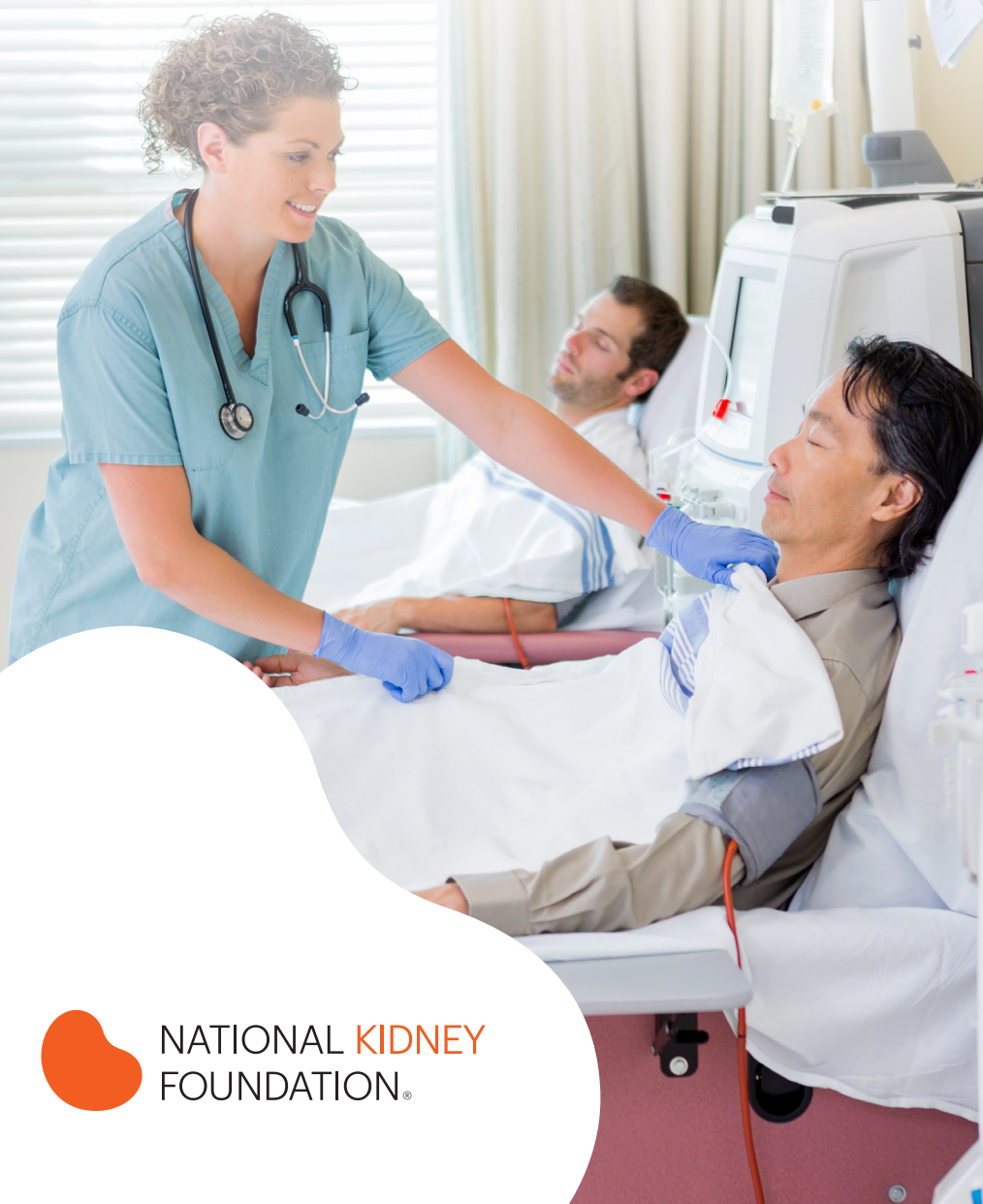


Hemodialysis

What you need to know









NATIONAL KIDNEY
FOUNDATION®

Stages of chronic kidney disease

There are 5 stages of kidney disease as shown in the table below. Your healthcare provider will tell you the stage of kidney disease, based on how well your kidneys are working and your estimated glomerular filtration rate (eGFR). The eGFR number comes from a lab test that measures the amount of blood your kidneys are filtering each minute. As CKD gets worse, the eGFR number goes down.

