

## Module 7 – Your Blood Work

Every month you will need to collect a sample of your blood just before you start dialysis, and depending on your doctor's recommendation, at the end of your dialysis treatment. You will collect all your blood samples at home and take them to your local laboratory for testing. You will be taught how to spin your blood in a centrifuge, and how to store your blood in the fridge overnight, until you can deliver it to your local laboratory. You will find a helpful handout called "**Getting to Know your Kidney Blood Work**" at the end of this module.

### How to draw blood before starting dialysis (fistula or graft)



#### Supplies:

1. Vacutainer sleeve/adaptor – blue one (slip tip type)
2. Blood tubes (Ask your nurse what tubes are required)
3. Labels, which include:
  - Your name
  - PHN (care card number)
  - Your date of birth
  - The date and time your blood was drawn
  - Pre-dialysis blood sample

### Steps for drawing blood- fistula and graft

1. Insert fistula needles using the procedure you were taught. Do not heparinize or flush your needles until after blood is collected. Make sure your needle is clamped.

2. Remove the syringe on the end of the needle.
3. Connect the vacutainer adaptor (blue) to the vacutainer sleeve.
4. Attach the vacutainer adaptor and sleeve to the fistula needle you are collecting blood from.
5. Unclamp the needle.
6. Attach blood tubes one at a time to vacutainer sleeve/ adaptor. Collect blood until the blood tube stops filling. Clamp the fistula needle once you have finished filling all blood tubes.
7. Gently rock tubes back and forth, 2–3 times.
8. Continue with your regular dialysis hook up procedure.
9. Let blood tubes stand upright for 30 minutes, until the blood has clotted in the tubes.
10. Spin the blood tubes in the centrifuge as instructed. Ask your nurse which tubes need to go in the centrifuge. If you have an odd number of blood tubes, you will need a balance tube. See photo in centrifuge section.
11. Store your blood tubes in a refrigerator until you can deliver them to the lab. Ask your nurse about how much time you have before you must get your blood samples to the lab.



## Steps for drawing blood- Catheter



### Supplies:

1. Vacutainer sleeve/adaptor – luer lock
2. Blood tubes (Ask your nurse what tubes are required)
3. Labels, which include:
  - Your name
  - PHN (care card number)
  - Your date of birth
  - The date and time your blood was drawn
  - Pre-dialysis blood sample

1. Clean the end of the arterial catheter lumen. Withdraw as instructed by educator.
2. Attach an empty 10mL syringe to catheter TEGO connector cap and withdraw a full 10mL of blood from catheter line that you will collect blood samples from.
3. Remove the blood filled syringe (discard in sharps bin) and attach the sterile vacutainer sleeve/adaptor to the catheter TEGO connector cap.
4. Unclamp the catheter line.
5. Attach blood tubes one at a time to the vacutainer sleeve/ adaptor. Collect blood until the blood tube stops filling. Clamp the catheter line when you have finished collecting all blood tubes. Remove the sleeve adaptor and attach a pre-filled saline syringe. Flush lines with saline.
6. Gently rock tubes back and forth, 2-3 times.
7. Continue with dialysis hook up procedure.

8. Let the blood tubes stand upright for 30 minutes, until the blood has clotted in the tubes.
9. Spin the blood tubes in the centrifuge as instructed. Ask your nurse which tubes need to go in the centrifuge. You will need a balance tube if you have an odd number of blood tubes. See photo in centrifuge section.
10. Store your blood tubes in a refrigerator until you can deliver them to the lab. Ask your nurse about how much time you have before you must get your blood samples to the lab.

## How to draw blood after dialysis



### Supplies:

1. Vacutainer sleeve/adaptor – green needle type
2. Blood tubes (Ask your nurse what tubes are required)
3. Labels, which include:
  - Your name
  - PHN (care card number)
  - Your date of birth
  - The date and time your blood was drawn
  - Pre-dialysis blood sample

## Steps for drawing blood

1. Once dialysis treatment is complete and before you return your blood, slow your blood pump speed to 100mL/min. **DO NOT** turn off the blood pump.
2. Connect the vacutainer adaptor to the vacutainer sleeve.

