HEMODIALYSIS:

What You Need to Know

National
Kidney
Foundation™

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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™) offers guidelines and commentaries 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.

Stages of Kidney Disease

There are 5 stages of 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.

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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 soon may need to start treatment for kidney failure. 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), or kidney failure. Your doctor can tell your stage of kidney disease 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 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 GFR is less than 30, your doctor should talk to you about the different treatments for kidney failure. Ask about information classes in your area where you can learn more about treatment options 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 and extra fluid to prevent them from building up in your blood
- Help to regulate blood pressure

How does hemodialysis work?

A hemodialysis machine has a special filter called a dialyzer (also called an artificial kidney) to clean your blood. To get your blood to the dialyzer, a surgeon will make an access, or entrance, into your blood vessels. This is done with minor surgery, usually to your arm.

Two main types of access can be made—a fistula or a graft.

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, placed under your skin.

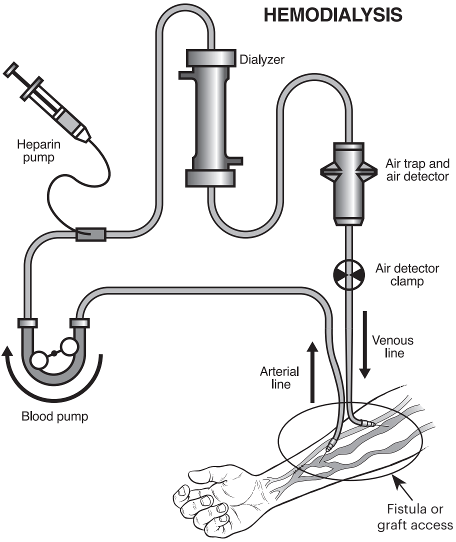
After the fistula or graft has healed for at least several months, it can be used for dialysis. Two needles will be placed every time you go for treatment. The needles are connected to plastic tubes. One tube carries your blood to the dialyzer where it is cleaned and the other tube returns the cleaned blood to you.

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

Main Parts of the Hemodialysis System



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 doctor's prescription.

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 healthcare provider 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 waste you have in your blood
- The type of artificial kidney used by your dialysis center

Your doctor will write a dialysis prescription for your individual treatment needs. 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 enable you to live longer.

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

Your healthcare provider will develop a special dialysis prescription for you. This will help make sure that you get the right amount of 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”). 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. 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 dose of dialysis.

Ask your dialysis care team what test they are using to determine your 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 dialysis 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 provider decide this is a good choice, you and a dialysis care partner will be trained how to do hemodialysis at home. Your dialysis care partner can 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 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. However, Medicare will not cover the cost of a home health aide if you do not have a care partner.

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 6-8 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 for daily activities
- 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 in the home setting.”*
>
> —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:

- 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:

- Initial anxiety about duties and equipment
- Training for home hemodialysis is not offered by all dialysis centers
- More space is needed in your home for equipment and supplies
- A care partner is required to be home with you during treatments
- 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 locate a dialysis center for support when traveling
- Less social interaction compared with going to the dialysis center
- Your care partner may tire of their role

See the National Kidney Foundation's booklet *Home Hemodialysis* (Order# 11-10-0329).

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 medicines as instructed by your doctor if you have high blood pressure. Studies show that some blood pressure medicines can help protect any remaining kidney function you may have.
- 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 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. See the National Kidney Foundation's brochure *Kidney Transplant* (Order# 11-10-0304)

TIP

Stay 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 your blood pressure medications.
- Adjust your dry weight or target weight.
- Lower the temperature of the dialysate a little.
- Ask your doctor 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.

I have heard I might have to reuse my dialyzer for 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.

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 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 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 2,000 mg of sodium (salt). Your dietitian can give you suggestions for a low sodium diet.

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

For more information about your special diet, see the National Kidney Foundation’s booklet *Nutrition and Hemodialysis* and the online *A to Z Guide: Nutrition and Diet* section. Also visit the online Kidney Kitchen for kidney-friendly recipes for dialysis patients: **www.kidney.org/patients/kidneykitchen**

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.

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 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 will be available to provide support and 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 conditions like anemia and to 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 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. For more information, see the National Kidney Foundation'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 are 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 National Kidney Foundation's booklet *Working With Kidney Disease* (Order# 11-10-0501).

TIP

Improve your quality of life.

- Ask your doctor 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. They tell whether 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. If they get out of balance, the parathyroid glands start making more PTH. High PTH can lead to loss of calcium from the bones, and increased risk of heart and blood vessel disease.

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

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 glands 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 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.

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 may need extra iron if you have anemia.

MY DIALYSIS CARE TEAM

Nephrologist (kidney doctor):

name: ______________________________

phone: _____________________________

Nurse:

name: ______________________________

phone: _____________________________

Dialysis technician:

name: ______________________________

phone: _____________________________

Dietitian:

name: ______________________________

phone: _____________________________

Social worker:

name: ______________________________

phone: _____________________________

Where can I get more information?

Contact the National Kidney Foundation's NKF Cares Patient Help Line toll-free at **855.NKF.CARES** (855.653.2273) or email **nkfcares@kidney.org**

You may be interested in a free copy of the following booklets from the National Kidney Foundation:

Choosing a Treatment for Kidney Failure Order# 11-10-0352

Home Hemodialysis
Order# 11-10-0329

Kidney Transplant Order# 11-10-0304

Peritoneal Dialysis: What You Need to Know Order# 11-50-0215

Nutrition and Hemodialysis
Order# 11-50-0136

Dining Out With Confidence
Order# 11-10-0405

Coping Effectively: A Guide for Patients and Their Families
Order# 11-10-0503

If You Choose Not to Start Dialysis Treatment Order# 11-10-0330

When Stopping Dialysis is Your Choice Order# 11-10-0331

Travel Tips for Kidney Patients
Order# 11-10-0513

Staying Fit With Chronic Kidney Disease Order# 11-10-0502

Working With Kidney Disease
Order# 11-10-0501

Learn more at **www.kidney.org**

The **National Kidney Foundation** is the leading organization in the U.S. dedicated to the awareness, prevention, and treatment of kidney disease for hundreds of thousands of healthcare professionals, millions of patients and their families, and tens of millions of Americans at risk.

Help fight kidney disease.
Learn more at **www.kidney.org**

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Awareness. Prevention. Treatment.