

# Living well on haemodialysis – getting involved



Education and information for  
patients, relatives and carers

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## Introduction

This booklet has been created for people on haemodialysis who want to be involved with their care, with the aim to educate and help you understand more about your treatment.

**Note:** The content of this booklet is intended for information and educational purposes only. Please also consult with your renal doctor / dietitian / nursing team for medical advice.

## Acknowledgement

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# The kidney: an overview

## The Kidney Anatomy

### Renal Capsule

- A tough fibrous layer surrounding your kidney which protects from injury and infection.

### Renal Cortex

- The second layer which also helps to protect the inner part of your kidney.

### Renal Artery

- Supplies oxygen-rich blood from your heart to your kidney for filtration.

### Renal Vein

- Drains filtered blood from your kidney back to your heart.

### Renal Pelvis

- Functions as a pathway for fluid to travel to your bladder.

### Renal Medulla

- The smooth, inner tissue of your kidney. It contains the Pyramids and is where the Loops of Henle are found.

### Renal Pyramid

- Cone-shaped tissue which consists of segments of Nephrons and Tubules.

### Renal Column

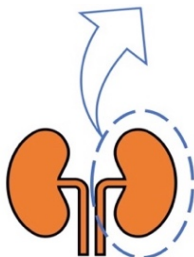
- Helps the renal cortex to be better anchored. It contains blood vessels, urinary tubules and fibrous material.

### Renal Calyx

- Helps collect fluid before it moves into your bladder. This is where extra fluid and waste become urine.

### Ureter

- Carries waste fluid (urine) from your kidneys to your bladder.



- Kidneys are two bean-shaped organs found in your abdomen (tummy), behind your gut. Their main role is to filter your blood.
- The kidneys help your body remove excess water, salt and waste products, as well as helping with other important functions of the body.

# The Nephrons

## Bowman Capsule

- Remaining fluid (called Capsular Urine) passes through this into the renal tubules.

## Proximal Convoluted Tubule

- Absorbs water, sodium and glucose into the blood.

## Efferent Arteriole

- Drains blood from the Glomerulus.

## Descending/Ascending Limb of Loop of Henle

- This section further absorbs potassium, chloride and sodium into the blood.

## Afferent Arteriole

- Carries blood to the Glomerulus.

## Glomerulus

- Capillaries that absorb protein from the blood into the renal corpuscle.

## Distal Convoluted Tubule

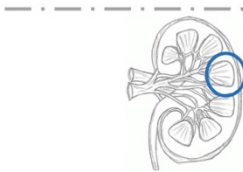
- Absorbs more sodium into the blood and takes in potassium and acid.

## Collecting Ducts

- Where filtered fluid exits the nephrons. Once in the collecting duct, the fluid moves on to its final stop in the renal pelvis.

## Vasa Recta

- Blood vessels that supply oxygen and nutrients to the tissue through which they pass the Renal Medulla. They also play an important role in forming concentrated urine.



- Nephrons are the “filtering units” of the kidneys, where blood is filtered before coming out as urine.
- Each kidney contains about one million nephrons.
- Nephrons enable the formation of urine through three processes:

## Filtration

- removes toxins and water from your bloodstream.



## Reabsorption

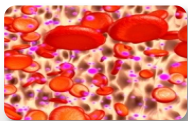
- moves back important nutrients and water that your body needs.



## Secretion

- releases waste and hydrogen ions that your body does not need, to complete urine formation.

## Functions of the kidneys include:



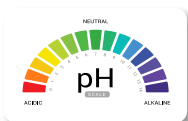
**Waste Excretion** Your kidneys remove waste products like Urea (formed from the breakdown of toxins) and Uric Acid (formed from the breakdown of nucleic acids), by getting rid of them in the urine.



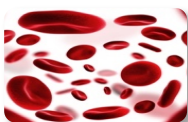
**Fluid Balance Regulation** Your kidney controls the balance between how much you drink and how much urine you produce. If you drink less water, your kidneys adjust accordingly and keep water in your body and reduce the amount of urine produced.



**Blood Pressure Regulation** Your kidneys need constant pressure to filter the blood effectively. Your kidneys respond to changes in blood pressure by producing proteins which act to help restore normal blood pressure.



**Acid-Base Regulation** Your kidneys and lungs help keep a stable acid-base balance within your body, allowing the cells in your body to function effectively. Your kidneys reabsorb and regenerate bicarbonate (which helps neutralise acids), and excrete hydrogen ions and acids when needed.



### **Secretion of Active Compounds**

**The kidneys produce:**

**Erythropoietin** - a hormone that stimulates the bone marrow to produce more oxygen-carrying red blood cells.

**Renin** - a protein that helps manage blood volume and blood pressure.

**Vitamin D** - a vitamin that helps control levels of calcium and phosphate balance in your blood.

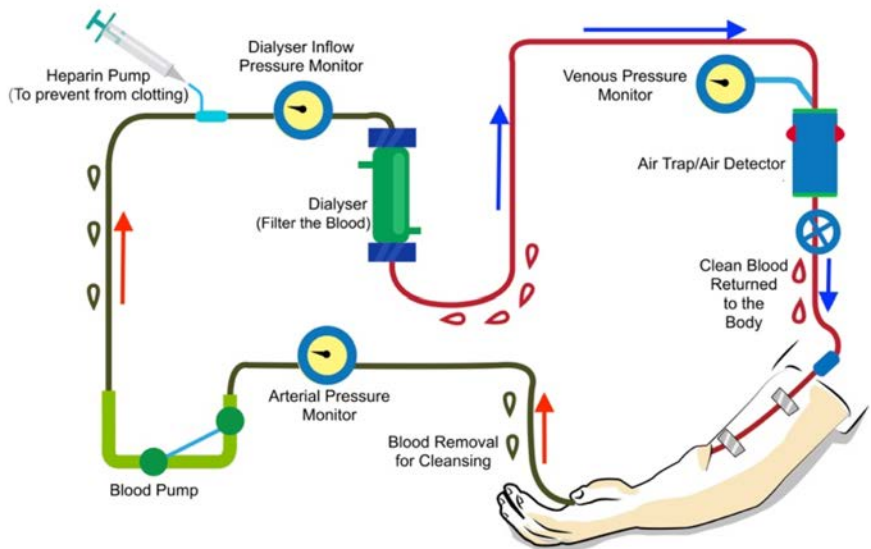


## You have chosen haemodialysis:

### What is haemodialysis?

**Haemodialysis (HD)** is a method of removing waste products and extra fluid from the blood when the kidneys are no longer able to work properly.