STAGES OF KIDNEY DISEASE

| STAGE | DESCRIPTION | ESTIMATED GLOMERULAR FILTRATION RATE (eGFR) | KIDNEY FUNCTION |
|-------|---|---|---|
| 1 | Kidney damage (e.g., protein in the urine) with normal kidney function | 90 or above |  90-100% |
| 2 | Kidney damage with mild loss of kidney function | 60 to 89 |  60-89% |
| 3a | Mild to moderate loss of kidney function | 45 to 59 |  45-59% |
| 3b | Moderate to severe loss of kidney function | 30 to 44 |  30-44% |
| 4 | Severe loss of kidney function | 15 to 29 |  15-29% |
| 5 | Kidney failure | Less than 15 |  Less than 15% |

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Introduction

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 healthcare professional to find best choice for you.

This booklet is written for people who may be getting ready to start treatment for kidney failure as well as for those who are already on hemodialysis. Information is based on recommendations from the National Kidney Foundation's Kidney Disease Outcomes Quality Initiative (NKF-KDOQI®) Clinical Practice Guidelines.

When will I need to start treatment for kidney failure?

Treatment is needed when someone has stage 5 chronic kidney disease (CKD), which is also called kidney failure. Your healthcare professional can tell your stage of kidney disease by checking your estimated glomerular filtration rate (eGFR). Your eGFR is a calculation from the results of a blood test for creatinine, a waste product from muscle activity.

If your eGFR falls below 15, you have kidney failure (CKD stage 5), and you will need to have a kidney transplant or dialysis treatment to replace the function of your kidneys.

If your eGFR is less than 30 (CKD stage 4), your healthcare provider should talk to you about the different treatments for kidney failure. Ask about information classes in your area so you can learn more about kidney failure treatment options.

How does hemodialysis help people with kidney failure?

Hemodialysis is a life-saving treatment for people with kidney failure. A hemodialysis machine works as an artificial kidney by:

- Removing wastes and extra fluids in your body to prevent them from building up in your blood
- Helping to regulate blood pressure

How does hemodialysis work?

A hemodialysis machine has a special filter called a dialyzer to clean your blood. To get your blood to the dialyzer, a surgeon will make an opening into one of your blood vessels. This opening is called an access, this is done with minor surgery, usually in your arm.

Fistulas and grafts are two types of accesses that are used.

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 start treatment.

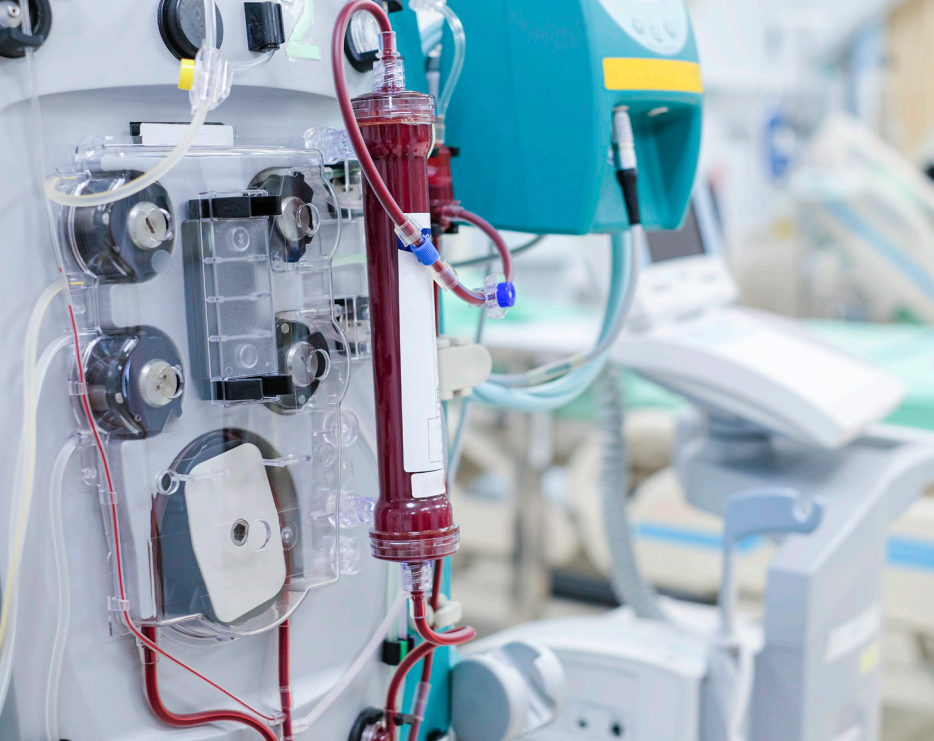
If your blood vessels are not suitable for a fistula, a graft may be done. This involves joining an artery and a nearby vein with a small, soft tube made of synthetic material that is placed under your skin.

