MD, Nephrologist, Manitoba Renal Program
- James Zacharias, MD, Nephrologist, Manitoba Renal Program
- Judy Olson, RN, Home Dialysis Nurse, Manitoba Renal Program
- Lori Wazny, Pharm.D., Clinical Pharmacist, Manitoba Renal Program

DOCUMENTATION:

Dialysis Chart: Medication Administration Record prn
Ward Chart: Integrated Progress Notes if applicable.
PURPOSE:

1. Changing the dialyzer during treatment allows the operator to continue with the treatment without losing treatment information in the event of having to discard a dialyzer during hemodialysis or discontinue treatment early with the intent of restarting. Examples of situations may include:
   a. Discarding a clotted dialyzer
   b. Discarding defective blood tubing or monitoring lines
   c. Discarding a dialyzer with unresolved air in blood
   d. Discontinuing treatment early for vascular access issues

POLICY:

1. Registered Nurses or Licensed Practical Nurses deemed competent with use of the Formula Delivery System, may change the dialyzer during treatment if indicated.

EQUIPMENT:

- Dialyzer as prescribed for the individual patient
- Arterial bloodline
- Venous bloodline
- 2-1000 ml bags of saline
- Equipment to maintain patency of vascular access
- (2-10 ml syringes of saline)

PROCEDURE:

Changing the Dialyzer During Hemodialysis:

1. Press SEE/MOD PARAMETERS.
2. Press HEMOFILTER MANAGEMENT.
3. Press CHANGE FILTER. ▪ The Formula will display the question—Do you want to change dialyzer?
PROCEDURE:

4. Press YES.

5. If it is safe to return the blood to the patient, you may do so by flushing the extracorporeal circuit with saline.
   a. For a fistula:
      - Set pump speed at 150-200 ml/min.
      - Clamp the arterial bloodline and arterial needle.
      - Ensure the saline administration set and T line are clamped.
      - Attach the saline administration set to one of the ends of the recirculation line.
      - Disconnect the arterial bloodline from the arterial needle and connect the arterial bloodline to the other end of the recirculation connector.
      - Use the cap from the recirculation connector to cover the open port of the T line.
      - Attach a syringe containing saline to the arterial needle and flush the needle. Re-clamp the arterial needle extension.
      - Unclamp the arterial bloodline and start the blood pump at 150-200 ml/min.
      - Clamp and release remove the blood stuck to the sides of the tubing the bloodlines to help
      - When the venous line is clear, stop the blood pump and clamp the venous bloodline and venous needle.
   b. For a CVC:
      - Set pump speed at 150 ml/min.
      - Clamp the arterial bloodline.
      - Open the clamps on the arterial T line and on the saline administration line.
      - Start the pump for 10 seconds to allow any air bubbles or clots to run AWAY from the patient, holding the dialyzer side of the blood line up.
      - Stop the blood pump.
      - Open the clamp on the arterial bloodline and allow the saline to flush back blood in

KEY POINTS:

- The following things will occur:
  - The status bar on the top right screen will read FILTER CHANGE.
  - The blood pump will stop.
  - The formula will go into bypass
  - The UF rate will drop to 0.1 kg/hr.
PROCEDURE:

- Clamp the arterial bloodline clamp and the arterial lumen of the catheter.
- Make sure the blood pump is set to 150-200 ml/min and start the blood pump.
- Clamp and release the bloodlines to help remove the blood adhering to the sides of the tubing.
- When the venous line is clear, stop the blood pump and clamp the venous bloodline and venous extension of the CVC.

6. If unsafe to return blood, clamp both arterial and venous vascular access and bloodlines.

7. Disconnect the bloodlines from the needles (or CVC ports) and flush the needles (CVC extensions) with 10 ml saline.

8. Remove the dialysate lines from the dialyzer & reconnect to the Formula.

9. Remove the dialyzer & tubing from the Formula & discard.

10. Replace the dialyzer and tubing and re-prime the dialyzer as described in Procedure Bellco (Formula 2000): Use of.


12. Turn the dialyzer arterial end up and reattach the dialysate hoses.

13. Press BYPASS to fill the dialyzer with dialysate.

14. Recirculate for 10 min. then rinse the dialyzer and bloodlines with 300 ml of saline.

15. Press the blood pump off.

16. Reattach the bloodlines to the needles (or CVC).

17. Set the pump to 150-200 ml and turn it on.

18. Press bypass to restart the dialysate flow if the Formula is still in bypass.

KEY POINTS:

- There will be a DIALYZER CONNECTOR warning, that will ring every 30 sec.

