New Orleans Nephrology Associates

HEALTHY START KIDNEY DISEASE CLINIC

Guide to Understanding Chronic Kidney Disease

Stages 1 – 4

Basic Edition

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A Patient's Perspective

Ruth Miles sat nervously across from the physician, who seemed preoccupied with reading her chart and the results of her lab work. Ruth toyed with the straps on her purse and occasionally ran her right hand through her hair, which to her now seemed much too long! She shrugged and thought to herself, "What a time to think of long hair when I don't know what the future holds for me."

Her regular physician had sent her to see a nephrologist, or kidney specialist, two weeks ago because of a rising creatinine lab value. "Two weeks ago," she thought, "I had not heard of the word 'creatinine'." Yet now it had become extremely important, because it told her physician that her kidneys were not functioning well. In fact, it became Ruth's number one priority to know everything about the word 'creatinine' and how her kidneys function. Right now, Ruth could only think of possible limitations and changes in her lifestyle.

What seemed like a lifetime to Ruth was only a few minutes for the physician to review her labs and chart. The physician pulled her chair closer to Ruth's, and Ruth suddenly felt a large lump in her throat and what felt like a million butterflies in her stomach. The physician gave Ruth a reassuring smile as she lightly touched her hand and placed the results of Ruth's lab work in front of her. The physician carefully explained Ruth's lab results to her and answered all of her immediate concerns about kidney disease. Ruth felt relieved that her laboratory results indicated that she did not have to start dialysis right away She was also a little nervous about knowing that she might need dialysis in about a year.

The physician recommended that Ruth see the Nurse Educator to learn more about her kidney disease and treatment choices. She felt confident knowing that she would become more knowledgeable about her kidney disease through the Nurse Educator and looked forward to participating in decisions with other healthcare workers that would affect her lifestyle.

Ruth soon found out that while her kidney problems had changed her lifestyle somewhat, it was not the end of the world. With the right kind of scheduling, she could still work, travel, drive, eat healthy, and do most of the things she was used to doing.

Like Ruth, it is normal for you to be nervous, worried, or even afraid about how your life will change. Also like Ruth, you will discover, through the Nurse Educator, that kidney disease is not the end of your life. You will have a group of health care professionals — physicians, nurses, dietitians, and social workers — all forming a critical link with you and your family to provide you with the best education, counseling, medical treatment, and quality care to achieve balance in your life.

The Nurse Educator and other healthcare professionals will allow you to take control of your life. You will be able to set realistic goals for yourself and face challenges. We can help you gain the courage to accept the things you cannot change and change the things you can.

Chronic Kidney Disease Definition

Chronic kidney disease has often been termed kidney disease and kidney failure. There are various forms and levels of this. The technical definition of chronic kidney disease is a description of the kidneys either having changes in secretion of certain substances, or decreased function. There are five levels of chronic kidney disease. These have been established by the National Kidney Foundation and are used throughout our education and treatment of patients. You will hear these terms continually when a physician or nurse or health care staff describe your chronic kidney disease to you.

Are You at Increased Risk for Chronic Kidney Disease?

How do you know?

Your doctor or clinic should check to see if you have any risk factors for chronic kidney disease. These include:

- diabetes
- high blood pressure
- a family history of kidney failure
- older age

Chronic kidney disease is also more common in African Americans,

Hispanic Americans, Asians, Pacific Islanders, and American Indians.

Why are African Americans and other ethnic groups at increased risk for chronic kidney disease?

Diabetes, the leading cause of chronic kidney disease, is more common in these groups. Also, high blood pressure, the second leading cause of chronic kidney disease, appears more often in African Americans than in other ethnic groups. Many experts believe these groups may have an inherited tendency to develop these diseases. When combined with other things, such as being overweight, this tendency may lead to disease. Staying at a normal weight and getting enough exercise is very important for these groups to help prevent diabetes and high blood pressure.

What happens if my test results show I may have chronic kidney disease?

Your doctor will want to pinpoint your diagnosis and check your kidney function to help plan your treatment. The doctor may do the following:

- Calculate your Glomerular Filtration Rate (GFR), which is the best way to tell how much kidney function you have. You do not need to have another test to know your GFR. Your doctor can calculate it from your blood creatinine, your age, race, gender and other factors. Your GFR tells your doctor your stage of kidney disease and helps the doctor plan your treatment. (See chart "Stages of Chronic Kidney Disease")
- Perform an ultrasound or CT scan to get a picture of your kidneys and urinary tract. This tells your doctor whether your kidneys are too large or too small, whether you have a problem like a kidney stone or tumor and whether there are any problems in the structure of your kidneys and urinary tract.
- Perform a kidney biopsy, which is done in some cases to check for a specific type of kidney disease, see how much kidney damage has occurred and help plan treatment. To do a biopsy, the doctor removes small pieces of kidney tissue and looks at them under a microscope.

Your doctor may also ask you to see a kidney specialist who will consult on your case and help manage your care.

5 Stages of Chronic Kidney Disease

Stage	Description	Glomerular Filtration Rate (GFR)
At increased risk	**Risk factors** for kidney disease (e.g., diabetes, high blood pressure, family history, older age, ethnic group)	More than 90
1	Kidney damage (protein in the urine) and **normal** GFR	More than 90
2	Kidney damage and **mild** decrease in GFR	60 to 89
3	**Moderate** decrease in GFR	30 to 59
4	**Severe** decrease in GFR	15 to 29
5	**Kidney Failure** (dialysis or kidney transplant needed)	Less than 15

Can CKD progression be prevented?

Most likely. Early detection and treatment can often slow or stop chronic kidney disease. How well your treatment can achieve this goal depends on:

- Your stage of chronic kidney disease when you start treatment. The earlier you start, the better you are likely to do.
- How carefully you follow your treatment plan. Learn all you can about chronic kidney disease and its treatment, and make sure to follow all the steps of your treatment faithfully.
- The cause of your kidney disease. Some kidney diseases are more difficult to control.

If you would like more information, please contact us.

SECTION 2

The Work of the Kidneys

What is Kidney Failure?

Symptoms of Kidney Failure

Causes of Kidney Failure

Objectives

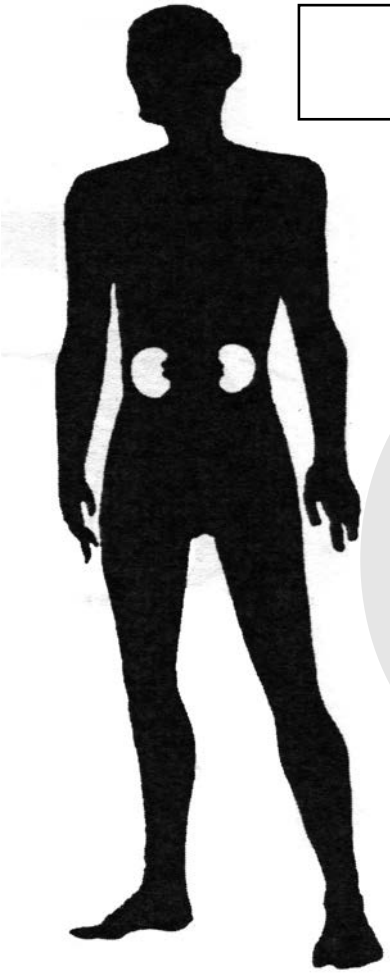
The participant will be able to:

1. Locate the kidney.
2. Describe at least three functions of the kidneys.
3. Describe kidney failure.
4. State the leading cause of kidney failure.
5. Identify three or more symptoms of kidney failure.

The Work of The Kidneys

Most people are born with two kidneys. They are located in the small of the back, behind your other abdominal organs. They are on both sides of the spine and are shaped like kidney beans (Figure 1). They are about the size of a tightened fist and weigh about a quarter pound each. They perform many important functions.

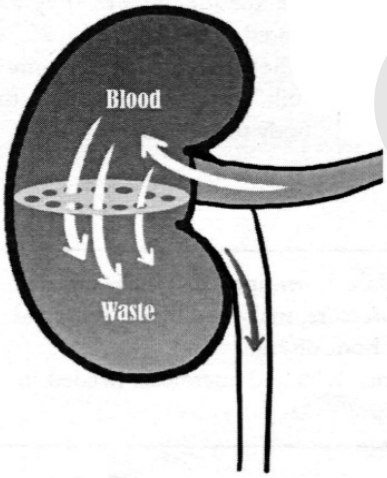
When one kidney is injured, removed, or no longer functioning, then the good kidney can carry on the work of removing waste products from the body. If both kidneys fail, waste products and water build up in the blood. These waste products are poisonous to the blood, and if these poisonous toxins are not removed through such treatment as dialysis, the person will die.