### The haemodialysis process



- When your kidneys are not working well, waste products and fluid can build up to dangerous levels in your body. Dialysis filters out toxins and excess fluid from your blood before this happens.
- During the procedure, blood flows into the dialysis circuit and through a filter, where it is “cleaned/filtered”, before it is returned into your body.

(NHS UK)

## Your nursing care plan:

### Access:

For haemodialysis to take place, blood needs to flow out of your body (via a large vein), into the dialysis machine where it is cleaned as it passes through a special filter called a “dialyser”, flowing back into your body. You therefore need an “Access”, a method of connecting you to the machine, in order to be able to have dialysis on a regular basis.

### Your access could be:



**Fistula** - Minor surgery is used to make a blood vessel in your arm wider and stronger by joining an artery and vein. This blood vessel can then be needled regularly for use during haemodialysis.



**Graft** - Minor surgery is used to join an artery and vein (usually in your arm) with a soft piece of tubing. The “graft” is then needled regularly for use during haemodialysis.



**Catheter (Tesio Line)** - A soft tube that is placed in a large vein, usually in your upper chest.

## Caring for your access:

It is important that you take good care of your access, whether it is a fistula, graft or catheter. Your dialysis care team will check your fistula/graft/catheter often to make sure it is working well.

### Fistula or Graft:

- **Reduce the risk of infection** by washing the overlying skin with antibacterial soap each day, and always before dialysis, and by avoiding scratching the overlying skin or picking scabs.
- **Keep the fistula/graft healthy** by asking your dialysis care team to rotate the needles when you have your dialysis treatment. This helps prevent thinning and scarring of the blood vessel.
- **Check for problems** which would require assistance, such as: **Signs of infection** (Redness, excess warmth or the beginning of a pimple in the area overlying the fistula/graft); **Signs of a blood clot** (If you can no longer feel a “Buzz” over the fistula/graft).

### Catheter (Teso Line):

- Keep the catheter dressing clean and dry.
- Make sure the area around the catheter is cleaned and the dressing is changed once a week.
- Keep an emergency dressing kit at home in case you need to change your dressing between treatments.
- You must not open your catheter to the air.

### When access problems occur:

- If you notice any signs of bleeding/infection/a blood clot, inform the Nursing Staff at your Dialysis Unit. When at home, you may contact and arrange an appointment at Rapid Assessment Unit – Hammersmith Hospital:

**020 3313 6603 / 020 3313 6604**

## Reducing risk of infection

Frequent hand washing with soap and water is the most effective way of cleaning the hands to reduce any risk of infection when undertaking haemodialysis.

**It is important to wash your hands.**

**Protect yourself!**

**Handwashing technique with soap and water:**



Wet your hands with water and apply soap to cover all hand surfaces.



Rub your hands palm to palm.



Rub the back of your hand with palm of your other hand.



Rub each of your thumb and wrist clasped in opposite hand using a rotational movement.



Rub the back of your fingers against your palms with your fingers interlocked.



Rub your palms together with your fingers interlaced.



Rub the tips of your fingers in opposite palm in a circular motion.



After washing, rinse your hands with water and use your elbow to turn off the water tap.



Dry your hands thoroughly with a clean disposable towel.

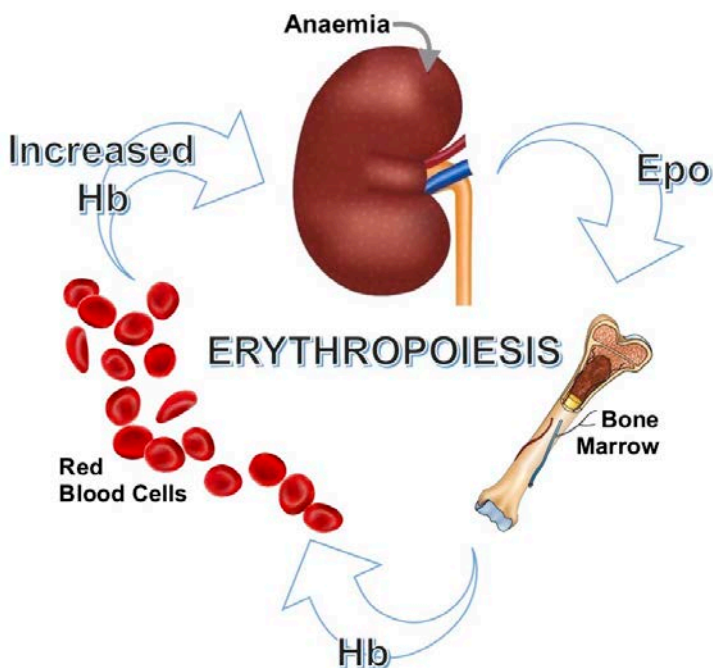
## Anaemia:

Is the general term for having fewer **red blood cells** than normal. Red blood cells carry oxygen around the body using a substance called **haemoglobin (Hb)**. Without oxygen, tissues and organs - particularly the heart and brain - do not function well. For this reason, people who are anaemic may get tired easily or may look pale.