- You will need to manually unload the pump, remove the venous line from the venous clamp & remove Heparin syringe. There will be AIR DETECTOR alarms as the air detector is enabled. Reset the alarms as they occur.

- The pump will not stop automatically.

- There may be BLD alarm until the dialyzer fills with fluid. Press reset.

- When the blood is sensed by the arterial and venous sensors the Formula will return to DIALYSIS DN mode.
**PROCEDURE:**

19. Set the blood pump to dialyzing speed.

20. If the patient is able to tolerate it, add all additional administered volumes of saline to the weight loss.

**KEY POINTS:**

**DOCUMENTATION:**

- Document the issues and interventions on the Hemodialysis treatment sheet and on progress notes

**REFERENCES:**

Formula ™ 2000 PLUS Information Binder, BHC Medical, 2855 Argentia road, Unit 2, Mississauga, ON L5N 8G2; [www.bhcmedical.ca](http://www.bhcmedical.ca)
PURPOSE:

1. Home Hemodialysis patients undergoing Nocturnal therapy requires true pre and post blood sampling to determine the need for and prescribed amounts of dialysate additives. Centrifuging blood tubes will allow patients to draw samples immediately pre and post hemodialysis and maintain integrity of the sample until transported to the lab.

POLICY:

1. Registered nurses who have demonstrated competency with the Horizon Mini E Centrifuge may instruct patients in use of this equipment for Nocturnal Hemodialysis therapy.

EQUIPMENT:

- Horizon Centrifuge, model 642E
- Blood sample tubes
- 125 mm or 75mm tube holders equal to number of samples and tubes to balance samples
- Tube cushions as required
- Blood sample tubes filled with water to balance as required
- Pipette
- Aliquot tube

PROCEDURE:

A. Collection of blood sample:

- Drawing the correct stated draw volume ensures the proper blood-to-additive ratio within each blood tube. Routine chemistry tubes must be centrifuged and serum or plasma removed from blood cells to protect the integrity of the sample (the extent to which the serum or plasma is free from undesirable constituents such as fibrin, cells and platelets). Separation of serum or plasma from cells should take place within 2 hours of
**PROCEDURE:**

1. Collect blood samples per program protocol. Ensure equal volumes of blood per chemistry tube drawn. Ensure the stated volume of blood is drawn for the specific blood tube.

2. If using heparin-plasma collection tubes, invert tubes 8-10 times immediately after collection to ensure that the blood and heparin are mixed thoroughly.

**B. Preparation of blood tubes:**

1. Place each blood sample in a tube cushion and holder.

2. Prepare water filled blood tubes to balance blood tubes as required. The centrifuge must contain a balanced load in order to function properly. Opposing tube holders must be identical and must contain the same cushion or none at all. Opposing tube holders must be empty or loaded with equally weighted samples. If an odd number of samples are to be spun, a tube with water to match the weight of the unpaired sample must be placed across from the sample. Ensure volume of water is equal to the opposing tube of blood.

**C. Operation of the centrifuge:**

1. Ensure the centrifuge is plugged in to an approved electrical outlet.

2. Ensure the centrifuge is on a flat level surface with suction cups in good contact with the surface.

3. Push the OPEN/EMERGENCY STOP button and then open the lid, by turning the latch counter clockwise. For safety purposes, the locking system is always activated. Pressing the OPEN/EMERGENCY STOP button momentarily interrupts the system. The UNLOCKED indicator light should illuminate. If it does not, refer to the trouble shooting section. The lid will be unlocked for 15 seconds duration.

