

National Kidney
Foundation™

Peritoneal Dialysis: What You Need to Know



What is peritoneal dialysis?

Peritoneal dialysis (PD) is a treatment for people who have kidney failure. Kidney failure is stage five of chronic kidney disease (CKD). Healthy kidneys clean wastes from blood and remove extra fluid from the body. But when your kidneys are not working well, wastes and extra fluid can build up in your blood and make you sick. This can cause:

- nausea
- trouble sleeping
- poor appetite
- loss of energy
- hiccups
- dry, itchy skin
- weight loss
- irregular menstrual periods
- muscle cramping, especially at night
- swelling
- anemia (low blood count)
- trouble breathing

Why do I need peritoneal dialysis?

You need treatment because your kidneys no longer clean enough wastes from your blood and remove extra fluid from your body. Even though people with kidney failure may still have some kidney function, it's not enough and without treatment you will die.

TIP

You should do all you can to protect any kidney function you have left. Studies show that remaining kidney function helps dialysis patients stay healthier and live longer. Ask your dialysis care team about the following steps to help keep or enhance your remaining kidney function:

- Taking blood pressure pills called ACEs (angiotensin converting enzyme inhibitors) or ARBs (angiotensin receptor blockers) if you have high blood pressure. These medicines help to protect kidney function.
- Avoiding medicines that can harm your kidneys such as pain relieving medicines called NSAIDs (nonsteroidal anti-inflammatory drugs) and certain antibiotics.
- 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.

Are there other treatments for kidney failure besides peritoneal dialysis?

Yes, there are two other treatments for kidney failure. They are:

■ Hemodialysis

In hemodialysis, your blood flows through a machine that has a filter which cleans the

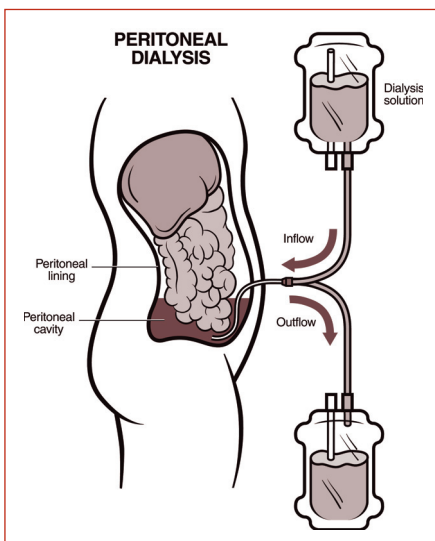
blood. This machine is called a *dialyzer* or artificial kidney. Hemodialysis is usually done three times a week, several hours each session. It can be done at a dialysis center or at home. To get your blood into the dialyzer, two needles are inserted into your vein during each dialysis treatment.

■ Kidney Transplant

In transplantation, a healthy kidney is put inside your body to do the work of your own kidneys.

How does peritoneal dialysis work?

A soft tube, called a *catheter*, is placed in your belly. This is done by minor surgery. This catheter makes it possible for you to easily connect to a special tubing which allows two to three quarts of a cleansing fluid to flow into your belly. The cleansing fluid is called *dialysate*. It takes about 10 minutes for the dialysate to fill your belly. When the filling is done, the catheter is capped so that it doesn't leak.



What happens next is an amazing process.

The lining of your belly (called the peritoneal membrane) acts as a natural filter. It lets the wastes and extra fluid in your blood pass through it into the cleansing fluid. At the same time, the lining of your belly holds back the important things your body needs, like red blood cells and nutrients.

To do its job, the dialysate must stay in your belly for two hours or more, depending on your body size and how much waste has to be removed. This time is called your *dwell time*.

After your dwell time, you drain the cleansing fluid from your body into an empty bag. You discard the bag. You then repeat the in-and-out process a number of times during the day, using fresh dialysate. The process of exchanging bags of dialysate is called a *bag exchange*. PD can be done at home, at work, or while traveling.

How will I learn how to do peritoneal dialysis?

The training staff at your dialysis center will teach you everything you need to know, including how to do exchanges, order supplies, clean your catheter, and guard against infection. Once you and the staff are comfortable with your ability to do PD alone, you can start doing your own treatments at home.

Are there different types of peritoneal dialysis?