Healthy kidneys produce **erythropoietin (Epo)**, a hormone that stimulates the bone marrow to produce red blood cells. Therefore, when your kidneys are not working well, you become anaemic. This is reflected in your blood tests by a low Hb. The target Hb for patients with kidney disease is:

**105 – 125 g/L.**

*(Kidney Care UK)*



## How anaemia is treated

Many people with kidney disease need both an Epo and Iron supplements to raise their Hb to a satisfactory level.



### Erythropoietin (Epo)

- Is given intravenously during haemodialysis treatment. The dose is tailored individually for each person.



### Iron

- If iron levels are too low, the Epo won't work well and you will continue to be anaemic. Therefore, we test for and treat iron deficiency. We aim to keep your Ferritin levels (a measure of iron stores) between 300-500 mcg/L.



### Blood Transfusion

- May be used for people who have a severe drop of Hb level too quickly to increase the amount of red blood cells and iron in the blood. They may be offered to you if you clinically need it – for example if you have a severe drop in Hb due to bleeding, blood disorders or chronic infection.

*(Kidney Care UK)*

**Note: Epo, Iron & Blood Transfusions** are prescribed by your Doctor or Nurse Prescriber. Dose and frequency are based on your Hb and/or Ferritin level.

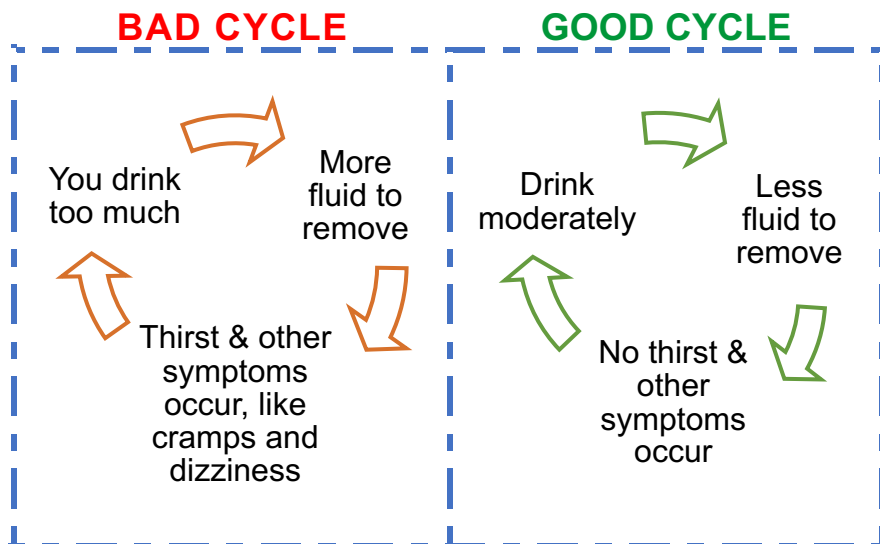
## Fluid management:

Dialysis removes excess fluid from your body. However, there is a limit to the amount of fluid that can be safely removed during a dialysis session, so it is important to manage your fluid intake. Limiting your fluids will help you feel better and stay healthier.

## What is dry weight?

**Dry weight** is your normal weight without any extra fluid built up in your body. Controlling your fluid intake helps you stay at your dry weight. If you let too much fluid build-up between sessions, it is harder to achieve your dry weight and this can be dangerous.

During or after dialysis treatment, your blood pressure may drop quickly and you may experience cramping, dizziness, or nausea. These symptoms may happen if too much fluid is removed, or if fluid is removed too fast. Be sure to tell your dialysis care team if this happens.



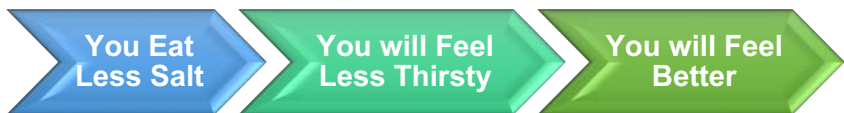
*(Fresenius Kidney Care)*



Excess salt contributes to fluid retention. Therefore, reducing your salt intake can be useful for controlling excessive fluid gain between dialysis sessions.

Less salt intake will help:

- Control your thirst.
- Prevent the build-up of excess fluid in your body – both oedema (swelling in ankles, fingers, waist or under your eyes) and fluid in the lungs (causing difficulty in breathing).



## What is my daily fluid allowance?



Fluid allowance is determined by the amount of urine you can produce in a 24-hour period. The usual allowance is between 500-700ml of fluid per day plus urine output. Therefore, if you can urinate 500ml per day and your fluid allowance is 700ml per day, your total daily fluid allowance would be 1200ml per day. However, if you don't pass any urine, your total fluid allowance would be only 700ml per day.



Excess fluid in your body shows up as weight gain. Your body weight can be an important sign of how well you control your fluid intake and how well your treatments are working. You can discuss with your **Dietitian** and **Nurses** how to monitor fluid gain and track what your fluid intake is to help you feel your best.

*(Fresenius Kidney Care)*

## Adequacy:

Or 'Clearance', refers to how well your dialysis treatment removes waste products from your blood.

**Kt/V** is the method we use to measure dialysis adequacy. Blood samples (e.g. Urea) are taken pre-/post- dialysis treatment to measure how well your dialysis is working.

In this measurement: **Kt** - is clearance(K) multiplied by time(t), representing the volume of fluid completely cleared of urea during a single treatment. **V** - is the volume of water your body contains. The body is about 60% water by weight.

**Imperial-Renal target Kt/V = 1.6 or More**

Factors which result in better dialysis clearance include:



More dialysis time



Good access flow  
(Fistula/Graft/Tesio Line)



High dialysis pump speed  
(400-450 mls/min)



Use of a bigger dialyser



Use of a bigger needle  
size (Fistula/Graft)

## Your dietary needs

Malnutrition and muscle wasting are common in people on dialysis, with patients with chronic renal failure at the highest risk. The negative consequences of a poor nutritional state include impaired wound healing, increased susceptibility to infection, malaise, fatigue, poor rehabilitation and increased risk of death.