3. Swab the arterial port on the arterial bloodline with alcohol swab.
4. Poke the arterial port with the needle end of the vacutainer sleeve.
5. Attach blood tube to vacutainer adaptor inside vacutainer sleeve. Collect blood until the blood tube stops filling.
6. Remove blood tube and gently rock tube back and forth, 2–3 times.
7. Continue with dialysis rinseback.
8. Let the blood tube stand upright for 30 minutes, until the blood is clotted in the tube.
9. Spin the blood tubes in the centrifuge as instructed. You will need a balance tube if the number of tubes is uneven.
10. Store your blood tubes in a refrigerator until you can deliver them to the lab. Ask your nurse about how much time you have before you must get your blood samples to the lab.

## How to use the centrifuge



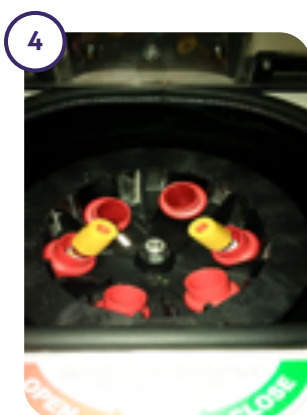
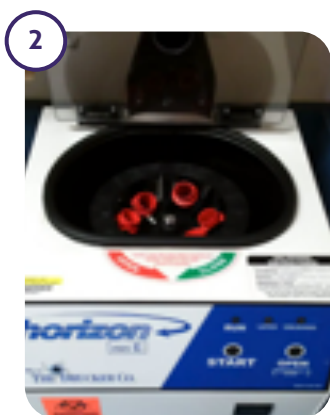
### Supplies:

- Centrifuge (within reach if you do not have a helper)
- Blood collecting tubes
- Tubes with water for balancing your blood tubes

## Spinning your blood samples

1. Place centrifuge on a flat, level surface making sure the suction cups have good contact. Plug into power outlet.

2. Press **Open** to allow opening of lid.
3. Ensure that tube holders are placed in the six holes in the rotor.
4. Each tube must be placed with a tube opposite so that they are balanced while spinning. If necessary, use a tube filled with water to achieve balance.
5. Close the latch on the lid.
6. Press **Start**.
7. If excessive vibration or noise occurs, stop the centrifuge by pressing **Emergency Stop**. Then, recheck the loading pattern to ensure it is balanced and restart.
8. Wait until rotor stops spinning.
9. Press **Open** and open the lid.
10. Store your blood sample tubes upright in your refrigerator until it can be delivered to the lab.



# Getting to know your kidney blood work

## (For patients on home hemodialysis)

**Note:**

Recommended ranges for dialysis patients may change over time based on new research findings.

Test	Approximate Normal Values for those on home hemodialysis	What is it?
<b>CBC and Iron Studies</b>		
Hemoglobin (Hgb)	Between 95-115	<ul style="list-style-type: none"> <li>Part of the red blood cells that carry oxygen</li> <li>Levels are kept slightly lower for patients on dialysis to prevent clots in vascular access or the machine</li> </ul>
White Blood Count (WBC)	4-10 giga/L	<ul style="list-style-type: none"> <li>A high WBC could mean you have an infection</li> </ul>
Platelet Count	150-400 giga/L	<ul style="list-style-type: none"> <li>Determines if your blood is clotting properly</li> </ul>
Iron Saturation (TSat)	Greater than 0.20	<ul style="list-style-type: none"> <li>Measures the amount of iron you have available to make new red blood cells</li> <li>If low, you may need iron supplements or IV iron</li> </ul>
Ferritin	100-800 ug/L	<ul style="list-style-type: none"> <li>A form of stored iron</li> </ul>
<b>Electrolytes</b>		
Sodium (Na+)	135-145 mmol/L	<ul style="list-style-type: none"> <li>Mineral that helps balance water in your body</li> <li>Important in blood pressure control and fluid balance</li> <li>A high sodium level could indicate dehydration</li> <li>A low sodium level could indicate fluid overload or overhydration</li> </ul>
Potassium (K+)	3.5-5.0 mmol/L	<ul style="list-style-type: none"> <li>Mineral found in most foods</li> <li>You may need diet changes or more dialysis to keep levels safe</li> <li>High potassium could stop your muscles from working properly. Your arms and legs may feel heavy and you may get tingling in your fingers and toes.</li> <li>***A dangerously high potassium could cause the heart muscle to beat abnormally and in some cases could cause the heart to stop (cardiac arrest)</li> </ul>
Bicarbonate (HCO <sub>3</sub> )	22-35 mmol/L	<ul style="list-style-type: none"> <li>A low HCO<sub>3</sub> means your blood has too much acid</li> <li>A high HCO<sub>3</sub> means your blood is more alkaline</li> <li>The doctor may adjust your HCO<sub>3</sub> level on your machine to help regulate this.</li> </ul>