Yes. The major ones are:

- **Continuous Ambulatory Peritoneal Dialysis (CAPD).** With CAPD, you do the exchanges yourself three to four times a day.
- **Continuous Cycling Peritoneal Dialysis (CCPD).** With CCPD, a machine called a cycler does the exchanges automatically while you sleep. You may also need to do one exchange during the day if your kidney function decreases further.

How will I know how much dialysis I need?

The amount of dialysis needed is different for everyone. It is based on many factors, including your weight, how much kidney function you still have, your overall health, and the results of your lab tests. Your doctor will give you a dialysis prescription that is designed just for you. Your prescription will tell you:

- How many exchanges you need to make each day.
- How long the dialysis fluid needs to stay in your belly (your dwell time).
- What type and amount of dialysis fluid you need to use for each exchange.

What will my dialysis prescription be based on?

Your doctor will base your prescription on:

- Your size

Large, muscular people may need more frequent exchanges or larger bags, which means that more dialysis fluid goes into your belly.

- Your remaining kidney function

How much dialysis you need is based on how much kidney function you have left. Your doctor or dialysis care team should measure your remaining kidney function. This is measured by a blood test and 24-hour urine collection. It should be checked within the first month after starting dialysis and every four months thereafter if your urine output is stable. However, if your urine output is decreasing, your remaining kidney function should be checked every two months. You should tell your doctor whenever you notice a drop in your daily urine output.

- Your nutritional health

How well you feel on dialysis may be affected by how well you eat. Your dietitian will help you plan a diet that gives you the right amount of nutrients.

- Your general health

If you are getting enough treatment, you should feel well, have a good appetite and have enough energy to do many of the activities you enjoy. You should tell your doctor if you:

- are often nauseous
- have a poor appetite



- cannot taste
- are feeling too tired for your daily activities

This may mean you have other health problems or that you are not getting enough dialysis. If so, your doctor may need to change your dialysis prescription or other medical care that you are receiving.

■ Your peritoneal equilibration test (PET)

This test is done within 4–8 weeks after starting peritoneal dialysis. It tells how your peritoneal membrane is working and helps your doctor decide how many exchanges you need each day, how long the dialysis fluid should stay in your belly, what amount of dialysis fluid you need and what type of dialysis fluid to use.

TIP

Getting the right amount of dialysis depends on how well you follow your prescription.

Make sure you:

- Do all your prescribed exchanges.
- Follow the prescribed amount of time (dwell time) you keep the dialysis fluid in your belly.
- Use the full amount of dialysis fluid prescribed for you.
- Prevent infections by doing your exchanges exactly as you were taught.
- Take all your medications exactly as ordered by your doctor.
- Follow your diet and fluid allowances. Too much fluid in your body can cause swelling, shortness of breath and increased blood pressure.
- Report any problems to your doctor or dialysis care team.
- Never be afraid to tell your dialysis care team exactly how you do your exchanges. This is the best way to check that you are doing them correctly.

Will my dialysis care team monitor my treatments?

Yes. Your dialysis care team will measure your treatments regularly with lab tests. This tells them if your treatment is removing enough wastes from your blood. The test that is used to check your “delivered dose” of dialysis is called Kt/V_{urea}

(pronounced “kay tee over vee yur ee a”). Your total Kt/V_{urea} from the dialysis and your remaining kidney function should never be less than 1.7 per week.

How often should my treatments be measured?

Your delivered dose of dialysis should be measured every four months. This measurement should be done more often when:

- you first start PD treatment
- your PD prescription is changed
- your dialysis care team feels it is needed
- your level of kidney function has gone down

To measure your delivered dose of dialysis, your dialysis care team may ask you to bring to the dialysis center all the dialysis bags you used over a 24-hour period, or just a sample from each of the used bags. You also may be asked to collect a 24-hour urine collection. Both the urine and the dialysate collections are important in measuring your total dose of dialysis.

What if my overall health happens to get worse?

Tell your doctor. Your dialysis care team will do some tests to find out why. They may check to see if:

- you are doing all your exchanges as prescribed for you
- you have other health problems not related to kidney failure and dialysis
- your peritoneal membrane is working well

Your membrane may not work as well if you have had serious infections, or if you have been on PD for several years. If so, your doctor may need to change your dialysis prescription.

- Your remaining kidney function has decreased too much

If this happens, your doctor may want you to:

- increase the number of bags you use each day
- use a cycler
- switch to hemodialysis

Will I need to follow a special diet?