After the fistula or graft has fully healed, it can be used for dialysis. During dialysis, two needles will be placed into your access. Each needle is connected to a plastic tube. One tube carries your blood to the dialyzer where it is cleaned and the other tube returns the cleaned blood back to your body.



There is a third type of access, called a catheter, which is a soft tube that is placed into a large vein in your neck or chest. This type of access is generally used only when you need dialysis for a short period of time.

Catheters can be used as a permanent access when a fistula or a graft cannot be placed. Catheters can be connected directly to the dialysis tubes and needles are not used. Catheters have more health complications than other types of access.



How does the dialyzer clean my blood?

Inside the dialyzer, or filter, there are two sides—one for your blood and the other for a fluid called dialysate. A thin film, called a membrane, separates these two sides. Blood cells, proteins, and types of cells remain in your blood because they are too big to pass through the membrane.

Smaller waste products, such as urea and creatinine, and extra fluid, move from your blood through the membrane, and are removed. The composition of the dialysate, or cleansing fluid, is made for your special needs according to your healthcare professional's prescription.

Where is hemodialysis done?

Hemodialysis can be done at a hospital, a dialysis center or even at home. You and your healthcare professional should work together to decide where it would be best for you to have your hemodialysis treatment.

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 make sure that enough wastes and fluids are removed. Just how often you should get dialysis depends on:

- How well your kidneys are working
- The amount of fluid you retain between treatments
- The amount of waste products you have in your blood
- The kind of dialyzer you are using

Your healthcare professional will recommend and write a dialysis prescription that is best for you. 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 may help you to live longer.



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

Your healthcare professional will develop a special dialysis prescription for you. This will help to make sure that you get the right treatment. In addition, your dialysis care team will monitor your treatment with monthly lab tests to measure the amount of dialysis you receive (your “dose” of dialysis).

The most accurate way to measure this is called urea kinetic modeling. The number that tells how well your blood is being cleaned by dialysis is your Kt/V (sounds like “kay tee over vee”). Your goal Kt/V number may change depending on how often you have dialysis and on how well your kidneys are working. For example, many dialysis patients who have treatments 3 times a week, should have a Kt/V of at least 1.2 for each treatment.

There are other ways to measure the dialysis dose that is delivered. One is called the urea reduction ratio (URR). If this ratio is used to measure your delivered dose of dialysis, your URR should be at least 65% for each treatment.



Tips

Know your dose of dialysis

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

Ask what your number is. If you are not pleased with your number, ask how it can be improved.

Your dialysis care team is available to help you make sure you:

- Access is working well
- Dialyzer is working well
- Blood flow and the flow rate of the dialysate fluid (cleansing fluid) are working well during dialysis
- Blood samples are taken correctly

You can also help to make sure you are receiving the right dialysis dose by:

- Keeping all your appointments
- Completing your full treatment
- Taking care of your access



Can hemodialysis be done at home?

