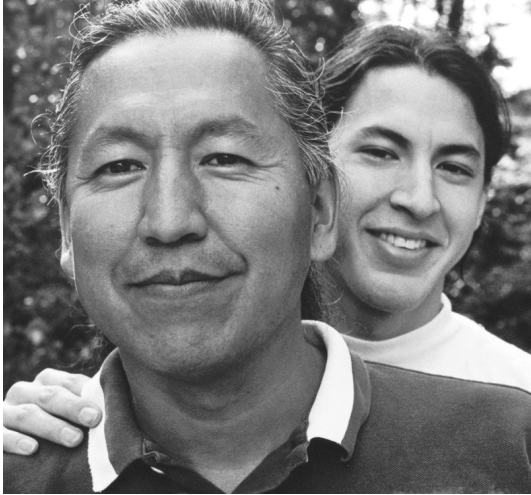


National Kidney
Foundation™

Hemodialysis: What You Need to Know





Healthy kidneys clean your blood and remove extra fluid in the form of urine. They also make hormones your body needs for some important functions. When kidney failure occurs, treatment is needed to replace some of the important jobs your kidneys do. The treatments for kidney failure are hemodialysis, peritoneal dialysis and kidney transplant. Learn all you can and speak to your doctor about which is the best choice for you.

This booklet is about hemodialysis. It is written for people who are already receiving hemodialysis, and for those who may need to start treatment for kidney failure soon. Information is based on recommendations from the National Kidney Foundation's (NKF) Kidney Disease Outcomes Quality Initiative Clinical Practice Guidelines.

When will I need to start treatment?

Treatment is needed when someone has stage 5 chronic kidney disease (CKD), or kidney failure. Your doctor can tell your stage of CKD by checking your glomerular filtration rate (GFR). Your GFR can be estimated from the results of a blood test for creatinine, a waste product from muscle activity. If your GFR falls below 15, you are said to have kidney failure (CKD stage 5), and you will need to have some form of treatment to replace the function of your kidneys. If your GFR is less than 30, your doctor should talk to you about the different treatments for kidney failure. Learn all you can to make the best treatment choices for yourself and your family.

What does dialysis do to keep me healthy?

Both hemodialysis and peritoneal dialysis do the following:

- Remove waste, salt and extra water to prevent them from building up in your blood
- Keep a safe level of certain chemicals in your blood
- Help to regulate blood pressure

How does hemodialysis work?

A hemodialysis machine has a special filter called a dialyzer, or artificial kidney, to clean your blood. To get your blood into the dialyzer, the doctor needs to make an

access, or entrance, into your blood vessels. This is done with minor surgery, usually to your arm.

Three different types of access can be made—a fistula, a graft or a catheter.

A fistula is the first choice for an access. It is made by joining an artery to a nearby vein under your skin to make a bigger blood vessel. This type of access is preferred because it has fewer problems and lasts longer. You should be evaluated by a special doctor called a vascular surgeon at least six months before you will need to start dialysis. A fistula should be placed early (several months before starting dialysis) so it has plenty of time to heal and be ready by the time you need treatment.

If your blood vessels are not suitable for a fistula, a graft may be used. This involves joining an artery and nearby vein with a small, soft tube made of synthetic material and placed under your skin.

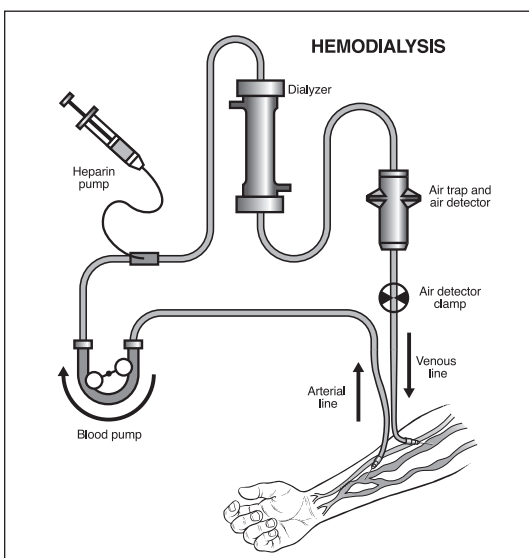
After the fistula or graft has healed and dialysis is started, two needles will be placed—one in the artery side and one in the vein side of the access—every time you go for treatment. The needles are connected to plastic tubes. One tube carries your blood to the dialyzer where it is cleaned and the other tube returns the cleaned blood back to you.