You have two kidneys

Kidneys are important because they clean your blood and keep your body in balance.

Kidneys are made up of millions of tiny filters



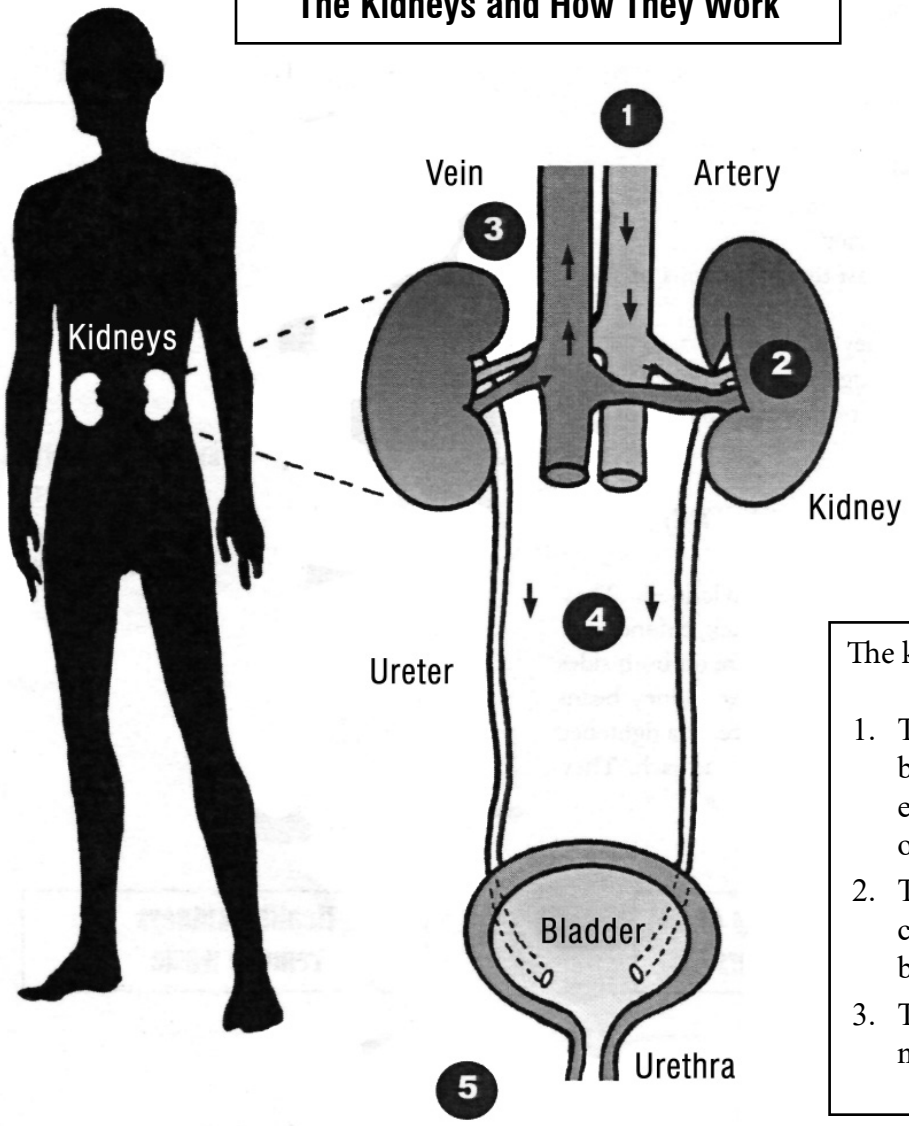
Your blood goes through these filters to be cleaned

Healthy kidneys remove waste

Waste →

Extra fluid in blood

The Kidneys and How They Work

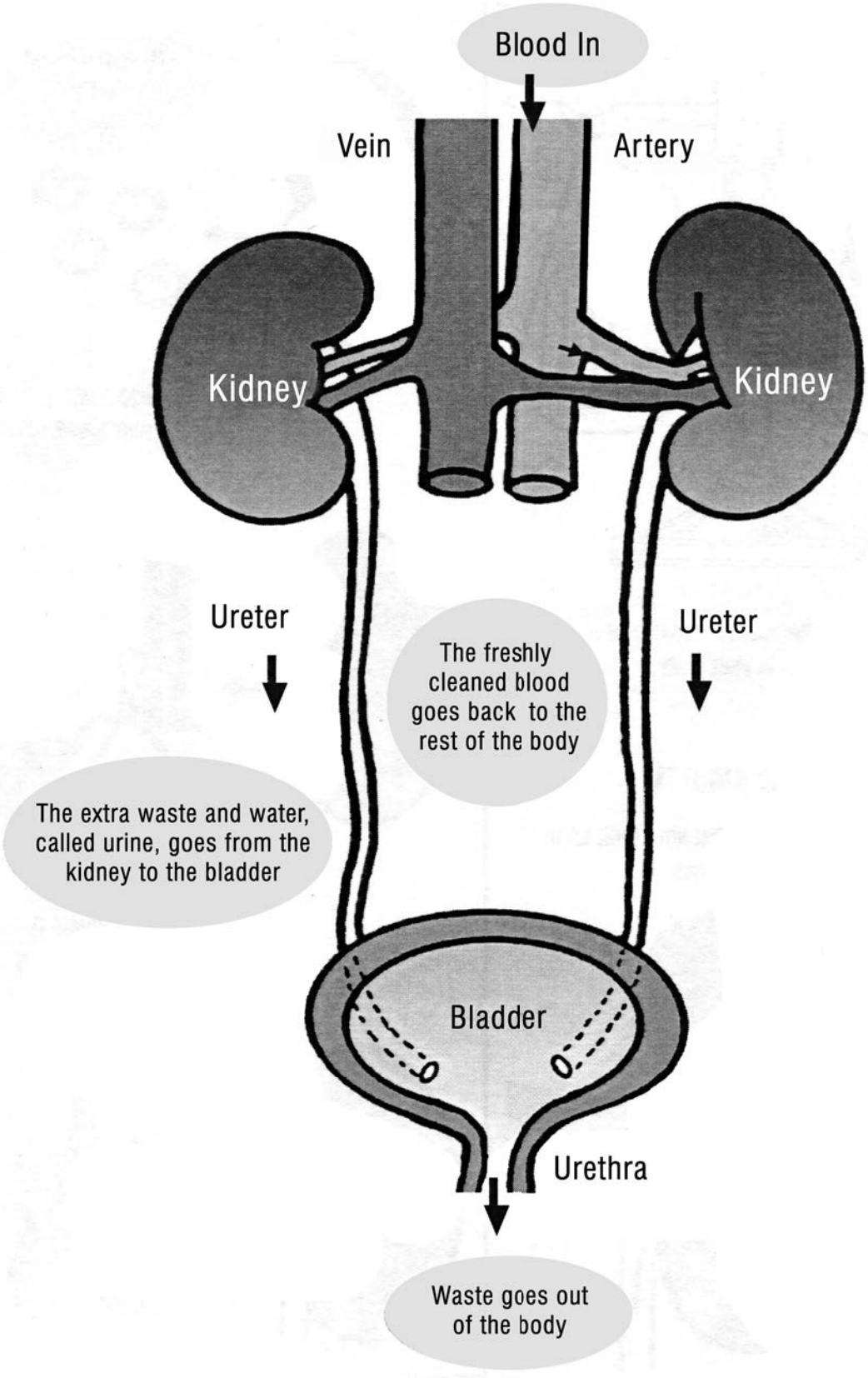


1. Blood enters the kidney through an artery from the heart.
2. Inside the kidneys, blood is cleansed as it passes through millions of tiny blood filters called nephrons.
3. Newly cleansed blood returns to the bloodstream by way of veins.
4. Waste products and excess fluids pass from the kidney through the ureter and enter the bladder where they are stored as urine.
5. When the bladder becomes full, urine passes out of the body through the urethra.