4. Spin the rotor by hand to check for free and level rotation. If the rotor does not rotate freely, refer to the troubleshooting section.

5. Place the tube holders inside the rotor, ensuring the each tube has an opposing tube and holder of equal weight.

6. Close the lid and rotate the lid knob clockwise to its complete stop position. Ensure the LATCH indicator light is illuminated. If the LATCH indicator light is not illuminated, ensure the lid is latched properly. The centrifuge will not run unless the lid is latched and the LATCH light is on.

7. Turn the centrifuge on by pushing the START button. The RUN indicator will illuminate.

**KEY POINTS:**

collection to prevent erroneous test results. Any chemistry requiring special handling, eg PTH, must be drawn within the lab or dialysis unit. Hematology requires not to be centrifuged, only immediately inverted 8-10 times.
8. Listen to the sound of the centrifuge. Ensure the RUN light is illuminated.

9. Wait until the rotor stops spinning. The RUN indicator light is extinguished, and the UNLOCKED indicator light is illuminated. Turn the lid knob counterclockwise to open the lid.

10. Remove the samples. Ensure blood has separated and serum is clear. Keep tubes upright until plasma has been drawn off.

D. Preparing samples for overnight storage or transport:

1. Using a disposable pipette, transfer plasma to a labeled aliquot tube.

2. Store aliquot tubes upright in the refrigerator until transport to the lab. Ensure tubes are clearly labeled with name, PHIN and indicate pre or post HD.

3. Dispose of blood collection tube and pipette.

E. Cleaning of the centrifuge:

1. Wipe the surface of the centrifuge with hospital approved disinfectant after each use.

2. Every 6 months or whenever there is tube breakage, it may be necessary to remove the rotor and clean the rotor chamber. Unplug the electrical cord to eliminate the risk of electrical shock:

- The timer is preset to a time of 10 minutes. The RUN indicator light will illuminate. A smooth whirring sound should be heard. If there are any loud or unusual sounds, stop the centrifuge by pushing the OPEN/EMERGENCY STOP button immediately and refer to troubleshooting. The lid should remain locked until the rotor has completely stopped. Once the rotor has stopped, the interlock system will become disengaged for 60 seconds. The UNLOCKED indicator light will illuminate during this time. To gain entry into the centrifuge after this period has ended, press the OPEN/EMERGENCY STOP button. The lid will unlock for 15 additional seconds.

- The RUN indicator light will begin to flash when one minute remains. After this time has elapsed, the RUN indicator light will extinguish and the rotor will slow to a complete stop. The UNLOCKED indicator light will illuminate and the locking mechanism will disengage allowing entry into the rotor chamber.

- If the centrifuge re-locks before the samples are removed, press the OPEN/EMERGENCY STOP button to unlock the lid for an additional 15 seconds.

- Changing the orientation of the sample from upright may lead to mixing and re-suspension of components that were previously on or near the gel surface.

- Draw plasma from the top of the plasma column to avoid drawing cells and platelets, which are concentrated on or near the gel surface (buffy coat).

- Apply cleaning solutions using a towel or cloth.
PROCEDURE:

a. To remove the rotor:
   - Unlock the centrifuge by pushing the OPEN/EMERGENCY STOOP button and unlatch and open the lid.
   - Remove the test tube holders.
   - Remove the knob in the center of the rotor by turning it counterclockwise.
   - The rotor is sitting on a cone-shaped adapter. Pull the rotor up and off of this adapter.

b. To install the rotor:
   - Place the rotor back onto the cone-shaped adapter.
   - Once a proper fit has been achieved, replace the rotor knob and turn it until it is hand-tight.
   - Replace the tube holders and verify that they are seated properly.
   - Follow initial set-up procedure to ensure the rotor has been installed correctly.
   - You may need to turn the rotor slightly to line it up properly. The rotor should slide onto the rotor cone freely.