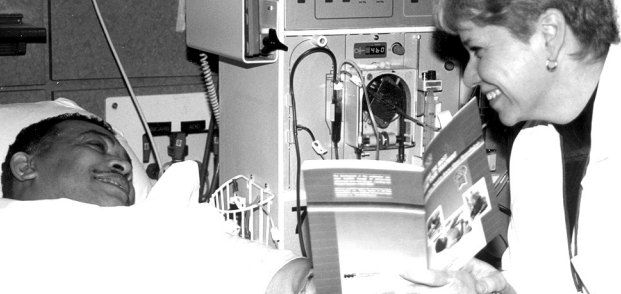
The third type of access, called a catheter, is inserted into a large vein in your neck or chest. This type of access is generally used when you need dialysis for a short period of time. Catheters may be used as a permanent access but only when a fistula or a graft cannot be placed. Catheters can be connected directly to the dialysis tubes and needles are not used.

You will be referred to a special surgeon for placement of your access.

How does the dialyzer clean my blood?

The dialyzer, or filter, has two parts—one part for your blood and the other part for a washing fluid called dialysate. A thin membrane separates these two sides. Blood cells, protein and other important things remain in your blood because they





are too big to pass through the membrane. Smaller waste products such as urea, creatinine and extra fluid pass through the membrane and are removed. Changes in the dialysate or cleansing fluid can be made for your special needs.

Where is hemodialysis done?

Hemodialysis can be done at a hospital, at a dialysis center that is not part of a hospital or at home. You and your doctor will decide which place is best based on your medical condition and your wishes.

How long will each hemodialysis treatment last?

Hemodialysis treatments are usually done three times a week. Each treatment lasts about four hours, but you may need more time to ensure that enough wastes and fluid are removed. The amount of dialysis you need depends on:

- How much your own kidneys are working
- How much fluid weight you gain between treatments
- How much you weigh
- How much waste you have in your blood

- The type of artificial kidney used by your dialysis center

Your doctor will give you a dialysis prescription that tells how much treatment you need. Studies have shown that getting the right amount of dialysis improves your overall health, makes you feel better, keeps you out of the hospital and enables you to live longer.

How do I know if I am getting the right amount of dialysis?

A special dialysis prescription will be developed for you. This will help make sure that you get the right amount of treatment. In addition, your dialysis care team should monitor your treatment with monthly lab tests to measure the amount of dialysis you receive (your delivered dose of dialysis). The most accurate way to measure this is called urea kinetic modeling. The number that tells your delivered dose of dialysis is your Kt/V (say “kay tee over vee”). The goal for your Kt/V number may vary depending on how often you have dialysis and on how much remaining kidney function you have left. For many dialysis patients who have three treatments weekly, Kt/V should be at least 1.2 for each treatment.

Other methods are sometimes used to measure delivered dose of dialysis. For example, some dialysis centers may use the urea reduction ratio (URR). If this ratio

is used to measure your delivered dose of dialysis, your URR should be at least 65 percent for each treatment.

TIP

Know your delivered dose of dialysis

Ask your dialysis care team what test they are using to determine your delivered dose of dialysis.

Ask what your number is. If your number is not as good as it should be, ask how it can be improved.

Ask your dialysis care team to make sure:

- Your access is working well.
- Your dialyzer is working well.
- Your blood flow and the flow rate of the dialysate fluid (cleansing fluid) are not too slow during dialysis.
- Your blood samples are taken correctly.

You can help to ensure that you receive enough treatment by:

- Arriving on time and staying for the full treatment.
- Keeping all your treatment appointments.

Can I have hemodialysis at home?