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## Getting to Know Your Kidney Bloodwork (for patients on home hemodialysis)

<b>Bone Health</b>		
Calcium (Ca <sup>2+</sup> )	2.10-2.55 mmol/L	<ul style="list-style-type: none"> <li>Mineral found in food, such as dairy products, nuts and chocolate</li> <li>Helps keep bones healthy</li> <li>You may need medication to help maintain normal levels</li> <li>Dialysis patients may have a low calcium level due to poor absorption from the gut. This causes the body to “steal” calcium from the bones causing them to become weak and brittle</li> </ul>
Phosphate (PO <sub>4</sub> )	0.8 to 1.5 mmol/L	<ul style="list-style-type: none"> <li>Mineral found in foods such as dairy products</li> <li>You may need diet changes or medication to help maintain normal levels</li> <li>Patients who dialyze for extended hours (such as nocturnal dialysis patients who dialyze five or six times a week) may have a phosphorus level so low that extra phosphate will need to be added to their dialysis bath.</li> </ul>
Intact Parathyroid Hormone (iPTH)	For dialysis patients 30-80 mmol/L	<ul style="list-style-type: none"> <li>Hormone that helps to balance calcium and phosphorus</li> <li>iPTH is released into your bloodstream when the level of calcium in your blood is too low and/or the phosphorus level is too high. iPTH tells your bones to give up their calcium, which leads to a weakening of the bones</li> <li>Following your renal diet, taking your phosphate binders and Vitamin D supplements as prescribed and getting adequate dialysis will all help to keep your calcium, phosphorus and parathyroid hormone levels in balance</li> </ul>
<b>Other Blood Tests</b>		
Creatinine	45-110 umol/L	<ul style="list-style-type: none"> <li>Waste made by muscle activity</li> </ul>
Urea	Less than 9 mmol/L	<ul style="list-style-type: none"> <li>Waste made by the body</li> </ul>
Glucose or Random Blood Sugar (non-fasting)	3.8-7 mmol/L	<ul style="list-style-type: none"> <li>This is a measure of the sugar in your blood. Levels may vary for patients who have diabetes</li> </ul>
Hemoglobin A1C (HgbA1C)	Less than 7.0	<ul style="list-style-type: none"> <li>Measures your blood sugars over the past three months</li> </ul>
Albumin	35-52 g/L	<ul style="list-style-type: none"> <li>An important protein to determine how well you are eating</li> <li>Protein is an important part of growth and tissue repair</li> </ul>
Magnesium	0.70-1.00 mmol/L	<ul style="list-style-type: none"> <li>High magnesium levels can cause neurological problems and abnormal heart beats</li> </ul>

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## Getting to Know Your Kidney Bloodwork (for patients on home hemodialysis)

<b>Lipids</b>		
Cholesterol	2.0 - <5.0 mmol/L	<ul style="list-style-type: none"> <li>High levels of cholesterol and triglycerides can increase your risk of heart disease</li> </ul>
Triglycerides	0.45 - <1.7 mmol/L	
Cholesterol HDL Ratio	Less than 4.0	
LDL Cholesterol	1.5 - <2.0 mmol/L	
<b>Liver Function Tests</b>		
Aspartate transaminase (AST)	Less than 35u/L	<ul style="list-style-type: none"> <li>Determines if you have a healthy liver</li> </ul>
Alkaline phosphate (Alk Phos)	42-116u/L	<ul style="list-style-type: none"> <li>This level may be high if you have bone disease (see calcium, phosphorus and parathyroid hormone levels discussed above)</li> </ul>
<b>Hepatitis Screening</b>		
Hepatitis BsAg, Hepatitis BsAb, Anti HBc and HCV		<ul style="list-style-type: none"> <li>This screen is done once a year to test for Hepatitis B and C viruses. You can catch these viruses if you come into close contact with the blood or body fluids of an infected person.</li> </ul>
<b>Transplant Blood Work</b>		
Cytotoxic Antibodies		<ul style="list-style-type: none"> <li>Patients who are on the active kidney transplant waiting list must collect blood antibody levels at the beginning of every month within the first 7 days of the month.</li> </ul>

