About the kidneys

What do healthy kidneys do?
Your two kidneys work more than you realise. The kidneys remove excess body water and waste products 24 hours a day.

The excess body water and waste products are removed from your body in the urine.

Besides the “removal” or “cleaning” job, kidneys have several other very important functions.

They regulate electrolytes such as potassium and sodium (“salt”) concentration in your body. Kidneys also produce hormones that help to control blood pressure, produce red blood cells, and keep your bones strong.

What is kidney disease and why do they stop working?
Chronic Kidney Disease (CKD) simply means that your kidneys no longer work well enough to keep you healthy.

Your doctor will work closely with you to slow the progression of the disease.

This period may last for weeks or years. Over time, the kidney disease will reduce kidney function to a level where a replacement therapy will become necessary. This level or stage is called End Stage Renal Disease or ESRD.

There are different kidney replacement therapy options available to do the work your kidneys used to do.

Diseases like diabetes, high blood pressure and chronic kidney infections may cause kidney damage over the course of many years.

Other causes of chronic kidney disease may be hereditary or the result of birth defects in the kidney system.

What happens when kidneys fail?
When the kidneys start to fail, the important functions decrease.

Excess body water and waste products build up in your blood. This is called uraemia.

Due to the accumulation of water and waste products, and the decreased production of certain hormones, you may start to feel sick.
About kidney disease and the available treatment options

Symptoms of chronic kidney disease
Unfortunately, in some cases the exact cause of the kidney disease is not known. Signs of chronic kidney disease often appear very slowly.

You may barely notice when these signs and symptoms start. As a result of the accumulation of water and waste products you may experience one or more of the following symptoms:
- decreased amount of urine
- swelling in hands, face, legs
- shortness of breath
- sleeping problems
- loss of appetite, nausea / vomiting
- high blood pressure
- feeling cold and tired

What can be done if my kidneys fail?
During the early stages of chronic kidney disease, your doctor will try to slow down the progression of the kidney disease, and the onset of some symptoms, through diet and medication.

Later though, you will need a treatment that replaces more of the lost kidney function.

There are three different treatment options available to replace some of the lost kidney function:
- Peritoneal dialysis
- Haemodialysis
- Kidney transplantation

What is dialysis?
Dialysis is a procedure to replace some of the kidneys’ functions such as
- removal of excess body water
- removal of waste products

There are two modes of dialysis:
- Peritoneal dialysis (PD)
- Haemodialysis (HD)
Peritoneal dialysis (PD) treatment

**Peritoneal dialysis**

The peritoneal cavity is a space in everybody’s abdomen.

A thin lining called the peritoneal membrane covers this space.

The peritoneal membrane is used as a filter to clean the blood and removes excess body water.

In peritoneal dialysis, a PD solution is used to fill the peritoneal cavity through a small plastic tube called a catheter. The PD solution remains there for several hours, this is called the dwell time.

After the dwell time the used PD solution is drained and replaced with fresh PD solution.

This process is called an exchange and is repeated 4 to 5 times a day.

**Peritoneal dialysis access**

PD solution goes in and out of the peritoneal cavity through a catheter.

The catheter is a soft, flexible tube about the size of a straw.

It is placed in the lower abdomen during a minor surgical procedure and is usually ready to use in two weeks after surgery.

The catheter stays in place during the entire time in a peritoneal dialysis patient.

**What are the different options of peritoneal dialysis?**

Peritoneal dialysis can be performed in two ways:

- Manually – CAPD (Continuous Ambulatory Peritoneal Dialysis), typically done during the day

- Automatically – APD (Automated Peritoneal Dialysis) using a machine called a cycler, typically done during the night

Both treatment types are normally done at home. The choice between them depends on the personal likes/dislikes, lifestyle choices and medical conditions.
Peritoneal dialysis (PD) treatment

How is CAPD done?
In CAPD, most exchanges are done during the day.
Typically, four exchanges are done per day:
1. In the morning after waking up
2. Around lunch time
3. Late afternoon or early evening
4. Just before bed time
Each exchange procedure takes about 30 minutes.
Dialysis takes place during the time the PD solution is in the peritoneal cavity.

How is APD done?
In APD most exchanges are done during the night with the help of a machine, called a cycler.
The patient is connected to the cycler which infuses the PD solution through a tubing set for approximately 8–10 hours.
The cycler fills and drains the peritoneal cavity automatically, while the patient is sleeping.