Possibly. Many patients have their hemodialysis treatments at home. If you and your doctor decide this is a good choice for your treatment, you and a dialysis care partner will be trained in how to do hemodialysis at home. Your dialysis care partner will usually be a family member or friend but may also be someone you hire to assist you. Home hemodialysis allows you to schedule your treatments to fit your routine. Your home must have enough space for the equipment and enough water drainage and electric power to operate the dialysis machine and water purification unit. Medicare covers the cost of home hemodialysis just as they do for dialysis in a hospital or other treatment center. Medicare may help cover the cost of minor modifications to your home for home hemodialysis. However, Medicare will not cover the cost of a home health aide if you have no one who can be a care partner for you.

Some newer methods of home hemodialysis are now available. These methods are called short daily home hemodialysis and nocturnal home hemodialysis. They involve either shorter, more frequent treatments or long, slow treatments during sleep. Many patients using these treatments have better control of blood phosphorus levels, blood pressure and anemia; better sleep; and improved quality of life. Speak to your

doctor and dialysis care team if you are interested in these treatments. (See the NKF's booklet *Home Hemodialysis*.)

TIP

Protect your remaining kidney function

Studies show that remaining kidney function contributes to better outcomes in dialysis patients. Ask your dialysis care team about the following steps to help keep remaining kidney function:

- Take blood pressure pills called angiotensin-converting enzyme inhibitors (ACEIs) or angiotensin receptor blockers (ARBs) if you have high blood pressure. These medicines help to protect kidney function.
- Avoid medicines that can harm your kidneys, such as pain-relieving medicines called nonsteroidal anti-inflammatory drugs (NSAIDs) and certain antibiotics.
- Ask your doctor about taking diuretics (water pills) to help remove salt and water from your blood.
- Make sure conditions like diabetes and high blood pressure are well-controlled.

Can dialysis cure my kidney disease?

In some cases of sudden (also called acute) kidney failure, dialysis may only be needed for a short time until the kidneys get better. However, when CKD progresses slowly over time to kidney failure, your kidneys do not get better. You will need dialysis for the rest of your life unless

TIP

Stay comfortable on dialysis

Symptoms like cramps, headaches, nausea or dizziness are not common during dialysis. If you experience any of them, ask your dialysis care team if any of the following steps could help you:

- Slow down your fluid removal, which could increase your dialysis time.
- Check your high blood pressure medications.
- Adjust your dry weight or target weight.
- Cool the dialysate a little.

You can help yourself by carefully following your sodium (salt) and fluid limits between treatments to decrease fluid buildup in your body.

you are able to receive a kidney transplant. (See the NKF's brochure *Kidney Transplant*.)

I have heard I might have to reuse my dialyzer each treatment. Is this safe?

Before you reuse your dialyzer (filter), your dialysis center cleans it according to careful guidelines. If done properly, reuse is safe. Before each treatment, your dialyzer must be tested to make sure that it is still working well. Ask your dialysis care team if they have tested your dialyzer and if it still works well.

If your dialyzer no longer works well, it should be discarded and you should be given a new one.

If you do not wish to reuse your dialyzer, your center may be willing to provide you with a new one for each treatment. Ask about the center's policy on reuse. For more information about reuse, see the NKF's booklet *What You Should Know About Dialyzer Reuse: A Guide for Hemodialysis Patients and Their Families*.

Will I need to follow a special diet?

Yes. Your diet will be different from the one you followed before starting dialysis. Although certain foods may be limited, it's important to get the right amount of protein

and calories to maintain good health. The registered dietitian at your center will help you develop a meal plan that meets your needs. It's important to stick to your fluid and sodium (salt) limits so you don't build up too much fluid in your body between treatments. This buildup may lead to the need for more fluid removal (ultrafiltration) during your dialysis treatment. Ultrafiltration may cause some discomfort during your treatment. Excess fluid buildup can also increase your blood pressure. To help prevent fluid buildup between treatments, your daily diet should not include more than 2 grams of sodium, or 5 grams of salt. Your dietitian can give you suggestions for a limited-salt diet. For more information about your special diet, see the NKF's booklets *Nutrition and Hemodialysis* and *Nutrition in Dialysis: Are You Getting Enough?*, and *A to Z Guide Sodium and Your Diet: How to Spice Up Your Cooking*.