Many patients have their hemodialysis treatments at home. If you and your healthcare professional decide home hemodialysis is a good choice for you, then you will be trained how to do hemodialysis at home.

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 up to 80% of 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 plumbing or electrical modifications to your home for home hemodialysis.

There are three types of home hemodialysis—conventional, short daily, and nocturnal. Conventional home hemodialysis is usually done 3 times a week for 3-5 hours. Short daily home hemodialysis involves more treatments per week for shorter periods. Nocturnal hemodialysis involves longer, slower treatments, which are done while you sleep, usually for 6 to 8 hours.

Research shows that people who use short daily and nocturnal home hemodialysis:

- Take less medication to control high blood pressure and anemia
- Take less medication to keep high blood phosphorus under control
- Have improvements in blood pressure, nerve damage, and symptoms of restless leg syndrome
- Feel better during dialysis and less “washed out” after dialysis
- Have fewer limits on their diet and fluid intake
- Have more energy
- Sleep better
- Have fewer and shorter hospital stays
- Have a better quality of life
- Live longer

“ With daily home hemodialysis, you don’t have the swings in your blood chemistries and fluids like you do when you don’t dialyze every day, so you feel a lot better. Home dialysis is for people who want to be in control of the process and be at home.”

—David J., patient on daily home hemodialysis

Home hemodialysis versus in a center

Home hemodialysis has some important pros and cons when compared with in-center hemodialysis.

PROS of Home Hemodialysis

Easier to fit into your daily schedule

Easier to keep working if you have a job or you wish to return to work or school

The convenience and cost savings of not having to travel to a dialysis center three times a week

Independence and being in control of your own treatments

The comfort and privacy of being in your own home during treatment

Having greater access to telephone, family members, and visitors during treatment

Being able to eat and drink when you choose

CONS of Home Hemodialysis

Initial fears about duties and caring for the dialysis machine

Training for home hemodialysis is not offered by all dialysis centers

More space is needed in your home for equipment and supplies

Training may take three to eight weeks or longer, with three- to five-hour training sessions per week

Some plumbing and wiring changes in your home may be necessary, but newer machines use standard household outlets

Electric, gas, and water bills may increase slightly

Some new machines are portable, but you will have to find a dialysis center for support when traveling

Less social interaction compared with going to the dialysis center



Tips

Protect your remaining kidney function

Studies show that maintaining as much kidney function as possible, leads to greater overall satisfaction in people on dialysis. Ask your dialysis care team about the steps you can take to help keep your kidney working as well as possible, such as:

- Take blood pressure medicines, if needed, as instructed by your healthcare professional. Studies show that some blood pressure medicines may help protect kidneys from further damage.
- Avoid medicines that can harm your kidneys, such as some pain relievers called nonsteroidal anti-inflammatory drugs (NSAIDs), and certain antibiotics.
- Ask your healthcare provider 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 kidney disease progresses slowly over time to kidney failure, your kidneys do not get better. You will need dialysis for the rest of your life, unless you are able to receive a kidney transplant.



Tips

Staying comfortable on dialysis

If you experience symptoms like cramps, headaches, nausea, or dizziness during dialysis, 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 the dose and timing of your blood pressure medications.
- Adjust your dry weight or target weight.
- Lower the temperature of the dialysate a little.
- Ask your healthcare provider if it would help to change to a different type of dialyzer.
- You can help yourself by carefully following your sodium (salt) and fluid limits between treatments to decrease fluid buildup in your body.





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, you need 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 keep 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 needing 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 over 2,000 mg of sodium (salt). Your dietitian can help you plan a low sodium diet.

You may also need to limit the amount of potassium and phosphorous in your diet. Review your monthly labs with your dietitian and discuss your individual diet needs.



Tips

Keep sodium levels under control

Limit the amount of sodium in your diet and help prevent too much fluid buildup by trying 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 want more tips.

What insurance coverage is available for dialysis?