Here are two ways how to perform APD:

- CCPD (Continuous Cyclic Peritoneal Dialysis)
  A long daytime dwell and 3–6 night time exchanges are performed with a cycler. Patients have more freedom during the day

- PD Plus
  This is an APD modality with one additional exchange during the day time
Peritoneal dialysis (PD) is a continuous treatment which is done seven days a week. The PD patient is free to do all usual activities between the exchanges. In APD, most of the day is free.

Peritoneal dialysis is a gentle treatment. Excess water and waste products are removed slowly and continuously from the body.

- Regular clinic visits are needed every 4–6 weeks
- Storage space is needed at home
- Electrical outlets may need to be modified for the cycler
- Patient training usually takes 1–2 weeks

The nurses in the PD unit will train the patient how to do the PD exchanges. They will give continuous support while doing PD at home. Usually a partner is not required, although a family member or carer can also learn to assist the patient if required.

In addition, the patient is responsible for

- weight and blood pressure control
- catheter surveillance
- a clean environment to perform exchanges

Bath or hot tubs are not recommended.
Haemodialysis (HD) treatment

Haemodialysis

Haemodialysis uses an “artificial kidney” called a dialyser, and a haemodialysis machine.

During the treatment, a portion of blood is pumped through a specially prepared tubing set to the dialyser. Excess body water and waste products from the blood are removed in the dialyser.

The cleaned blood is then returned to the body through the tubing set. Only one cup of blood is outside the body at any one time during the treatment. The average adult has between 4–5 litres of blood, and can easily tolerate this small amount out of the body.

How is haemodialysis done?

A dialyser is a bundle of hollow fibres produced from a special material that allows water and waste products to pass through.

At the same time useful substances, such as red blood cells and proteins, are retained. The blood flows inside the fibres while dialysis fluid or dialysate flows outside the fibres. During this process, dialysis takes place.

A surgeon will create an access to the blood stream, usually in the arm or sometimes in the leg. Before treatment starts, two fistula needles are inserted into the blood access to allow the blood to pass to and from the haemodialysis machine, via a special tubing set, during the treatment. The fistula needles are removed when the treatment is finished.

Haemodialysis access

For haemodialysis a special blood access is needed. There are three possible types.

- **Fistula**
  A connection is made between an artery and a vein during a minor surgical procedure. It is helpful to create the fistula at least one month before starting with dialysis.

- **Graft**
  An artificial vessel (tube) is placed under the skin connecting an artery to a vein during a minor surgical procedure.

- **Catheter**
  A temporary catheter is inserted into a vein. The catheter remains in place between the treatments. No needles are necessary, as the catheter is directly connected to the tubing system.
What are the different options for haemodialysis?

Time, length and frequency of haemodialysis (HD) treatment depends on medical issues, lifestyle and the dialysis unit. Haemodialysis treatments can be performed in a variety of settings:

- At a dialysis clinic or hospital (in-centre) where medical staff will prepare, perform and monitor the treatment. The HD schedule is usually three times a week for approximately 4–5 hours.
- At a self-care or limited care facility where the patient prepares and performs the treatment. Medical staff are available to support the patient, if required.
- At home where the patient prepares, performs and monitors the treatment. Medical staff are able to offer support over telephone, if required. The patient has more flexibility over the dialysis schedule.

Things to consider about haemodialysis in-centre and self-care

There are many clinics and hospitals offering haemodialysis treatment. Some of them may offer self-care haemodialysis, too.

The dialysis machine and all required medical supplies are provided by the dialysis unit.

A regular dialysis schedule is provided, e.g. Monday-Wednesday-Friday.

- The patient needs transportation from home to the dialysis unit and back.
- It is important to arrive always on time for the treatment.
- Opportunity to see and talk to other patients and medical staff.

Things to consider about home haemodialysis

The patient and, if required, an additional person will need to successfully complete a training programme which usually takes 6–8 weeks.

The patient will have a very flexible schedule without the need of transportation from home to the dialysis unit and back. A variety of alternative treatment options can be offered.

The dialysis machine needs to be connected at home to the electrical circuit and water system. Therefore electrical and plumbing outlets may have to be installed or modified. Energy and water consumption will increase.

Sufficient space is needed for the haemodialysis machine, water treatment system and medical supplies.
What are the different options for home haemodialysis?

Time, length and frequency of the home haemodialysis treatment depends on the medical condition and lifestyle issues.