Yes. Getting the right nutrients and balancing fluids is as important to your health as getting the right amount of dialysis. The registered dietitian at your dialysis center will help you plan your diet to make sure you get the right amount of protein, calories and other important nutrients. You may also need to:

- limit how much sodium (salt) you eat
- take nutritional supplements

TIP

Because your dialysis fluid contains sugar, you may have a tendency to gain weight. Your dietitian can help you plan your diet to get the right amount of calories and keep the right weight for you. If you have diabetes, your dosage of insulin or other medications may need to change.



What is peritonitis?

One thing you have to be very careful about in PD is peritonitis, an infection of the *peritoneum* (the lining of the belly). Peritonitis happens when germs get into the peritoneal cavity through the catheter. It is treatable with antibiotics, but it's important to get it treated promptly. When doing an exchange:

- Make sure the area where you do your exchange is clean.
- Make sure you and anyone else in the room wears a surgical mask.
- Do not allow children or pets into the room.
- Close all doors and windows and turn off any ceiling fans or air conditioners.
- Gather all your supplies before you start your exchange.
- Scrub your hands for at least two minutes before each exchange, using a good soap. Your dialysis care team can suggest a soap to use.
- Dry your hands with a disposable paper towel. Do not touch anything unrelated to your treatment, not even your skin or your

hair. If you do touch something, wash your hands again before continuing.

- Avoid coughing or sneezing on your sterile supplies. If this happens, you must start the process over with new supplies.

Make sure you do your exchanges exactly as taught by your training program. Don't try anything different without asking your dialysis care team about it.

What are the signs of peritonitis?

The main signs of peritonitis are:

- a cloudy dialysis bag when you are draining out the used fluid
- unusual stomach pain, either mild or severe
- fever or chills

If you notice any of these signs, call your doctor or dialysis center right away. Getting prompt treatment for peritonitis is very important. If you do not get prompt treatment, the infection can get worse and you may have to go to the hospital. In addition, the infection may scar your peritoneal membrane, making PD less effective. In extreme cases, you may have to change to hemodialysis.

Are there any other infections I should watch for?

Infections can also occur at the place where the catheter leaves your skin, called your exit site. You should clean this area at least once a day with soap and water. You should also check your exit site and catheter every day. If problems occur, you

can often catch them in the early stages. Signs of exit site infection are:

- pus at the exit site
- redness around the exit site
- swelling or bulging around the exit site
- tenderness or pain at the exit site

TIP

Taking good care of your catheter is also important to prevent infections and do well on PD. Here are some tips for routine catheter care:

- Check your catheter every day for signs of cracking or pulling.
- Do not wear tight clothes and belts around the exit site.
- Wash your hands with soap and water for at least two minutes and dry them with a disposable paper towel before handling your catheter, and before and after an exchange is made.
- Tape the catheter down to your skin.
- Keep the catheter away from scissors or other sharp objects.
- Cleanse the catheter thoroughly with a wash cloth and soap every day.
- Keep a special dressing over the exit site if your dialysis care team tells you to do so.
- Do not allow tugging or pulling of your catheter.



What if I have questions or problems?

Once you have learned all you need to know, your PD supplies will be delivered directly to your home and you will be ready to start your treatment. But you will never be on your own. You will visit your dialysis center for regular checkups and lab tests. Your doctor and dialysis care team will check:

- your overall health and nutritional health
- any symptoms that indicate you may not be getting enough dialysis
- how you are doing with your exchanges
- the results of other important tests (see “What Your Tests Measure” on page 20)

In addition, your center will always be just a phone call away if you have any problems. You will be the primary person responsible for your own care. So be sure to call your doctor or dialysis care team if you notice any problems (see “Checking for Problems” on page 18).

What other 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 educational materials and programs. You can also call the national toll-free number 800.622.9010 or visit www.kidney.org for more information. You may be interested in asking for a free copy 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 Transplantation
(11-10-0304)

If You Choose Not to Start Dialysis Treatment
(11-10-0330)

Nutrition and Kidney Failure: Are You Getting What You Need?
(11-50-0115)

Staying Fit with Chronic Kidney Disease
(11-10-0331)

Travel Tips for Kidney Patients
(11-10-0513)

Hemodialysis: What You Need to Know
(11-50-0214)

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, contact the National Kidney Foundation, 30 East 33rd Street, New York, NY 10016; Telephone: 800.622.9010; Web site: www.kidney.org/patients; e-mail: pfc@kidney.org. Membership in the Council is free.