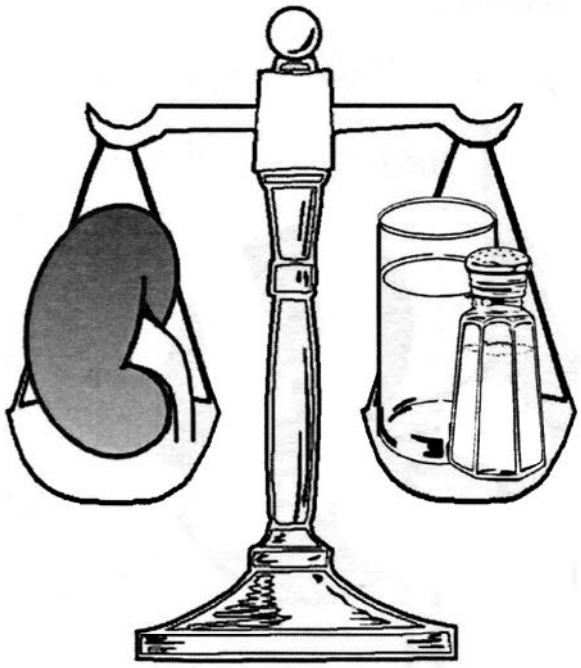
The kidneys have three main jobs:

1. To produce urine (this is how the body gets rid of waste products and extra fluid). They regulate the amount of water in the body.
2. To regulate hormones that help control blood pressure, make red blood cells, and prevent bone disease.
3. To balance salts and chemicals needed in the body.

How Do The Kidneys Work?



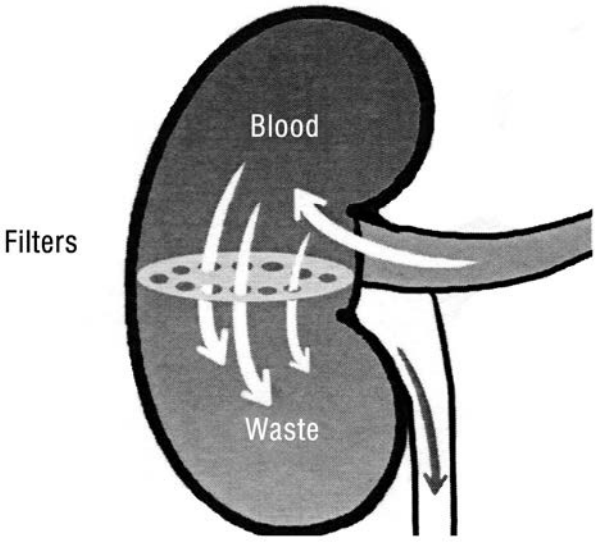
Healthy Kidneys Work To:



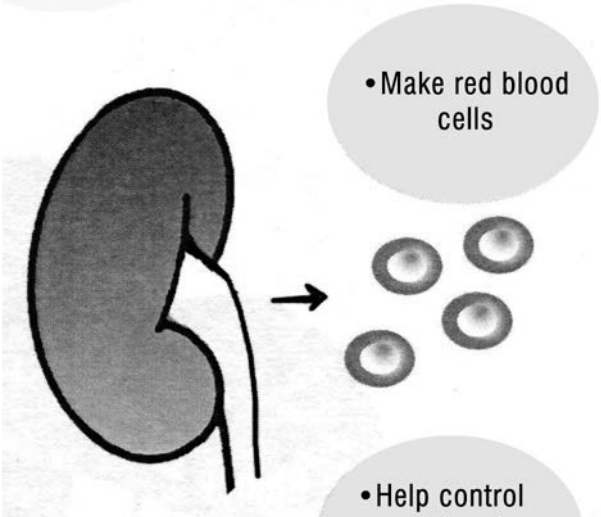
• Balance the amount of salt and fluid(s) in your body

HEALTHY KIDNEYS

• Remove waste products that have built up in your bloodstream

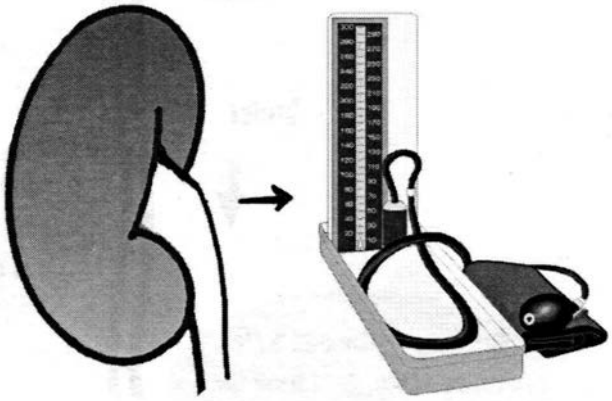


Healthy Kidneys Work To:

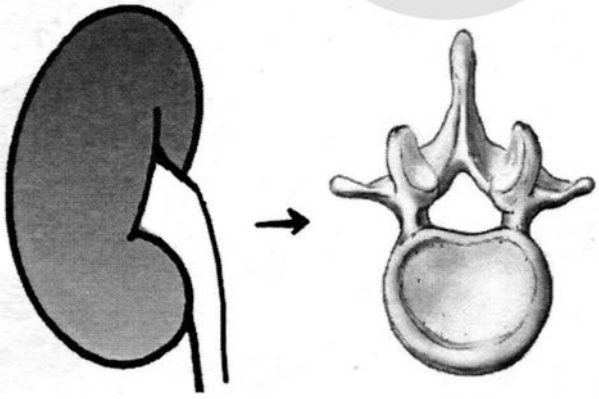


• Make red blood cells

• Help control our blood pressure



• Make Vitamin D hormone and keep bones healthy



What is Kidney Failure?

If both kidneys decrease their work or stop working for any reason, this is called "kidney failure." However, there is no single kidney disease. There are many diseases of the kidneys. Kidney problems can range from a minor urinary tract infection to chronic problems or end stage renal disease.

What happens to your body when your kidneys begin to fail?

Generally, as your kidneys begin to fail, your body loses its ability to do the following:

- Regulate blood pressure
- Balance the body fluids — that is the amount of water, salt, and other substances that you take in
- Remove waste products (you may still produce urine) that have built up in your bloodstream
- Control the way calcium is used by the body, which in turn affects the bones
- Make the vitamins which control bone growth
- Control the production of blood (red blood cells)

Waste products will build up in the bloodstream and become toxic (poisonous). This condition is called "uremia." When uremia occurs, you get itchy skin or an upset stomach. Your appetite may decrease. Some people feel tired or irritable and have trouble sleeping. You may also have trouble concentrating and be very tired.

Symptoms of Kidney Failure

The symptoms of kidney failure and/or kidney disease may include these:

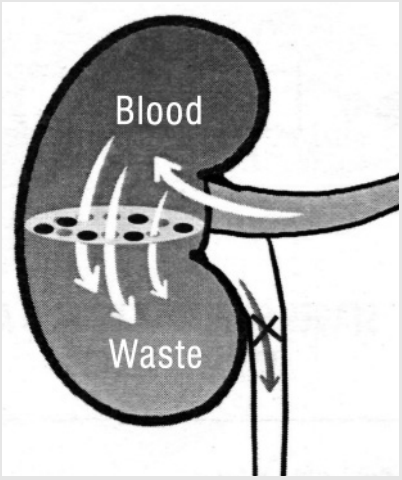
- Extra fluid which can cause swelling, usually in your hands, feet, and ankles and puffiness around the eyes; your breathing may not be as easy if fluid collects around your lungs (you may feel the need to sleep on two pillows)
- Frequent need to urinate at night or less urine output
- High blood pressure
- Itching
- Nausea (upset stomach), morning sickness

What Is Kidney Disease?