Dietary guidance and treatment changes as renal impairment progresses and is dependent on your individual circumstances.

### **Seeing a dietician is important as they can:**

- Help you understand any dietary changes you could make to stay healthy.
- Help you to stay well-nourished and avoid problems from not eating properly.
- Work with you to preserve flexibility in your diet to keep your lifestyle as normal as possible.
- Help you decide on what food choices are best for you, so that you can still enjoy the food that you eat.

*(Kidney Research UK)*

## Maintaining healthy levels of calcium, phosphate and potassium:

On dialysis, we will monitor your calcium, phosphate and potassium levels through blood tests and adjust your treatment accordingly.

### Calcium and Phosphate:

The kidneys are important in maintaining a healthy balance of calcium, phosphate and Vitamin D in the body. In health, the kidneys produce “active” Vitamin D, which helps maintain the balance of calcium and phosphate in the body. Therefore, when kidneys fail there is a short supply of active vitamin D, which causes problems with calcium and phosphate balance.

**Calcium:** very low levels can cause muscle twitching and spasms, especially in the face and arms. The treatment is to give vitamin D and calcium supplements in tablet form e.g. Alfacalcidol, Calcium Carbonate.

High levels of calcium can also cause abdominal pain, agitation, and gritty eyes. The treatment is to stop calcium and vitamin D tablets, and treat other causes such as high level of parathyroid hormones (PTH). The acceptable range for blood Calcium if you are on dialysis is: **2.0 – 2.6 mmol/L.**

**Phosphate:** high phosphate levels in the blood can lead to brittle bones, hardened blood vessels (increasing the risk of heart attacks and strokes) and can cause generalised itching, which can be unpleasant. The treatment is to optimise dialysis, reduce phosphate in the diet, and to take medication with food (e.g. phosphate binder such as Sevelamer/Renagel) to reduce phosphate absorption. The acceptable range for blood Phosphate if you are on dialysis is: **0.7 – 1.6 mmol/L.**

*(Healthline)*

## Potassium:

At healthy levels, potassium is important in helping the muscles work (including the muscles that control the heart and breathing) and regulating fluid balance and nerve signals. Normally, extra potassium that our body does not need is removed from our blood by our kidneys.

*(Healthline)*

When kidneys fail, potassium can build up in the blood, which can be dangerous. A blood test will confirm your potassium level. The acceptable range for blood potassium if you are on dialysis is:

**Pre-Dialysis: 3.5 – 6.0 mmol/L**

**Post-Dialysis: 3.0 – 4.0 mmol/L**

## Home dialysis patients

Some people on home dialysis may not need to restrict potassium, phosphate or fluid as strictly if they are dialysing for at least five days a week for three hours each session, a total of approximately fifteen hours a week of dialysis. The increased dialysis time can help achieve better blood levels of potassium, phosphate and calcium and consequently some people can eat and drink more freely.

## How to get in contact with the dietitian

Each dialysis unit has an allocated dietitian. You can ask your nurse to arrange an appointment for you when the Dietitian next visits the unit. Alternatively, the renal dietitians can be contacted at Hammersmith Hospital on:

**0203 313 5807**

	<b>High in Phosphate</b>
<b>Dairy</b>	cheese e.g. cheddar, processed cheese spreads, yoghurts, milk puddings, condensed and evaporated milk, coconut milk/cream, raita, Lassi, Kulfi
<b>Fish</b>	crab (fresh), monk fish, mussels, pilchards, sardines, scampi, sea bass, Taramasalata, whitebait
<b>Meat / meat alternatives</b>	offal e.g. liver or kidney, liver pate, processed or plastic wrapped cooked meats e.g. sausages, ham, bacon, salami, nuts, seeds, soya beans, quorn, ready prepared meals containing phosphate additives
<b>Drinks</b>	malted milk drinks e.g. horlicks, ovaltine, cocoa, hot chocolate, milky coffee, milkshakes, yoghurt-based smoothies, dark coloured fizzy drinks e.g. cola; lager, stout
<b>Fruit and vegetables</b>	
<b>Starchy Foods</b>	all bran, bran flakes, cereals with nuts or dried fruit, muesli, ready brek
<b>Miscellaneous</b>	chocolate, chocolate spread, other foods containing chocolate Burfi, Bombay mix, chevra, halva, marzipan, peanut butter, scones, waffles and crumpets, baking powder, shop bought naan breads Instant sauces containing phosphate additives

	Lower in Phosphate
<b>Dairy</b>	cream, crème fraiche, cream cheese, ice-cream, ricotta cheese, cottage cheese, paneer, almond milk, rice milk, oat milk, 1/3rd of a pint of milk or 2/3rd pint of soya milk (or small pot of yogurt) per day
<b>Fish</b>	all fish except for those listed in the foods to limit section e.g. cod, crab (tinned), plaice, fresh salmon, sea bream, tinned or fresh tuna
<b>Meat / meat alternatives</b>	all meat except for those listed in the foods to limit section e.g. chicken, lamb, beef, pork, turkey, soya mince, tofu, eggs (up to 4/week) baked beans, black eyed beans (boiled), chick peas (tinned), hummus, lentils (boiled)
<b>Drinks</b>	coffee (little milk), tea, herbal teas, fizzy drinks (e.g. lemonade, orangeade), squashes and cordials, mineral and flavoured water
<b>Fruit and vegetables</b>	all types that are low in phosphate, however they do contain potassium
<b>Starchy Foods</b>	all types of bread, rice, pasta, couscous, breakfast cereals, noodles, croissants, bagels, chapattis, naan, pitta bread, puri's, plain paratha
<b>Miscellaneous</b>	rice cakes, crisp breads, breadsticks, crackers, popcorn, plain biscuits, plain cake, boiled sweets, marshmallow, mints, honey, marmalade