What insurance coverage is available for dialysis?

The federal government's Medicare program covers 80 percent of all dialysis costs for most patients. Private insurance or state medical aid may also help with the costs. Most dialysis centers have billing personnel who can answer your questions about insurance coverage and billing.

TIP

Keep sodium under control

To limit the amount of sodium in your diet and help prevent too much fluid buildup, try the following:

- Cook with herbs and spices instead of salt.
- Read food labels; choose foods low in sodium.
- When eating out, order meat or fish without salt. Ask for gravy or sauce on the side because these may contain large amounts of salt and should be used in small amounts.
- Limit use of canned, processed and frozen foods.
- Avoid salt substitutes and specialty low-sodium foods made with salt substitutes because these are high in potassium.
- Speak to your dietitian if you have any questions or need more tips.

Will dialysis change my lifestyle?

You and your family need time to get used to dialysis and your treatment schedule. The social worker at your dialysis center will be available to provide counseling to help you and your family adjust to changes in your lifestyle caused by your illness.

Once you get used to your treatment, you should feel a lot better. In fact, you may feel more like doing the activities you enjoyed before your kidney disease developed. Medications are available to treat your anemia and keep your bones healthy so you will feel stronger and less tired.

Can people on dialysis travel?

Yes. Dialysis centers are located in every part of the United States and in many foreign countries. Before you travel, you must make an appointment for dialysis treatment at another dialysis center. The staff at your dialysis center may be able to help you arrange the appointment. For more information, see the NKF's booklet *Travel Tips for Kidney Patients*.

Can people on dialysis continue to work?

Yes. Many dialysis patients continue to work or return to work after they have gotten used to dialysis. If your job requires a lot of physical labor (heavy lifting, digging, etc.), you may need to change your duties. For more information, see the NKF's booklet *Working With Kidney Disease: Rehabilitation and Employment*.

What help is available to me and my family?

Contact your local NKF office for information about resources available in your community and a listing of educa-



TIP

Improve your quality of life

Ask your doctor about an exercise program that is right for you. Exercising regularly can make you feel stronger.

Learn all you can about your treatment. Speak to your dialysis care team if you have any questions at all. They are there to help you do well on your treatment.

Get back into your life. Dialysis should just be a means to keep you well enough to do the things you want in your life.

tional materials and programs. You can also call the national toll-free number at 800.622.9010 or visit www.kidney.org for more information. You may be interested in asking for copies of the following NKF booklets:

- *Choosing a Treatment for Kidney Failure* (11-10-0352)
- *Dining Out With Confidence* (11-10-0405)
- *Coping Effectively: A Guide for Patients and Their Families* (11-10-0503)
- *Home Hemodialysis* (11-10-0329)
- *Kidney Transplant* (11-10-0304)
- *If You Choose Not to Start Dialysis Treatment* (11-10-0330)
- *Nutrition and Hemodialysis* (11-50-0136)
- *Staying Fit With Chronic Kidney Disease* (11-10-0331)
- *Travel Tips for Kidney Patients* (11-10-0513)
- *What You Need to Know About Dialyzer Reuse: A Guide for Hemodialysis Patients and Their Families* (11-10-0335)
- *Peritoneal Dialysis: What You Need to Know* (11-50-0215)
- *When Stopping Dialysis is Your Choice* (11-10-0331)
- *Working With Kidney Disease: Rehabilitation and Employment* (11-10-0501)

You may be interested in becoming a member of NKF's Patient and Family Council. For more information about the benefits of membership and to receive an application, call or write the National Kidney Foundation. Membership in the council is free.

Understanding your lab values

Kt/V and *URR* are measures of your delivered dose of dialysis. They tell whether you are receiving the right amount of dialysis.

Glomerular filtration rate (GFR) is an estimate of how well your kidneys are working. Your GFR can be measured from the results of your blood creatinine test, your age, gender and race.