The federal government's Medicare program covers 80 percent of all dialysis costs for most patients. If you are not already on Medicare when you start dialysis, your coverage will start on the 1st day of the 4th month. If you begin a home training program within your first 90 days of treatment, then coverage will be retroactive, which means you will be covered starting back on day 1.

Private insurance or state Medicaid programs may also help with the costs. Ask your social worker or financial coordinator about your insurance options.

Dialysis centers also have billing personnel who can answer your questions about insurance coverage and billing.

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 can provide support and help you and your family adjust to changes in your lifestyle.

Once you get used to your treatment, you should feel a lot better. In fact, you may feel more like doing some of the activities you enjoyed before you developed kidney disease. Medications are available to treat anemia and also help keep your bones healthy so you can 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 other 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.

Can people on dialysis continue to work?

Yes. Many people on dialysis work when they are on dialysis. If your job requires a lot of physical labor (heavy lifting, digging, etc.), you may need to change your duties.

Tips

Improve your quality of life

- Ask your healthcare provider about an exercise program that is right for you.
- Regular exercise can make you feel stronger.
- Learn all you can about your treatment. Speak to your dialysis care team if you have any questions. They are there to help you do well on your treatment.
- Spend time with loved ones doing things you enjoy.



Understanding your lab values

Albumin and **normalized protein nitrogen appearance (nPNA)** are measures of your nutritional health. The test results show if you are getting enough protein and calories from your diet.

Average daily weight gain is the amount of fluid 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.

Calcium and **phosphorus** are two minerals that are important for bone health. Having too much or too little amounts of these minerals in your blood can lead to loss of calcium from the bones and increased risk of heart and blood vessel disease.

Estimated glomerular filtration rate (eGFR) is a calculation that measures how well your kidneys are working. Your eGFR can be calculated using the results of your blood creatinine test, your age, and gender.

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 one or more medicines to raise the red blood cell level in your body.

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

Parathyroid hormone (PTH) is made by four small parathyroid glands, which are located in your neck. If these glands 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.

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.

Potassium is a mineral that is important for a healthy heart. High or low levels of potassium in your blood may be harmful for your heart.

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

Transferrin saturation (TSAT) and **serum ferritin** are measures of iron stored in your body. Iron is needed to make red blood cells. You may need extra iron if you have anemia (low iron).



Where can you get more information?

If you have questions, speak with your healthcare team. They know you and can answer questions about you.

If you want to learn more about kidney disease:

- Call the NKF Cares Patient Help Line toll free at **855.NKF.CARES** (855.653.2273).
- Visit the National Kidney Foundation website at **[kidney.org/store](https://www.kidney.org/store)**.

Becoming an educated patient is very important to being healthy!

IMPORTANT NAMES AND PHONE NUMBERS

KIDNEY DOCTOR:

name: _____

phone: _____

NURSE:

name: _____

phone: _____

DIALYSIS TECHNICIAN:

name: _____

phone: _____

DIETITIAN:

name: _____

phone: _____

SOCIAL WORKER:

name: _____

phone: _____

Setting a standard for care

The National Kidney Foundation, through its *Kidney Disease Outcomes Quality Initiative* (KDOQI®), defines stages of kidney disease and offers guidelines that help your doctor and healthcare team make important decisions about your medical treatment.

The information in this booklet is based on those recommended guidelines.



The information contained in this publication is based on current data and expert guidance available at the time of publication. The information is intended to help patients become aware of their disease and its management. This publication is not intended to set out a preferred standard of care and should not be construed as one. Neither should the information be interpreted as prescribing an exclusive course of management. Patients should always consult with their healthcare providers regarding decisions about their individual plan of care.



NATIONAL KIDNEY FOUNDATION®

Fueled by passion and urgency, the National Kidney Foundation (NKF) is a lifeline for all people affected by kidney disease. As pioneers of scientific research and innovation, we focus on the whole patient through the lens of kidney health. Relentless in our work, we enhance lives through action, education, and accelerating change.

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