	<b>High in potassium</b>
<b>Fruit</b>	avocado, banana, coconut, redcurrants, sharon fruit, all dried fruit e.g. currants, prunes, raisins, figs, dates
<b>Vegetables</b>	baked beans, raw/boiled beetroot, breadfruit, brussels sprouts, chard, drumstick leaves/pods, endive, kantola, karella, mushrooms, okra, patra leaves, parsnips, rocket, spinach, tomato puree and sundried tomatoes, water chestnuts
<b>Starchy foods</b>	baked, steamed or jacket potatoes, chips, oven chips, hash browns, instant potato, potato waffles or wedges, potato pakoras, fried green banana, plantain, cassava, yam, dasheen, taro  breads and breakfast cereals that contain dried fruits, nuts or chocolate e.g. All Bran, Sultana Bran, Chocos, Fruit'n'Fibre, chocolate croissants, products made from gram flour or besan flour
<b>Drinks</b>	milky coffee, cocoa, drinking chocolate, malt drinks e.g. Horlicks, Ovaltine condensed, coconut and evaporated milk, pure fruit juices, fruit and vegetable smoothies, high juice squashes, ale, beer, cider, lager, stout, wine, port
<b>Protein</b>	nuts and seeds, roasted, dried soya beans
<b>Snacks</b>	potato and vegetable crisps, nuts and nut products e.g. peanut butter, bombay mix, chevra, papadums, pakoras  biscuits and cakes containing chocolate, nuts or dried fruit, fruit cake, chocolate, fudge, marzipan, black treacle, liquorice, toffee. asian sweets containing milk or nut products e.g. burfi, besan, halva, rasmali
<b>Miscellaneous</b>	salt substitutes e.g. Lo Salt, Ruthmol, Selora, vegetable-based soups, brown sauce and tomato Ketchup, tahini, Bovril, Marmite, peanut butter, chocolate spread



	Lower in potassium
<b>Fruit</b>	two 80g portions of fruit per day (fresh or drained tinned) e.g. apples, blueberries, grapes, lychee, pears, plum, pineapple, satsuma but not those listed in the foods to limit list
<b>Vegetables</b>	two 80g portions of boiled vegetables per day, e.g. beansprouts, bottle gourd, mange tout, marrow, mixed veg, peas, ridged gourd, squash, sweet corn but not those listed in the foods to limit list
<b>Starchy foods</b>	one small portion per day of well boiled potato, sweet potato, yam, taro or cassava all types of bread, rice, pasta, couscous, breakfast cereals (without nuts, dried fruit or chocolate), corn meal, noodles, croissants, bagels, crumpets, chapattis, naan, pitta bread, puris, plain paratha, tortilla wraps
<b>Drinks</b>	tea, herbal teas, fizzy drinks, squashes, cordial, water (flavoured and tonic), barley water, 1/3 of a pint of milk per day spirits e.g. brandy, gin, rum vodka, whisky (if permitted by your doctor)
<b>Protein</b>	all meat, fish, eggs, quorn, soya mince, pulses
<b>Snacks</b>	corn or maize based snacks e.g. skips, wotsits, tortilla chips, rice cakes, crisp breads, breadsticks, crackers, plain popcorn mints, plain biscuits, plain cake, boiled sweets, marshmallows, jelly babies, turkish delight, jelabi
<b>Miscellaneous</b>	mustard, mint sauce, horseradish, mayonnaise, salad cream, salad dressing, relish e.g. piccalilli, corn or onion relish, pickle, lemon curd, fruit jams, marmalade

## Next steps

### Start with shared haemodialysis care:

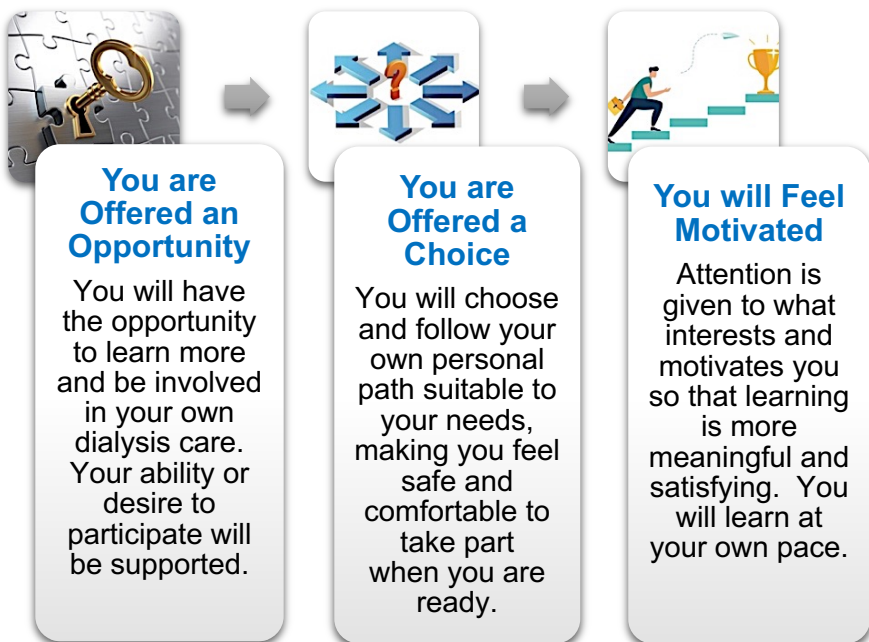
#### What is shared care?

**Shared Care** means healthcare professionals working in partnership with you to engage you in your treatment. We will encourage you to take an interest in helping yourself, helping you feel more involved and positive about your dialysis.

#### Why shared care?

The vision for Shared Care is for people who receive dialysis at dialysis centres to have the opportunity to, and information they need to, participate in aspects of their treatment and thereby improve their experience and their outcomes.