Albumin and *normalized protein nitrogen appearance (nPNA)* are measures of your nutritional health. They tell whether you are getting enough protein and calories from your diet.

Hemoglobin is the part of red blood cells that carries oxygen to your tissues. If your number is too low, you have anemia and you will need to take a medicine to raise red blood cell production in your body.

Transferrin saturation (TSAT) and *serum ferritin* are measures of the iron stores in your body. Iron is important to your body's ability to make red blood cells. You need extra iron if you have anemia.

Parathyroid hormone (PTH) is made by four small glands located in your neck. If these glands work too hard and make too much PTH, you may lose calcium from

your bones. Over time, this can weaken your bones and cause them to break more easily.

Calcium and **phosphorus** are two minerals that are important for bone health. If they get out of balance, the parathyroid glands start making more PTH, which may lead to loss of calcium from the bones.

Potassium is a mineral that is important to the heart. Too much or too little potassium in your blood may be harmful to your heart.

Target weight (or dry weight) is how much you should weigh after dialysis removes excess fluid from your body.

Average daily weight gain is the amount of weight you gain each day between dialysis treatments. If you do not follow your fluid and salt limits between treatments, you may gain too much fluid weight.

Pre-dialysis and **post-dialysis blood pressure** should be taken each time you receive dialysis. Your blood pressure goes down when excess fluid and salt are removed from your blood by your dialysis treatment.

NOTES

NOTES

My Dialysis Care Team

Nephrologist (Kidney Doctor)

name:

phone:

Primary Care Nurse

name:

phone:

Dietitian:

name:

phone:

Social Worker:

name:

phone:

Patient Care Technician:

name:

phone:

National Kidney Foundation's Kidney Disease Outcomes Quality Initiative

Did you know that the National Kidney Foundation's Kidney Disease Outcomes Quality Initiative (NKF-KDOQI)[™] develops guidelines that help your doctor and health care team make important decisions about your medical treatment? The information in this booklet is based on the NKF-KDOQI[™] recommended guidelines for hemodialysis, and it's very important for you to know.

Stages of Chronic Kidney Disease

There are five stages of chronic kidney disease. They are shown in the table below. Your doctor determines your stage of kidney disease based on the presence of kidney damage and your *glomerular filtration rate (GFR)*, which is a measure of your level of kidney function. Your treatment is based on your stage of kidney disease. Speak to your doctor if you have any questions about your stage of kidney disease or your treatment.

Stages of Kidney Disease

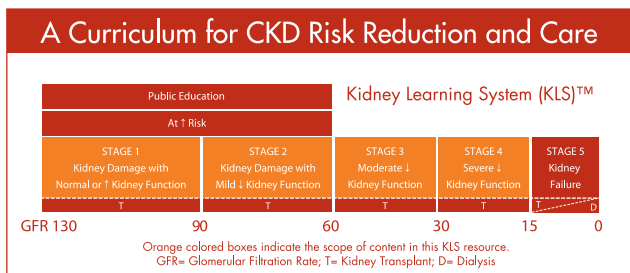
Stage	Description	Glomerular Filtration Rate (GFR)*
1	Kidney damage (e.g., protein in the urine) with normal GFR	90 or above
2	Kidney damage with mild decrease in GFR	60 to 89
3	Moderate decrease in GFR	30 to 59
4	Severe reduction in GFR	15 to 29
5	Kidney failure	Less than 15

*Your GFR number tells your doctor how much kidney function you have. As chronic kidney disease progresses, your GFR number decreases.

More than 26 million Americans have chronic kidney disease, and most don't even know it. Millions more are at increased risk. The National Kidney Foundation, a major voluntary health organization, seeks to prevent kidney and urinary tract diseases, improve the health and well-being of individuals and families affected by these diseases, and increase the availability of all organs for transplantation. Through its affiliates nationwide, the foundation conducts programs in research, professional education, patient and community services, public education and organ donation.

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Kidney Learning System (KLS)TM



Light-shaded boxes indicate the scope of content targeted in this KLS resource.
GFR = Glomerular Filtration Rate; T = Kidney Transplant; D = Dialysis

Cover photo: Judah S. Harris



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