There are different options for home haemodialysis:

- Conventional home haemodialysis where HD treatments are performed during the daytime, typically three times a week for 4–6 hours
- Nocturnal home haemodialysis where HD treatments are performed during the night while the patient sleeps. The schedule is either every night or every other night for about 8–10 hours
- Short daily home haemodialysis where HD treatments are performed 5–7 times a week for 2–3 hours

In addition, the patient is responsible for:

- weight and blood pressure control
- dialysis access (fistula, graft, catheter) surveillance
- notifying medical staff if side effects like headaches, nausea, cramps occur during the treatment or any other problems between treatments

The daily routine of a HD patient

While on HD the patient is responsible for complying to the treatment prescription and diet recommendation.
Kidney transplantation

What is kidney transplantation?

Kidney transplantation is the implanting of a healthy kidney from another person (donor) into a patient with end stage renal disease (recipient).

The suitability of a candidate for a kidney transplant is dependent on certain medical conditions. Various laboratory tests are done to ensure that the donor and recipient are good matches.

The time it takes to get a transplant varies. Unfortunately, not enough kidneys are available for transplantation, so some patients may be on a waiting list for some time.

A kidney may be donated from:
- a living blood relative, such as a parent or a sibling
- a living non-relative, such as a spouse or very close friend
- a non-living, or deceased donor, who has declared his intention to become a donor known prior to death

Kidney transplantation

The new kidney is placed in the lower abdomen while the diseased kidneys are normally not removed.

The new kidney may start working immediately, or may take up to a few weeks, to produce urine. In rare circumstances the new kidney may not work at all.

To avoid a rejection, the patient has to take daily anti-rejection medication after the transplantation.

Sometimes this medication cannot prevent a kidney rejection, or it may cause some unwanted side effects such as a weakened immune system, weight gain or high blood pressure.

Things to consider about kidney transplantation

A successful transplantation may help to return to a state of good health without dialysis.

After transplantation the patient has to be aware that:
- daily intake of anti-rejection medication is very important
- regular follow-up visits are necessary
- a successful transplantation may last for many years, but may not last forever
- if transplant fails, dialysis is still an option
- kidney transplantation is another form of therapy, but not a permanent cure for end stage renal disease
Taking care of yourself

How can I take care of myself?

Some key steps for taking care of yourself and staying healthy as directed by your doctor, include:

- treatment schedule and prescription
- diet and fluid intake
- medication
- regular visits to the clinic / hospital

Learn about the treatment you have chosen, in order to recognise problems and ask for help.

Take care of yourself by staying as active as possible and do not isolate yourself from family and friends. These are people who can care for you and can provide support and understanding.

Remember, dialysis should be part of your life, but not your whole life.

Living with dialysis

Although there will be changes in your life following kidney disease and treatment, life will go on!

Many people, just like you, have learnt how to live their lives around dialysis treatments. There are many resources, both professional and patient – sponsored, that can give you information and assistance with most of the issues that concern you and your family:

- Work / school
- Dining out
- Travel
- Exercise / activity
- Sexuality
- Social services
- Support systems

Nutrition and dialysis

Compliance with dietary recommendations is an important part of your therapy. There are recommendations for the type and amount of different nutrients an ESRD patient should eat. A good state of nutrition contributes to the well-being.

Malnourishment or malnutrition increases the risk of illness.

A renal dietician will help to develop an appropriate diet for you. You and your renal dietician will choose food you like to eat and ensure that food contains the important nutrients, which your body needs.

A special focus on the dietary recommendations will be on the intake of

- daily fluids
- salt
- potassium
- protein
Dedicated support to help you

Your healthcare team
No matter which form of therapy you choose, you will have a dedicated team of healthcare professionals to support you.

You will see these people on a regular basis. You should not hesitate to talk to them about your treatment or about issues you face while dealing with your kidney disease.

Your healthcare team includes your
- doctor
- dialysis nurse
- technician
- dietician
- pharmacist
- social worker

The choice is yours
We hope this patient brochure has been of help to you. The best treatment is the one that fits your medical condition, your lifestyle and your personal likes and dislikes.

Surely you may have more questions about the various treatment options. Ensure that you get all the information you need to make a good informed decision.

No matter which therapy you choose, you can count on the active and competent support from your medical staff and support team. Do not hesitate to ask your doctor and your nurse for advice.

Where you can find help
Please ask your health care team to provide you with the required information about
- support systems: local agencies, social services, patient associations
- financial issues: reimbursement, financial aid

You may also find helpful information on the internet, in your local library and through the National Kidney Association.