### With shared care:



*(Shared Haemodialysis Care)*

## Getting involved

You can be involved in your own dialysis care, from preparing for dialysis, to learning about your condition and how haemodialysis works. You can also participate in any of the tasks involved from monitoring your blood pressure to full self-care. For example:



Check your own weight and blood pressure.



Set-up and program your own machine.



Prepare your own trolley for the treatment.

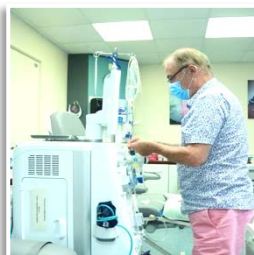
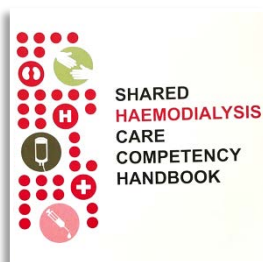


Start and discontinue your own treatment.

*(Shared Haemodialysis Care)*

## The benefits

- You will have more control over your treatment.
- You may reduce the time you have to wait for dialysis to start and stop.
- You will have a better understanding of your condition and haemodialysis treatment.
- You will feel more confident about your treatment, and can become independent to the level you choose.
- You will feel more confident to dialyse whilst on holiday.
- The confidence you gain could be a stepping stone to home dialysis.



## The stepping stone to home haemodialysis:

Are you considering doing home haemodialysis treatment? If so, speak to one of your nursing team, and, if suitable, we can help you prepare to dialyse in the comfort of your own home.

### How home haemodialysis works

Unlike hospital haemodialysis, where you have three fixed sessions lasting around three to five hours each session per week, with home haemodialysis:



- You can be more independent and will have more flexibility to fit dialysis around work, family and leisure time.
- You will not have a two-day non-dialysis gap without any blood cleaning.
- You will have fewer limits on what you eat and drink compared to the standard in-center treatments.
- You will not need to travel to hospital for dialysis treatment.
- You will be given the choice about how often and for how long you dialyse. For example, you may decide to have shorter, more frequent dialysis sessions (e.g. five days per week for three hours at a time). You can fit the treatments into your day – at any time that works for you and your family.

## FAQs:

### **What qualifies me for home haemodialysis?**

The most vital factor in whether you qualify for home dialysis is how much you want to do it. However, it may not be suitable for you if you often become unwell on dialysis or you have any other medical conditions which would make it less suitable. Your renal doctor can discuss this with you.

### **Is it important to have help from someone at home?**

The frequent treatments are gentle, and problems are very rare. Some people can manage to dialyse on their own, but having someone who could help you during your dialysis treatments would be better – they can fetch things you cannot reach when you are connected to the machine, and give you snacks, medicines or saline when you feel unwell. Talk to your family and discuss what help they may be able to give you. Your renal doctor and home dialysis team will also discuss with you the possible risks involved.

### **Who will prepare my home for dialysis?**

The home dialysis team and technicians will visit your house to assess if there is a suitable electricity and water supply, and sufficient space for the equipment needed for dialysis. They will also arrange for the necessary water testing and plumbing to be carried out in your house to ensure you have suitable water for dialysis, and the delivery of your equipment and other supplies you need for your treatment. If you do not own the property, you will need to get permission from your landlord/housing authority to make these changes.

## **When am I ready for home dialysis?**

Every individual is different and we are here to make sure you feel confident. You will be trained in your dialysis unit by your shared care team in preparation for your home dialysis training. We will make sure that you know what to expect, and are willing to commit to the training and treatment, which usually takes at least four weeks to complete. Your training nurse will help you and a member of your family learn to:

- set-up and be familiar with the NxStage machine.
- recognise and troubleshoot any problems.
- perform routine maintenance of your machine.
- order your supplies, and sort out any issues that may arise.
- take care of your dialysis access (your fistula, graft or tesio line).

## **Who will help me if I have a dialysis or machine problem?**

If you have any dialysis related problem, please contact your home dialysis team during the required time stated in the information leaflet. For machine related problems, please contact the NxStage tech support. The contact numbers will be given to you at the time of your home dialysis training.



**Call 999 in case of Emergency**

## Benefits of home haemodialysis

There are many benefits of Home HD, including significant improvements in health outcomes. There are benefits for physical, psychological & social wellbeing. For example:

In the home environment, you will be able to increase the frequency of dialysis treatments and extend the duration of sessions per week. The beneficial effects of this include:

- better control of fluid balance.
- improved blood biochemical parameters (including phosphate, calcium, potassium and urea) – The more you dialyse, the more you clean.
- improved nutritional status.
- improved blood pressure control.

Managing your own treatment will help you regain a sense of control over your health and life, as well as a sense of confidence.