Checking For Problems

What to Check

Signs of Possible Problems

Weigh yourself each day at about the same time.

A sudden weight gain along with swelling, shortness of breath and an increase in blood pressure is probably due to too much fluid in your body.

A gradual weight gain without swelling, shortness of breath and an increase in blood pressure may be due to an increase in muscle or fat.

Loss of weight with dizziness and low blood pressure may signify that there is too little fluid in your body.

Check your blood pressure and pulse every day.

An increase in blood pressure and pulse may be due to too much fluid weight gain.

Check how your dialysate looks when you drain it out.

Your dialysate should be clear and yellow in color. Cloudy dialysate is a sign of infection. You should be able to see the printed words on the bag through the solution. If you can't, your dialysate is cloudy.

Whitish strands in the dialysate are little clots of protein that have stuck together. They are not serious unless they get large enough to block your tubing or PD catheter.

Pinkish appearing dialysate means that some blood is leaking into the dialysis fluid. Some women notice this with their monthly period. It may also occur if you have been exercising or lifting something heavy.

Check yourself for signs of infection.

Unusual stomach pain, fever or cloudy dialysate could mean you have an infection called peritonitis. Peritonitis can become serious very quickly.

What You Should Do

Make sure to follow your diet and fluid allowances; speak to your doctor and dietitian about what diet, medications or dialysis prescription might be needed.

Speak to your dietitian about whether you need to change your intake of calories.

Speak to your doctor and dietitian about the amount of fluids you drink or whether your dialysis prescription needs to be changed.

Follow your sodium (salt) and fluid allowances to avoid too much fluid weight gain. Your doctor may want to change your medications to better control your blood pressure.

Call your doctor or dialysis center right away. You may have been given an antibiotic medication to take in case of infection. Ask if you should start taking it.

Call your dialysis center. You may need to inject a blood thinner called heparin into your fresh dialysate to clear the fluid; your nurse will tell you how to do this. If the strands do not go away in a day or two, call your dialysis center.

Do not be concerned about a small amount of blood if it occurs with a monthly period or after rigorous exercise. However, watch the fluid closely and call your dialysis center if it becomes more pinkish or red.

Call your doctor or dialysis center right away; follow your doctor's instructions carefully and take all the antibiotic medications ordered for you.

What Your Tests Measure

Kt/V_{urea} measures your delivered dose of dialysis. It tells whether you are receiving the right amount of dialysis. Your total Kt/V_{urea} from the dialysate and your remaining kidney function should be no less than 1.7 per week.

Glomerular Filtration Rate (GFR) is an estimate of how much kidney function you have left. Your GFR can be calculated from the results of your blood creatinine test, your age, gender and race.

Albumin and nPNA (normalized protein nitrogen appearance) 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 called an ESA (erythropoiesis-stimulating agent) to treat it.

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.

Parathyroid hormone (PTH) is made by four small glands located in your neck. If these glands become overactive 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 gland starts making more PTH, which may lead to loss of calcium from the bones.

Potassium is a mineral that is important to healthy heart function. 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.

Blood pressure should be taken on a daily basis. Your blood pressure decreases when excess fluid and salt are filtered out of your blood by your dialysis treatment.

National Kidney Foundation's Kidney Disease Outcomes Quality Initiative (NKF-KDOQI™)

Did you know that the National Kidney Foundation's *Kidney Disease Outcomes Quality Initiative* (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 National Kidney Foundation's KDOQI™ guidelines and recommendations for peritoneal dialysis.

Stages of Chronic Kidney Disease

There are five stages of kidney disease (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

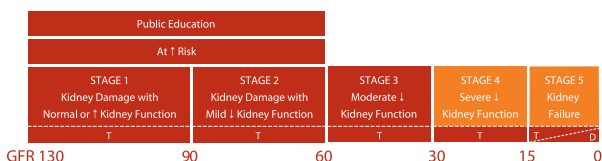
*Your GFR number tells your doctor how much kidney function you have. As chronic kidney disease progresses, your GFR number decreases.

NOTES

More than 20 million Americans—one in nine adults—have chronic kidney disease, and most don't even know it. More than 20 million others 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 47 affiliates nationwide, the foundation conducts programs in research, professional education, patient and community services, public education and organ donation. The work of the National Kidney Foundation is funded by public donations.

Kidney Learning System (KLS)[™]

A Curriculum for CKD Risk Reduction and Care



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

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