- **When the filters in one kidney fail, the remaining kidney can do the work of both kidneys if it is healthy and has enough filters.**
- **In kidney disease, filters within your kidneys become damaged and less able to do the work of the kidney.**

KIDNEY DISEASE

Damaged Filters



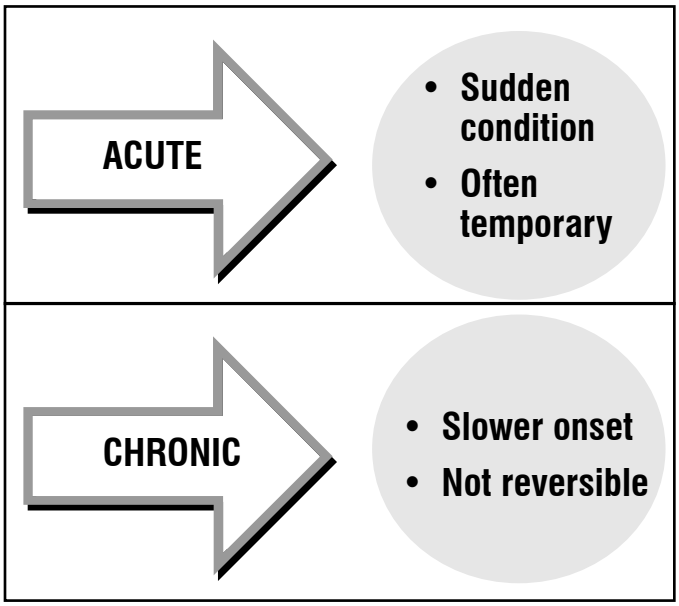
Damaged filters in the kidneys become less able to perform their job

- Decreased appetite
- Poor taste in mouth
- Muscle cramps, twitching, restlessness
- Sleep reversal — want to sleep all day and awake at night

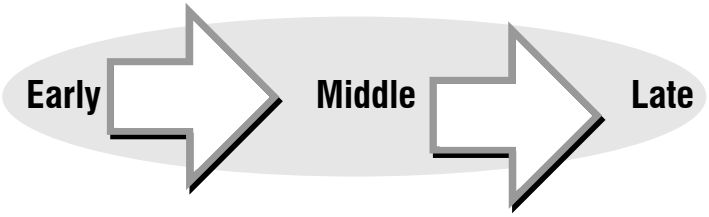
The following could indicate infection or other medical problems. If you have any of these, tell your doctor.

1. Back pain just below the rib cage (rare)
2. Blood or tea-colored urine
3. Burning or difficulty urinating
4. High blood pressure
5. Itching
6. Nausea (upset stomach), morning sickness
7. Decreased appetite
8. Muscle cramps, twitching, restlessness

What is Kidney Failure?
Less than 10% of Kidney Function



STAGES OF CHRONIC KIDNEY FAILURE



Stages of Kidney Disease at Various Stages

Early-mid Stage CKD 1 - 3a	• You may not have any symptoms
Mid-late Stage CKD 3b - 4	• Symptoms may start to appear
Late Stage CKD 5	• Both kidneys fail – more symptoms will appear

Causes of Kidney Failure

While kidney failure may be due to many things, research has shown that diabetes is the number one cause of kidney failure in the U.S. Every 12 minutes someone in the U.S. is told he or she has end stage renal disease. Hypertension (high blood pressure) is the second leading cause of kidney failure. There are many other causes of kidney failure.

A person whose kidneys are still working — but not perfectly — can be treated through medication and a special diet. For example, if too much fluid is retained or if blood pressure is too high, medication can be used to rid the body of excess water and lower blood pressure. Food and liquids are necessary for good health, but they also produce waste substances in the body that the kidneys must remove.

If the kidneys are not working normally, they can be helped by reducing their workload. One way to do this is to eat less of the foods that produce more waste products and to limit the amount of salt and liquids in the diet. The physician, nurse, and dietitian will help you determine what you can eat and what you should avoid.

WHAT CAUSES KIDNEY FAILURE?

- Diabetes
- Hypertension
- Inflammation
- Blockage
- Chronic Infection
- Heredity
- Other

SECTION 3

Understanding Laboratory Values

Objectives

The participant will be able to:

1. Discuss the meaning of certain laboratory tests that will explain how well the kidneys are working
2. Relate their own laboratory values to determine how well their kidneys are working

Your physician will order certain laboratory tests to determine how well your kidneys are working. Your Healthy Start Nurse Educator will discuss the meaning of each test with you and tell you how well your kidneys are functioning. Some of the laboratory tests will include the following:

1. BUN or Blood Urea Nitrogen
2. Creatinine
3. Creatinine Clearance
4. Potassium
5. Calcium
6. Phosphorus
7. Albumin
8. Hematocrit
9. Hemoglobin
10. Parathyroid Hormone
11. Glomerular Filtration Rate

BUN (BLOOD UREA NITROGEN): A waste product from the protein we eat. It is filtered by the kidneys. A high BUN indicates that your kidneys are not removing enough waste. Normal range: 5-25 mg/100ml.

CREATININE (CR): A waste product normally found in the blood due to normal muscle breakdown. It is removed from the blood by the kidneys. The amount of creatinine found in your blood is a good indication of how well your kidneys are working as well as how much muscle you have. Normal creatinine range: 0.5-1.5 mg/dl.

CREATININE CLEARANCE (CrCl): A kidney function test that measures how well your kidneys filter waste products. A decreased creatinine clearance means decreased function of the kidneys. Normal range: 80-125 ml/min.

POTASSIUM (K+): A mineral necessary for the body; however, too little or too much can be harmful. The level should be kept in the normal range. A potassium level over 7 may cause heart problems or even death. Normal potassium range: 3.5-5.3 mEq/L.

CALCIUM (Ca^{++}): A mineral found in the blood that is necessary and important for bone growth and formation and body functioning. Normal range: 8.5-10.5 mg/100ml.

PHOSPHORUS (PO_4): A mineral necessary for the bones, but can increase in the blood when the kidneys fail. Too much phosphorus and too little calcium can cause bones to become weak and brittle. Normal range: 3.5-5.5 mg/dl.

ALBUMIN (Alb): A protein substance your body makes that holds fluid in the blood vessels. Normal range: 3.6-5.0 gm/100ml.

HEMATOCRIT (Hct): A measure of the amount of red blood cells in the body. Normal range: 37-48%.

HEMOGLOBIN (Hgb): A part of red blood cells that carries oxygen from the lungs to the tissue. Normal range: 12-18 g/ 100ml.

PARATHYROID HORMONE: The parathyroid hormone is a hormone secreted from glands in your neck that surround your thyroid gland. The parathyroid hormone is responsible for calcium and phosphorus balance in your body. It becomes elevated for multiple reasons when the kidneys begin to have decreased function, especially at levels of kidney function below 50%.

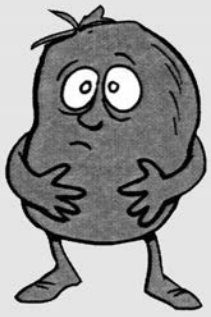
GLOMERULAR FILTRATION RATE: Glomerular filtration rate is a measure that is calculated in the laboratory of the percent of the kidney that is functioning. It is used in staging chronic kidney disease in stages 1 through 5 as described in Section 1 of this book.

Important Blood Tests — to tell how your kidneys are working

BUN (Blood urea Nitrogen)

- Waste product from the protein we eat (normal range 5-25 mg/100 ml)
- Unhealthy kidneys cannot remove enough of this waste from the blood
- Larger than normal amounts in the blood indicates your kidneys are working less

When BUN (Blood Urea Nitrogen) is high you feel sick. This sickness is called Uremia.



Creatinine (Cr)

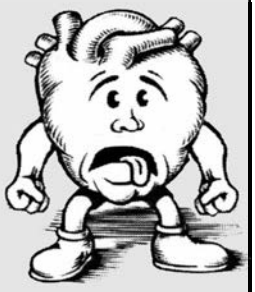
- Waste product from normal muscle breakdown (normal range 0.5-1.5 mg/dl)
- Unhealthy kidneys cannot remove enough this waste from the blood
- Larger than normal amounts in the blood indicates your kidneys are working less

Creatinine Clearance (CrCl) or Glomerular Filtrate (GFR)

- A 24-hour urine creatinine clearance and the GFR by MDRD (see Glossary) both tell you the percent at which your kidney functions

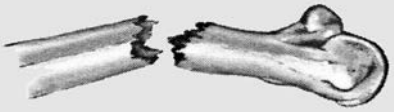
Potassium

- Mineral needed for normal heart function (normal range: 3.5-5.3 mEq/L)
- Unhealthy kidneys often cannot get rid of enough potassium
- Too much potassium in your blood can dangerously affect your heart
- If too much potassium builds up your muscles and heart get weak



Calcium and Phosphorus

- Minerals needed to keep bones healthy
- Unhealthy kidneys cannot use calcium properly
- Unhealthy kidneys cannot get rid of enough phosphorus
- High phosphorus and low calcium in the blood



Hematocrit/Hemoglobin

- The amount of red blood cells in your body
- Unhealthy kidneys cannot make enough red blood cells
- Not enough red blood cells (called anemia) can cause you to feel tired, weak, and short of breath

SECTION 4

Medications

Kidney Patient's Medication Guide

Objectives

The participant will be able to:

1. Describe what medications they are taking and why
2. State the importance of knowing when, how, how much and how often they should take their medications
3. State at least 3-4 helpful hints about taking medications
4. Identify medications to avoid kidney failure
5. Locate (in this section) over-the-counter medications recommended for various illnesses

Patients with kidney disease may have other medical problems. For this reason, medications and diet are individually prescribed. It is the responsibility of patients to ask questions about prescribed medications, and it is their right to be informed. They also have the responsibility to take medications as directed, especially since it helps to fulfill their right to high quality medical care.

What and Why

Patients should know what medicine they are taking and why they are taking it. It is easier to take a medication once you understand what it is and why it is needed. For example, your doctor may prescribe a phosphate binder for you. It is important for you to know that taking phosphate binders helps keep phosphates in your body at a normal level. It is also important that you take the fully prescribed dosage each day. Since it must bind the phosphate in the food eaten, it should be taken after meals.

When and How

Patients should know when and how to take their medicines. For example, some medications should be taken with meals, while others should be taken on an empty stomach. Some medicines are removed from the bloodstream during dialysis, while others are not affected by dialysis. This information is important.

How Much and How Often

Patients should know how much medication to take and how often to take it. Medication doses are prescribed individually because each person is different and may react differently to the drug. Comparisons with other people cannot be made because doses vary between people and between types of medications.

Side Effects

A side effect is another action that the medication may cause that is different from the action for

which it was prescribed. For example, some drugs that lower blood pressure may cause patients to have dry mouth. In this case, dry mouth is a side effect. Some side effects are more serious than others. Therefore, when your physician prescribes a medication, the benefits of the medicine must be weighed against the possible side effects. If you believe you are having a side effect to your medication, it is important to discuss it with your doctor

Drug Allergies

A drug allergy means that the patient is sensitive to certain chemicals in the medication. A drug allergy is not the same as a drug side effect.

Helpful Hints About Medications

1. Ask questions about medications and get specific instructions on how they are to be taken.
2. Select a pharmacy and stick with it. The pharmacist will get to know you and your medications and can provide help when asked.
3. Find out if buying 2 or 3 months' supply of medication is cheaper.
4. Carry an updated list of your medications with you at all times in your wallet or purse. This is extremely important in emergency situations.
5. Be sure that your eye doctor and dentist are aware of your medications.
6. Establish a routine. Pick specific times to take medicines and stick to your schedule.
7. When dialysis is started, you should know which drugs are affected by dialysis and whether they should be taken before or after dialysis.

Warnings

- Patients with decreased kidney function should never take any medication or even a home remedy unless a doctor prescribes it.
- Some medications can be habit forming. Medications should only be taken as directed.
- Medications that are safe for others can be extremely dangerous to patients with decreased kidney function, especially if that medication is released from the body through the kidneys.
- When having prescriptions filled, patients should never allow the pharmacist to substitute a drug without first consulting the physician who prescribed it.

NOTE: Be sure to avoid the following medications unless prescribed by your physician:

- Fleets enemas — high in phosphate
- Salt substitute — high in potassium
- Aluminum and magnesium-containing agents (Pepto-Bismol, Milk of Magnesia, Mylanta, Maalox, Carafate) and certain other antacids
- Alka Seltzer — high in sodium and aspirin
- Aspirin and Ibuprofen — Avoid "extra" aspirin, your 81 mg or 325 mg dose daily is acceptable. Extra aspirin and NSADS cause damage to my kidneys.
- Intravenous (IV) Contrast — This is a substance that is used by radiologists, cardiologists and other subspecialists in medicine and surgery to view your heart or other organs in a cardiac catheterization or multiple radiologic studies. This can be harmful to the kidney in terms of decreasing function, especially if your kidney function is less than 40% or you are a diabetic. You must realize that sometimes contrast is used emergently to save your life, and in those cases, physicians will take special precautions to protect your kidneys.

Should you need to take a medication for headache, constipation, insomnia, or a cold, please ask your doctors for their recommendations. Some medications should not be taken by patients on dialysis and in other cases, reduction of the usual dosage is necessary.

Kidney Patients' Medication

All medications have side effects, even over-the-counter non-prescription medications. Since you have kidney disease, you are more sensitive to any side effects. Some might even damage your kidneys further. Other medications can interfere with high blood pressure or heart medicines. It is very important to choose medications that are safe for you. The Nephrology Department wants to help you make safe choices at the drug store.

Below is a list of commonly used medications. They are organized by the type of symptom or illness you might have. The recommended medications under each category are listed. Take only if needed, and as directed on the bottle. At the end, there is a list of medications considered unsafe for kidney patients.

NAME OF MEDICATION	ACTION	DOSAGE
B-complex with C vitamins	Many vitamins are limited on restricted diets or removed by dialysis and must be replaced	One every day
Phosphate binders	Binds phosphorus so it can be excreted. Keeps calcium in the bones and prevents bones from becoming brittle	Usually taken with your meal
Vitamin D (Rocaltrol® Zemplar®, Hectoral®, Rayaldee® etc.)	Assists with the absorption of calcium and keeps bones strong	Usually once per day (physician's choice may vary)
Epogen (EPO) Procrit®	A hormone that is needed to increase the production of red blood cells and treat anemia (low blood count)	Usually given as an injection given 1 time per week
Oral Iron * IV Iron Injectafer®	Adequate iron is needed for erythropoietin (EPO) to work	Usually taken between meals or by 2 time injection at an infusion center
Cinacalcet-Calcimimetric (Sensipar®)	Decrease parathyroid secretion from the parathyroid gland which is increased in chronic kidney disease	Ranges from 30 to 180 mcg

Safe Medications

ACNE
Any cream over-the-counter is safe

DIZZINESS/MOTION SICKNESS
Bonnine®

Dramamine®

ALLERGY, COUGH, COLD
Benadryl

Chlor-Trimeton®

Tavist 1®

Robitussin® (regular or DM)

Guaifenesin

ANALGESICS (Pain Medicine)
Tylenol® (acetaminophen)

Percogesic®

ANTACIDS/HEARTBURN
Tagamet HB®

Pepcid®

Zantac®

Axid AR®

Mylicon®

ANTI-DIARRHEAL
Donnagel®

Imodium AD®

Kaopectate®

ANTI-FUNGALS
Lotrimin AF®

Micatin®

Tinactin®

EYE DROPS
Artificial tears

Visine®

LAXATIVE/STOOL SOFTENER
Colace/Peri-colace

Doxidan®

Dulcolax® tabs/suppositories - plain

Glycerin suppositories

Metamucil® / Effer-syllium

Surfak

Unifiber

TOPICAL ANTI-BACTERIALS
Neosporin®

Polysporin®

Triple Antibiotic

SKIN RASH PREPARATIONS
Caladryl® lotion

Hydrocortisone 1%

VAGINAL ANTI-FUNGALS
Monistat®

Gyne-lotrimin®

Unsafe Medications

WARNINGS

Many over-the-counter drugs are not safe for your kidneys and can cause high blood pressure or interfere with your blood pressure medications.

The entire list of arthritis medications called non-steroidals are to be avoided unless otherwise approved by your nephrologist.

- **AVOID ARTHRITIS MEDICINES**
- **AVOID COMBINATION MEDICATIONS**
- **AVOID DECONGESTANTS**

IV CONTRAST (DYE) FOR IVP'S ANGIOGRAMS,CT SCANS, ETC.

Please notify your doctor, or any doctors such as the Emergency Room doctor or Cardiologist that you have mild, decreased function of your kidneys.

SECTION 5

Anemia in Chronic Kidney Disease

Objectives

The participant will be able to:

1. State the relationship between anemia and EPO.

In addition to all of the other functions that your kidneys perform, they also make a hormone that controls the production of red blood cells. This hormone is called erythropoietin (EPO). Almost all of the body's EPO is made in the kidneys. In reduced kidney function, the kidneys may not have enough EPO-producing cells. EPO tells your body to make red blood cells. When EPO is low, your body does not make enough red blood cells, and as result, you become anemic. Anemia causes fatigue and low energy red blood cells carry oxygen from the lungs to all parts of your body. Anemia may also be caused by low levels of iron, folic acid (a vitamin), and bleeding problems.

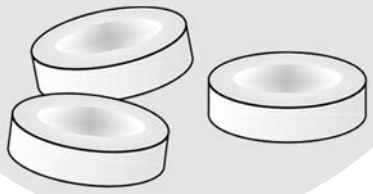
If your anemia is caused by a lack of or not enough EPO, it can be treated through EPO injections prescribed by your physician. Iron tablets or injections are used to treat anemia caused by low iron levels. Patients who receive EPO may also need extra iron. When iron levels are low, EPO does not work very effectively. Supplements of folic acid are used to treat anemia due to deficiency of this vitamin.

Correcting anemia in early kidney disease is also important in decreasing your risk of heart disease, improving appetite, improving sexual function, increasing your energy level, and keeping a general feeling of well-being.

Your physician will monitor your blood pressure during EPO treatments. This is because EPO may increase your blood pressure. The nurse will check your blood pressure prior to your EPO injection. If your blood pressure is too high, your EPO injection will be held until your blood pressure is within a range pre-determined by your physician. Your physician may also increase your blood pressure medicine or order new blood pressure medicine for you.

Medications Given for Anemia

- **Epogen (EPO), a synthetic (man-made) form of erythropoietin hormone that healthy kidneys make**
- **Your doctor may prescribe EPO as part of your treatment for kidney disease if you are anemic**



Symptoms of Progressive Kidney Disease Caused by Anemia

There may be less available erythropoietin hormone, and this can cause anemia with symptoms such as:

- **Shortness of breath**
- **Ongoing fatigue**
- **Constant feeling of being cold**
- **Rapid, irregular heartbeat**
- **Feeling dizzy or lightheaded**
- **Trouble concentrating**

SECTION 6

Diet

Objectives

Healthy kidneys are responsible for the following:

1. Filtering waste products from the digestion of protein
2. Controlling sodium (Na) and potassium (K+) levels
3. Helping to maintain fluid balance and acid balance

Introduction to Your Diet

As your kidney function decreases, several nutrients in your diet may need to be controlled. This booklet provides guidelines for your food intake.

You may be instructed to limit protein rich foods (such as dairy products, meat, and eggs) as your kidney function decreases. Eating too much protein can result in the build-up of waste products in your blood. When these levels are high, you may have nausea, vomiting, shortness of breath, or an overall sick feeling.

It is important to eat enough calories. Your new diet may be higher in carbohydrates and fats. Eating enough calories will help keep the body from using protein rich foods for energy instead of building and repairing muscle. Often, diabetics may be asked to include sugar-containing foods to provide adequate calories.

Limiting the amount of dietary sodium (salt) may be suggested. The failing kidney holds on to sodium and this may cause an increase in blood pressure, fluid buildup, and edema (general body swelling).

A restriction of potassium rich foods and beverages may also be necessary if the kidneys are not able to get rid of excess potassium from the body. High levels of potassium can cause abnormal heart rhythm and can be life threatening. The use of salt substitutes is to be avoided since these often contain potassium salts.

Depending on the kidneys ability to manage fluids, beverages and foods that are liquid at room temperature may need to be limited.

The dietary guidelines in this booklet have been prepared for you. Please follow these guidelines carefully. Your diet will change as your kidney function decreases.

Please contact your dietitian or doctor if you have additional questions. The information you need will be provided to you.

Diet Explanation

Properly working kidneys rid the body of excess waste products that build up in the blood. When the kidneys are not working as they should, the built up waste products cause progressive illness. The renal diet is to help your kidneys work as well as their limited capacity will allow.

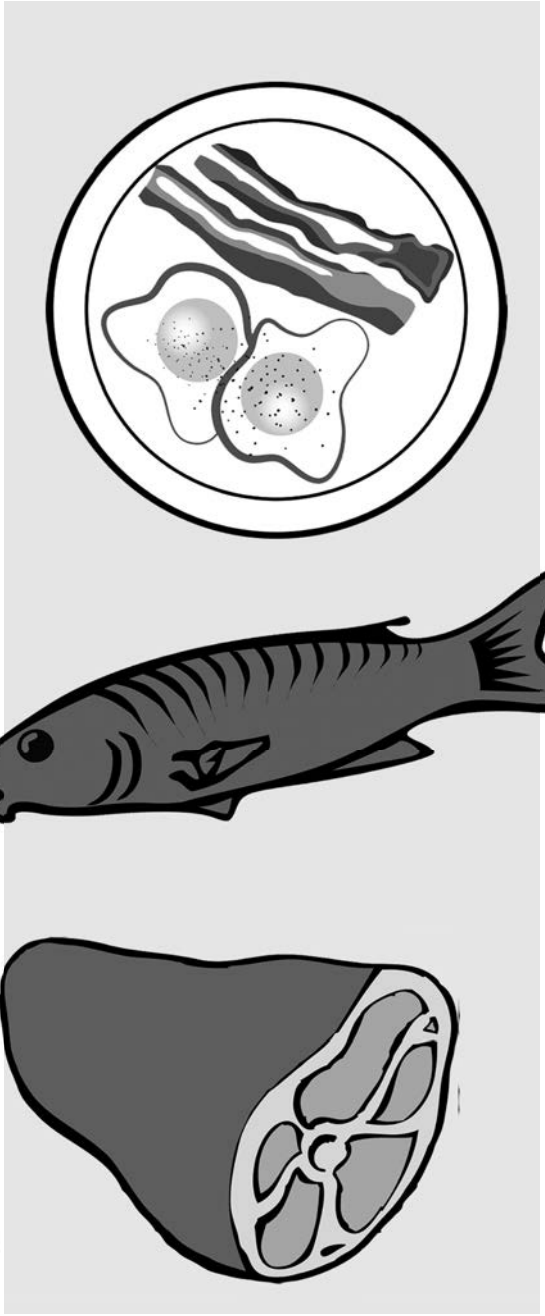
Protein: Protein is used to build and repair body tissue. There are two types of protein; high biological value and low biological value. The high biological value (HBV) protein foods are the most beneficial for you when eaten in the amounts suggested by your doctor. The amino acids found in these foods can not be made by the body; they must be eaten.

Your diet should contain approximately 66% to 75% protein coming from the HBV sources. The best sources are from eggs, dairy products, meats, fish, and poultry. The low biological value (LBV) protein foods provide amino acids that can be made by the body. These foods are important in your diet because they will provide calories, their food sources are from fruits, vegetables, and grains.

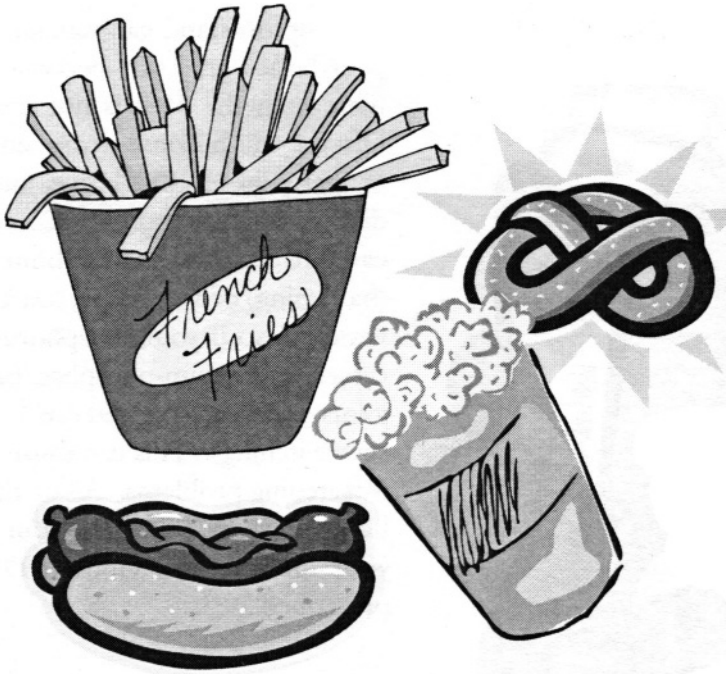
Urea is the waste product of protein breakdown. As kidney function declines, the ability to get rid of urea is limited. This build up causes nausea, vomiting, fatigue, and weakness. Limiting the total amount of protein in your diet will help limit some of these symptoms.

Calories: Giving your body adequate calories will help prevent the breakdown of muscle and weight loss. Adequate calories can be provided by using carbohydrates, fats, and special low protein products. If you notice weight loss, please call your dietitian so they can discuss it with you. DO NOT START A DIETARY SUPPLEMENT WITHOUT CONSULTING YOUR DIETITIAN OR DOCTOR. Many supplements that are easily available may not be appropriate for you. Patients with diabetes may need to include sugar-containing foods to provide adequate calories. Blood sugar control will need to be closely monitored, and insulin may need to be adjusted.

Foods That Are High In Protein



Foods That Are High in Sodium



You should limit the amount of sodium or salt that you eat. Salty foods also make you want to drink too much.

Sodium (Na): Sodium is a mineral that is closely associated with fluid and blood pressure control. When you can't get rid of excess sodium or water, you will gain (fluid) weight. This fluid causes body swelling (edema) and can put a strain on the heart. Too much sodium in the diet will also make you thirsty You may need to limit the amount of sodium-rich foods. Foods rich in sodium include: bacon, luncheon meats, canned foods, and spices containing salt as an ingredient.

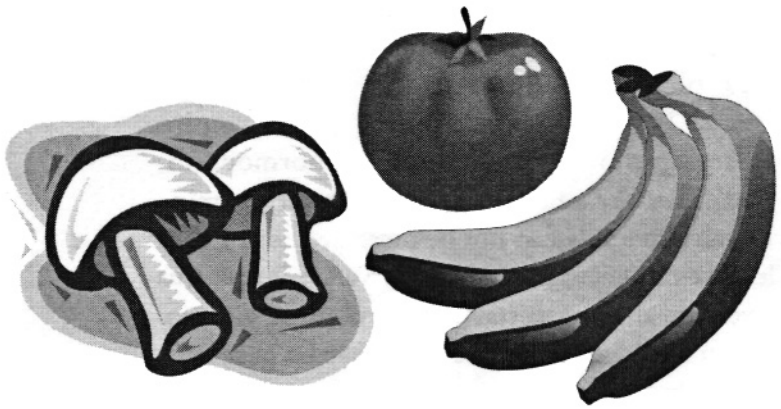
Potassium (K+): Potassium is a mineral that is necessary for normal heart and muscle function. Too much potassium is extremely dangerous. If the potassium level in your blood is high, it may cause muscle weakness, cramps, nervous irritability, or it can affect heart contractions enough to cause serious problems and even death. Foods with large amounts of potassium may need to be limited. These are: fruits, vegetables, dairy, and whole wheat products. Salt substitutes (that contain potassium) should not be used.

Not everyone needs a potassium restriction. Your kidney function will determine when it is time to start a potassium restriction. If you take a fluid pill, too much potassium may be removed from the blood and a potassium supplement may be ordered by your doctor. You may also be encouraged to eat foods rich in potassium.

As your kidney function decreases, your doctor will monitor your blood tests and make adjustments as needed.

Calcium (Ca++), Phosphorus (PO^4) and Vitamin D: When kidneys fail, calcium and phosphorus become out of balance. Because this process occurs slowly the body adjusts as well as it can. You have four parathyroid (PTH) glands located in your neck. The PTH glands signal the kidney to make Calcitriol (vitamin D), but the

Foods That Are High in Potassium



Foods That Are High in Phosphorus

response is slow At the same time, the kidneys ability to get rid of phosphorus is reduced. This causes phosphorus to build up in the blood. This high phosphorus leads to low calcium levels. The PTH gland responds to this low calcium by enlarging and making more PTH hormone to normalize the calcium level. Without vitamin D, calcium levels can not be increased, and PTH levels continue to rise. If calcium and phosphorus levels are allowed to stay in poor control, vitamin D can not be given and surgery may be necessary to remove these glands to correct the problem.

Renal Bone Disease is a condition that affects most people on dialysis. It begins without pain or symptoms and can remain quiet for years as your bones gradually become thinner and lose their strength. If it is not treated, Renal Bone Disease will become worse, and you may begin to feel pain in your bones and joints. As the disease worsens, bones become brittle, and you can suffer from broken bones or calcification (hardening) of soft tissue, heart valves, and blood vessels. Also, if your phosphorus is too high, sharp crystals of calcium-phosphate can build up in your joints, eyes (causing "red eye"), and skin (causing severe itching). This can cause serious, even life threatening problems. All of these problems can be avoided by following your diet and taking your binders and vitamin D supplement as prescribed.

Fluid: Excess fluid intake can cause blood pressure to rise, shortness of breath, congestive heart failure (CHF), or fluid in the lungs. Anything that is liquid at room temperature is fluid (ice, Jell-O, water, soup, etc.). Depending on the kidneys' ability to manage fluid balance, you may need to limit fluid from various foods and beverages. Dialysis is a treatment to remove waste products and excess fluid from your blood. When on dialysis you can only take in as much fluid as your body can handle.

How to count cups and ounces to cc's

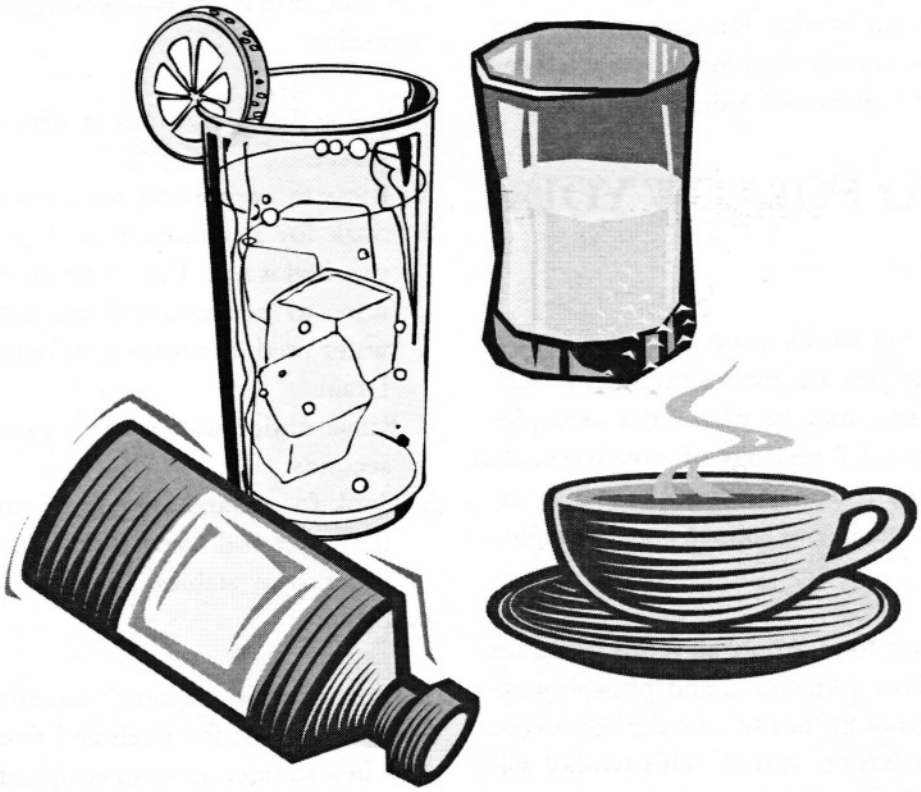
1 cup =	8 oz.	240 cc's
1/2 cup =	4 oz.	120 cc's
1/4 cup =	2 oz.	60 cc's
	1 oz.	30 cc's

Your Diet

DO NOT:

- **Change your diet until your doctor tells you to do so!**
- **Change your fluid intake until your doctor tells you to do so!**

What do we mean by Fluids?



Magnesium (Mg^+) and Aluminum (AlOH): Magnesium is a mineral necessary for many enzyme reactions. When renal function decreases, magnesium can be stored in the body and become toxic. The use of magnesium containing antacids and medications should only be used under your doctor's advice. Aluminum-containing antacids should be avoided. Aluminum is not well dialyzed and can be stored in the body This will cause an aluminum toxicity, leading to bone disease, buildup of aluminum in the soft tissues, or dementia. **DO NOT USE ANY PRODUCTS CONTAINING ALUMINUM.**

Vitamins and Minerals: Because the renal diet is limited, you may not be getting all of the vitamins and minerals that your body needs. Your doctor may advise you to take additional vitamins and mineral supplements. It is important that you take only the medication ordered by your doctor because certain vitamins and minerals can be harmful with decreased kidney function.

How to Follow Your Diet

The renal diet works using an exchange list. During the day; you are given amounts in each exchange list that may be used. For example: if you are allowed 7 servings of breads/starches during the day, you may have 2 servings at breakfast, 2 at lunch, 2 at supper, and 1 at night as a snack.