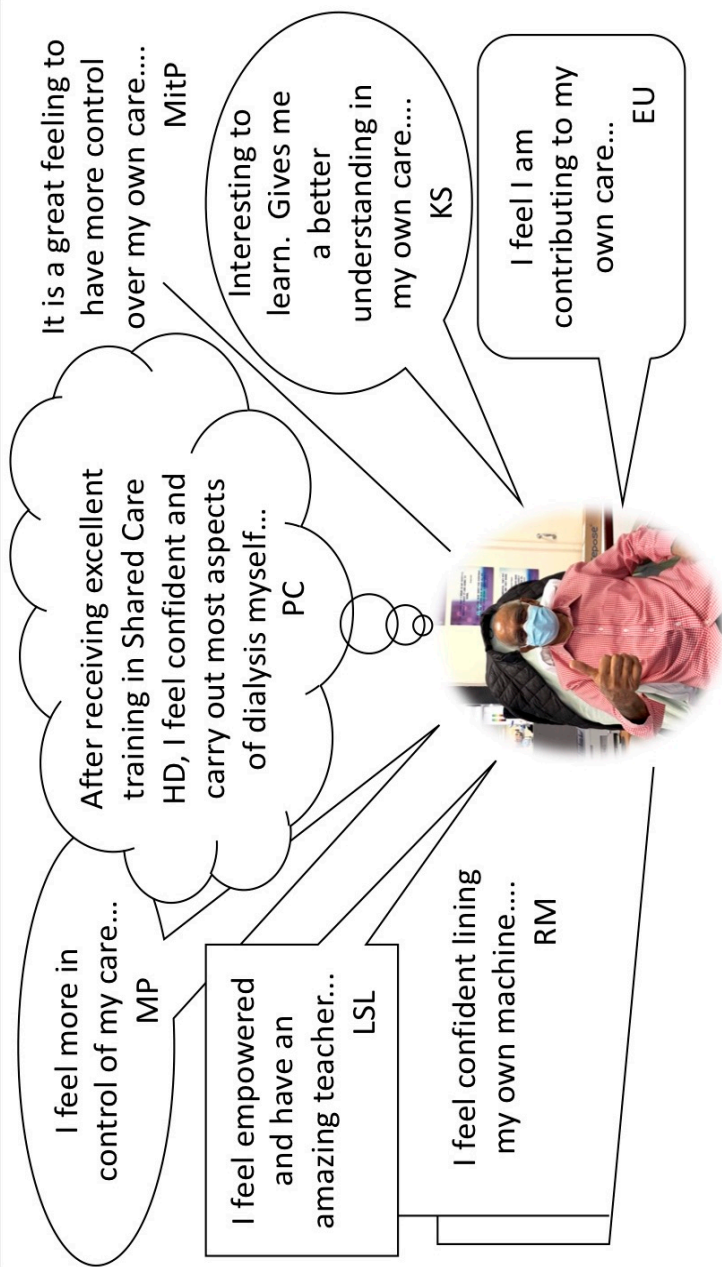
- enhanced quality of life.
- improved vitality, energy and sleep quality.
- recovery time or post dialysis fatigue is reduced.
- you will feel healthier due to improvement in mental well-being.

You will experience increased freedom because you will control your own time for dialysis. More of your time can now be devoted to socialising with family and friends, as well as spending time on leisure activities and work.

*(EDTNA/ERCA)*



## OUR PATIENTS' FEEDBACK:



## OUR PATIENTS AND TEAM IN ACTION...



## Your common blood results explained



Blood tests tell you and your nursing team how you are doing. Blood tests will be taken every month (or more often if needed), to look at a number of different parameters. The results help us keep track of your health and adjust your dialysis and other treatments accordingly.

**NOTE:** Blood levels are renal adjusted values. Please discuss your blood results with your renal doctor or dialysis nursing staff.

*(SOURCE: Lab Tests Online UK)*

### Tests that we do regularly

#### Full blood count (FBC):

<b>Haemoglobin (Hb)</b> <b>105–125 g/L</b>	Hb is a protein found in red blood cells that carries oxygen from your lungs to your cells. This test measures the amount of Hb in your blood and is a good indication of your blood's ability to carry oxygen around your body. If the Hb is low, we call this “Anaemia”.
<b>White Cell Count (WCC)</b> <b>3.0-10.0 x10<sup>9</sup>/L</b>	WCC indicates the number of white blood cells in a sample of blood. White blood cells are made in the bone marrow and protect the body against infection and aid in the immune response. The WCC may be high or low in infection.

### **FBC (continuation):**

<b>Mean Corpuscular Volume (MCV)</b> <b>80-99 fL</b>	MCV is a measurement relating to the volume, size and Hb content of red cells in the blood. This is calculated as part of a full blood count (FBC) analysis. This helps us diagnose & monitor diseases that affect the blood and bone marrow, such as anaemia.
<b>Platelets</b> <b>150-400 x10<sup>9</sup>/L</b>	Platelets are produced in the bone marrow and are released into the blood, where they play an important role in coagulation (blood clotting). If the platelets count is low, you may be at increased risk of bleeding .

### **Bone profile:**

<b>Corrected Calcium</b> <b>2.0-2.6 mmol/L</b>	Calcium is an essential mineral which is vital to the function of your heart, nerves, and blood-clotting systems. Blood calcium is tested to monitor a range of conditions relating to the bones, heart, nerves and kidneys. If the level is low or high, we may need to adjust your treatment.
<b>Phosphate</b> <b>0.7-1.6 mmol/L</b>	Phosphate is a substance found in the blood which is vital for energy production, muscle and nerve function, and bone growth. If the level is low or high, we may need to adjust your treatment.

## Renal profile (U&E):

<b>Sodium (Na)</b> <b>133-146</b> mmol/L	Sodium is an electrolyte present in all body fluids, and is vital to normal body function including nerve and muscle function. If the sodium level is low or high, we may need to adjust your dialysis or fluid/salt intake.
<b>Potassium (K<sup>+</sup>)</b> Pre-HD: <b>3.5-6.0</b> Post-HD: <b>3.0-4.0</b> mmol/L	Potassium is a mineral and an electrolyte that is important in helping your muscles work, including the muscles that control your heartbeat and breathing. If the potassium level is low or high, this can be dangerous and we may need to adjust your treatment.
<b>Urea</b> For dialysis patients: <b>8-20</b> mmol/L	Urea is the main breakdown product of proteins and the form in which nitrogen is excreted from the body in the urine. Levels are used to evaluate how well the kidneys are working and to monitor patients receiving kidney dialysis.
<b>Creatinine</b> For dialysis patients: <b>200-1000</b> umol/L	Creatinine is a waste product produced in your muscles from the breakdown of a compound called creatine. Almost all creatinine is excreted by the kidneys, so blood levels are a good measure of how well your kidneys are working. Creatinine will rise in the days between your dialysis sessions. The level will depend on the amount of muscle you have and your body size.