F. Initial set up procedure:

1. Ensure the centrifuge is plugged in to an approved electrical outlet.
2. Ensure the centrifuge is on a flat level surface with suction cups in good contact with the surface.
3. Push the OPEN/EMERGENCY STOP button and then open the lid, by turning the latch counter clockwise.
   - For safety purposes, the locking system is always activated. Pressing the OPEN/EMERGENCY STOP button momentarily interrupts the system. The UNLOCKED indicator light should illuminate. If it does not, refer to the trouble shooting section.
   - The lid will be unlocked for 15 seconds.
4. Spin the rotor by hand to check for free and level rotation.
   - If the rotor does not rotate freely, refer to the troubleshooting section.
5. Place the 6 test tube holders inside the rotor, ensuring they are seated properly.
6. Close the lid and rotate the lid knob clockwise to its complete stop position. Ensure the LATCH indicator light is illuminated.
   - If the LATCH indicator light is not illuminated, ensure the lid is latched properly. The centrifuge will not run unless the lid is latched and the LATCH light is on.
7. Turn the centrifuge on by pushing the START button.
   - The RUN indicator will illuminate.
8. The test tube holders will slide up into horizontal position and the unit will accelerate to full speed.
9. Listen to the sound of the centrifuge. Ensure the RUN light is illuminated. If there are any
   - The RUN indicator light will illuminate. A smooth whirring sound should be heard. If there are any
PROCEDURE:

10. While the centrifuge is running, try to turn the latch counterclockwise. Power may be cut to the motor but you should be UNABLE to fully turn the latch. If it is possible to turn the latch and open the lid while the unit is running, contact technology for service. Close and latch the lid.

11. Push the OPEN/EMERGENCY STOP button. The RUN indicator light should go out and the motor should slow to a stop.

G. Troublehooting:

1. **Problem: The rotor does not spin freely:**
   - Ensure nothing has fallen into the rotor chamber.
   - If there is nothing obstructing the rotor, contact technologist for service.

2. **Problem: Excessive noise when the centrifuge is running:**
   - Check to see that the load is balanced.
   - Make sure that nothing has fallen into the rotor chamber.
   - Make sure that the nut in the center of the rotor is tight.
   - Have a technologist test the motor and replace it if necessary.

3. **Problem: The centrifuge does not run:**
   - Check the electrical outlet.
   - Make sure the lid latch is turned completely clockwise to its stop position. When the lid is closed properly the latch light on the control panel will illuminate.
   - Check the circuit breaker switch at the bottom left of the machine. If the switch is white the breaker has tripped. Contact technology for further assistance.
   - The printed circuit board may be damaged. Have a technologist test and replace the circuit board if necessary.
PROCEDURE:

4. Problem: The latch light does not come on when the lid is closed:
   - Make sure the unit has power
   - Make sure the lid latch is turned completely clockwise to its stop position. The latch makes contact with a switch underneath the front top of the cabinet. If this switch is not activated, the light will not turn on, and the machine will not run.

5. Problem: The centrifuge does not unlock after a run is completed:
   - The lid should remain locked until the rotor has nearly come to a complete stop and then unlock for 60 seconds. If additional unlock time is needed, press the OPEN/EMERGENCY STOP button with the machine plugge4d in and the rotor stopped. If the lid remains locked after this and will not unlock, the electronics may have been damaged. Contact technology for assistance.

6. Problem: The run time is not set to the desired length:
   a. Verify the preset time:
      - Push the OPEN/EMERGENCY STOP button to disengage the lock and then push open the lid.
      - Push and hold the START button for approximately 3 seconds. The LATCH indicator light will begin to flash indicating program mode.
      - When you release the START button, the RUN indicator light will begin to flash. Each flash of the RUN indicator light represents on minute of run time.
   b. To change the preset time:
      - Push the OPEN/EMERGENCY STOP button to disengage the lock and then open the lid.
      - Push and hold the START and OPEN buttons for approximately 3 seconds. The LATCH indicator will begin to flash indicating program mode.
      - Release the buttons. The preset time has been reset to zero. Press the START button once for each desired minute of run-time (up to 30 minutes)
      - When you are finished, press the OPEN button to exit. Use the above procedure to verify the time change.
DOCUMENTATION:

- Document on the hemodialysis treatment record the blood samples drawn.

REFERENCES:

