



## MANITOBA RENAL PROGRAM

<b>SUBJECT</b> <ul style="list-style-type: none"> <li>▪ Use of the Horizon Mini E Centrifuge</li> </ul>	<b>SECTION</b> 50.10 Home Hemodialysis Procedures – General
	<b>CODE</b> 50.10.01
<b>AUTHORIZATION</b> <ul style="list-style-type: none"> <li>▪ Professional Advisory Committee, Manitoba Renal Program</li> </ul>	<b>EFFECTIVE DATE</b> March 2010
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### 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

### KEY POINTS:

- Inspect tube holders for cracks and if found, replace immediately.

### PROCEDURE:

#### A. Collection of blood sample:

### KEY POINTS:

- 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 collection to prevent erroneous test results. Any

## **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.

### **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.
4. Spin the rotor by hand to check for free and level rotation.
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.
7. Turn the centrifuge on by pushing the START button.

## **KEY POINTS:**

- blood work requiring special handling, eg HLA must be drawn within the lab or dialysis unit.
  - DO NOT centrifuge Hematology, immediately invert 8-10 times.
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- 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.
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- 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.
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- If the rotor does not rotate freely, refer to the troubleshooting section.
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- 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.
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- The RUN indicator will illuminate.

## **PROCEDURE:**

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 and PHIN. Sample should indicate lithium heparin sample and if sample is pre or post dialysis.
  
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:

## **KEY POINTS:**

- 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.

## **KEY POINTS:**

- 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
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## **PROCEDURE:**

loud or unusual sounds, stop the centrifuge by pushing the OPEN/EMERGENCY STOP button and refer to troubleshooting.

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. Troubleshooting:**

### **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.

## **KEY POINTS:**

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 lid should remain locked until the rotor has nearly stopped. If the centrifuge unlocks prematurely, contact technology for service. Once the rotor has stopped, the interlock system will become disengaged for 60 seconds. The UNLOCKED indicator light will illuminate during this time.

## 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 plugged 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 one 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.

## KEY POINTS:

- In the case of power failure, entry into the rotor chamber may be made by removing the latch label and using a pen to manually disengage the locking mechanism.

## **DOCUMENTATION:**

- Document on the hemodialysis treatment record the blood samples drawn

## **REFERENCES:**

Horizon mini E Operator's Manual, The Drucker Co., 200 Shady Lane Drive, Philipsburg, PA 16866, Ph 814-342-6205, [www.druckerco.com](http://www.druckerco.com)

"BD Vacutainer® Evacuated Blood Collection System", BD Diagnostics, Preanalytical Systems, 1 Becton Drive, Franklin Lakes, NJ 07417, Ph 1-800-631-0174, [www.bd.com/vacutainer](http://www.bd.com/vacutainer)

"Heparin Plasma Testing in Clinical Chemistry", BD Diagnostics, Preanalytical Systems, 1 Becton Drive, Franklin Lakes, NJ 07417, Ph 1-800-631-0174, [www.bd.com/vacutainer](http://www.bd.com/vacutainer)