## Liver profile:

<b>Alanine Transaminase (ALT)</b> <b>10-35 IU/L</b>	ALT is an enzyme found mostly in the liver; smaller amounts are also found in the kidneys, heart, and muscles. When the liver is damaged, ALT is released into the bloodstream, hence increasing the concentration that can be detected in a blood test.
<b>Alkaline Phosphate (ALP)</b> <b>40-135 IU/L</b>	ALP is an enzyme found in high amounts in bone and liver. Raised levels of ALP are usually due to a disorder of either the bone or liver.
<b>Total Bilirubin</b> <b>0-21 umol/L</b>	Bilirubin is a waste product of red blood cell breakdown. It is used to screen for, detect and monitor liver and blood disorders.
<b>Albumin</b> <b>35-50 g/L</b>	Albumin is the most abundant protein in the blood. It keeps fluid from leaking out of blood vessels; nourishes tissues; and transports hormones, vitamins, drugs, enzymes, and ions like calcium throughout the body. Albumin increases when a person is dehydrated and decreases in a number of disorders including heart, kidney, liver and nutritional diseases.

## Other blood tests that we do regularly:

<b>C-Reactive Protein (CRP)</b> <b>0-5 mg/L</b>	CRP is a protein made by the liver that is released into the blood in tissue injury, infection and inflammation. A high CRP can indicate underlying infection or inflammation that may need investigation or treatment.
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## Other blood tests (continuation):

<b>Ferritin</b> <b>200-500</b> mcg/L	The ferritin concentration within the blood stream reflects the amount of iron stored in your body. A low ferritin level may indicate iron deficiency, which may need treating if you are anaemic.
<b>Parathyroid Hormones (PTH)</b> We aim to keep the level between: <b>10 and 36</b> pmol/L	PTH controls calcium and phosphate balance in the body. It is part of a 'feedback loop' that includes the PTH, Vitamin D, Calcium, Phosphate and Magnesium. In renal disease, there is often an imbalance of calcium, phosphate and PTH levels. A high or low PTH level may indicate a need to adjust your treatment.
<b>Total Protein</b> <b>60-80</b> g/L	Total protein is a rough measure of all of the proteins in the plasma portion of your blood. Proteins are important building blocks of all cells and tissues. Protein in the serum is made up of albumin and immunoglobulin.

## Swab screening:

<b>Methicillin Resistant Staphylococcus Aureus (MRSA)</b> Positive or Negative	MRSA is an antibiotic resistant form of the bacteria called Staphylococcus Aureus. It is tested for using a nose or groin swab. If the swab is positive, it indicates that you are "colonised" with MRSA (not that you necessarily have an infection), and we will give you treatment to "clear" it.
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## Tests we may need to do when required

<b>Glucose</b> <b>3.8-7.8 mmol/L</b>	<p>Glucose is a simple sugar that serves as the main source of energy for the body. The fasting blood glucose test (collected after an eight to ten hour fast) is used to screen for and diagnose diabetes.</p>
<b>IFCC HbA1C</b> <b>27-47 mmol/mol</b>	<p>This test shows how well your diabetes has been controlled over the last two-three months. It will give a picture of the average level of glucose in your blood over that time period.</p>
<b>Vitamin B12 and Folate</b> <b>B12: 191-663</b> <b>Folate: 200-500</b>	<p>These are primarily requested to help diagnose the cause of anaemia, or to help evaluate the nutritional status of a patient with signs of significant malnutrition or malabsorption. If low, B12 and Folate are replaced by tablets or injections.</p>
<b>Cultures (Blood/Swab/Urine)</b> <b>Growth or No growth</b>	<p>Blood, swab and urine cultures are a method used to identify the presence of bacteria or yeasts when infection is suspected. If “positive”, treatment for the infection identified may be required.</p>
<b>Hepatitis B Virus Antibody</b> <b>Positive or Negative</b>	<p>Hepatitis B virus is an infection which causes liver damage. Blood tests can detect the presence of antibodies to HBV (indicating past or present infection, or previous vaccination). If this is positive, we may do further tests to determine if there is current infection.</p>



### Tests when required (continuation):

<b>Hepatitis C Virus Antibody</b> Positive or Negative	Hepatitis C virus is an infection which causes liver damage. Blood tests can detect the presence of antibodies to HCV (indicating past or present infection). If this is positive, we will do further blood tests to detect the presence of viral antigens, which would indicate current infection.
<b>HCV-RNA (PCR)</b> Detected or Not detected	Refers to an advanced technology that is used to detect ribonucleic acid from the Hep C Virus (HCV). The test identifies whether the virus is in your blood. If positive, it indicates that you have an active infection with HCV. It is usually performed by a test called a qualitative HCV.

## Useful links:

- **Kidney Care UK**  
[www.kidneycareuk.org](http://www.kidneycareuk.org)
- **Shared Haemodialysis Care**  
[www.shareddialysis-care.org.uk](http://www.shareddialysis-care.org.uk)
- **The National Kidney Federation**  
[www.kidney.org.uk](http://www.kidney.org.uk)
- **National Health Services (NHS)**  
[www.nhs.uk](http://www.nhs.uk)
- **Kidney Research UK**  
[www.kidneyresearchuk.org](http://www.kidneyresearchuk.org)
- **Fresenius Kidney Care**  
[www.freseniuskidneycare.com](http://www.freseniuskidneycare.com)
- **The Renal Association**  
[www.renal.org](http://www.renal.org)
- **European Dialysis and Transplant Nurses Association/European Renal Care Association (EDTNA/ERCA)**  
[www.edtnaerca.org/resource/edtna/files/111381\\_EDTNAE\\_RCA\\_NxStage\\_Book\\_Home\\_HD\\_2017.pdf](http://www.edtnaerca.org/resource/edtna/files/111381_EDTNAE_RCA_NxStage_Book_Home_HD_2017.pdf)
- **Healthline**  
[www.healthline.com](http://www.healthline.com)
- **Lab Tests Online UK**  
[www.labtestsonline.org.uk](http://www.labtestsonline.org.uk)

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