In each major food group, all foods listed are similar in protein, potassium, and phosphorus. Some foods do not fit "neatly?" into the exchanges. They will often have a symbol. This symbol will let you know that the food is either too high in potassium or phosphorus to be used often. Each exchange list provides the average amount of protein, sodium, potassium, and phosphorus. Potassium and phosphorus information is usually not included on the nutrition label of most foods. If you need help in learning how to read nutrition labels, please ask your dietitian. Some foods are not allowed on the renal diet because of their extremely high potassium or phosphorus content.

These foods are usually all of the beans, nuts, and seeds. Please contact your dietitian if you would like to have a food or product not listed.

If your doctor has ordered a potassium restriction, it is often necessary to "dialyze" some foods. Potatoes, white or sweet, as well as some vegetables are very high in potassium and will need to be dialyzed in order for them to be used in your diet.

How to dialyze vegetables

For white and sweet potatoes, carrots, beets, and rutabagas:

1. Peel and slice potatoes or vegetables in small pieces
2. Rinse in warm water for a few seconds
3. Soak for a minimum of 2 hours in warm, unsalted water. Use 10 times the amount of water to the amount of vegetables. The more water used, the more potassium is removed. Drain.
4. Rinse under warm water again for a few seconds
5. Cook for desired amount of time, changing the water and using 5 times the amount of water to vegetables
6. Drain

For greens, squash, mushrooms, and cauliflower (best for fresh and frozen varieties): thaw in a strainer at room temperature if frozen and follow steps 2 through 5 above, then cook in the usual way using 5 times the amount of water to the amount of vegetables.

Steaming or using the microwave to cook vegetables does not remove enough potassium to be allowed in the diet. You can not soak beans and peas to remove potassium.

If you are on a very restricted, low protein diet, often the dietitian will suggest that you purchase special low protein products or use a special low protein supplement. These specialty products can only be purchased through mail order but provide calories without the additional protein, potassium, or phosphorus. If you lose weight or feel you are always hungry, ask your dietitian for information.

SECTION 7

Keeping Your Bones Healthy

Objectives

The participant will be able to:

1. Discuss some of the advantages of exercising regularly
2. Describe how to start an exercise program best suited for his or her needs

Your kidneys play a key role in keeping your bones healthy The basic purpose of your bones is to hold up your body and protect your internal organs. Your muscles need your bones to help you walk and move around, and your bones store minerals your body needs. It is not unusual for patients with chronic kidney failure to have problems with their bones.

Exercise

Evidence shows that people with decreased renal function can benefit from a regular exercise program. Regular exercise can increase your energy level and your ability to do more activities; improve your blood pressure, strengthen your bones and muscles, strengthen your heart and reduce the risk of heart disease, and lower your cholesterol.

Before starting any exercise program, it is important to check with your doctor to determine the best exercise program for you. When planning an exercise program, it is best to include a variety of activities such as stretching, and continuous activities such as walking, swimming, bicycling, etc., that allow you to move large muscle groups and develop endurance. Also, you should select strengthening exercises, starting with low weights and building up to more repetitions and heavier weights. However, you should avoid strenuous lifting.

Whatever exercise program you select and/or design for yourself, make sure it is something you are interested in, enjoyable for you, and convenient to do.

You should exercise a minimum of three days a week for at least 30 minutes each session. If you do not have a regular exercise program, it would be better if you start out gradually, then build up to your goal over several weeks or months. For example, the first week you may want to start off exercising 12 minutes a day, then add 1-2 minutes each time you exercise until you reach your goal. Again make sure the exercise you choose is convenient and enjoyable for you.

Although when you exercise is a personal preference, early morning or late evening usually are the best times for exercising. Also, it is best to wait at least one hour after a large meal. And avoid exercising less than one hour before bedtime.

To a large extent, the intensity (or how hard you exercise) depends on your health and fitness level. But your breathing should not be so hard that you cannot talk. You should not be gasping for breath. Within one hour after exercising, you should feel completely normal again.

You should stop exercising if you have chest pain, leg cramps, dizziness, shortness of breath, tired, faint, rapid heart beat, or nausea. Inform your physician if you experience any of the above while exercising.

You should not exercise at all if you have a fever, any of the symptoms just discussed, or a worsening of your physical condition when you exercise. Please see your physician immediately.

SECTION 8

Words You May Hear

Access: A minor operation to connect an artery with a vein in your arm or leg to provide a way for you to be connected to the kidney machine for dialysis.

Acute Kidney Injury: A sudden and possibly fatal stopping of the kidney function which can occur in a matter of hours or days.

Anemia: A condition in which there is a decrease in the number of circulating red blood cells. Anemia causes paleness, weakness, and fatigue, among other symptoms.

Antibiotic: A drug used to fight infection.

Anticoagulants: Medications used to help prevent blood clotting.

Artery: Vessel carrying blood away from the heart. Part of the circulatory system.

Artificial Kidney: Also referred to as "dialyzer." A filtering device which removes excessive fluid and waste products from the bloodstream and corrects chemical imbalance of the blood during hemodialysis.

Artificial Kidney Machine (Hemodialysis Machine): A machine which supports and monitors the functioning of the artificial kidney (dialyzer). It cleanses the blood and removes extra fluid.

Benadryl: A medication sometimes given to relieve itching.

Bilateral Nephrectomies: Surgical removal of both kidneys.

Bladder: The sac in which urine produced by the kidneys is collected and stored until the urine is released from the body.

Blood Flow Rate: A setting on the dialysis machine that determines the clearance of waste from the blood. The amount of blood passing through the artificial kidney each minute. This is determined by the speed at which the blood pump is set. The higher the flow rate, the greater the clearance.

Blood Pressure: The force of blood flowing through your blood vessels, caused by the pumping of your heart. Blood pressure is reported as systolic over diastolic.

Blood Pump: A pump on the dialysis machine that carries blood from the vascular access (graft, cannula, or fistula) through the artificial kidney.

Blood Urea Nitrogen (BUN): A waste product from the protein we eat. This waste is not needed by the body.

Bruit: The rushing sound of blood flowing through your (fistula or graft) access.

Calcium: A mineral found in the blood that is important to bone growth and formation, and body functioning.

Cannulae/Cannula: Special tubes that carry blood from an artery directly to a nearby vein.

Chronic Kidney Disease: The slow destruction of normal kidney tissue that occurs over months or years and results in permanent kidney failure.

Creatinine: A waste product in the blood produced by normal tissue breakdown. It is removed from the blood by the kidneys. This level tells how well a kidney is working.

Dialysate: The "bath" solution which passes through the artificial kidney to remove excess waste from the blood.

Dialyzer: The filtering part of the hemodialysis machine. Also referred to as the artificial kidney, the device or filter containing the membrane through which blood passes during hemodialysis.

Diastolic: Pressure inside the artery when the heart is at rest; the lower number in a blood pressure measurement.

Diffusion: Passage of particles from a solution of high concentration to a solution of low concentration.

Dry (or Ideal) Weight: The weight at which no extra fluid is present in the body.

Edema (Swelling): An abnormal amount of fluid in the tissues, especially in the ankles, face (particularly the eyelids), and sometimes in the abdomen or lungs (see pulmonary edema).

End Stage Renal Disease (ESRD): Stage of kidney damage that requires dialysis or kidney transplantation to maintain life and health. Another term for permanent kidney failure

EPO (Epogen or Erythropoietin): A hormone that working kidneys produce. It tells the body to make red blood cells.

Fistula: An access for dialysis created surgically by joining an artery and a vein. The vein then "matures" or dilates and provides a route to supply and return blood during dialysis.

Fluid Overload: A condition in which there is too much fluid in your body. Edema, hypertension, and difficulty in breathing may occur.

Folic Acid: A vitamin necessary for red blood cell production. It is water soluble and is usually taken after dialysis.

Hematocrit: A measure of the amount of red blood cells in the body.

Hemodialysis: The process by which excess body waste and fluid are removed from the blood when passing through an artificial kidney.

Hemoglobin: A portion of red blood cells that carries oxygen from the lungs to the tissue.

Heparin: A "blood thinner" or anti-coagulant used during dialysis to slow blood clotting.

Hypertension: High blood pressure. Some cases of hypertension can result in kidney

damage, and some cases of hypertension are caused by kidney failure.

Hypotension: Low blood pressure. A potential problem during a hemodialysis treatment.

Iron: Helps build hemoglobin, which aids red blood cells in carrying oxygen. It is a chemical constipating drug and will make stools dark in color. It should be taken between meals, but with a snack as it may be irritating to the stomach. Iron should not be taken with phosphate binders, as the two bind together, and the iron will not be efficiently absorbed.

Kayexalate: A medication given to lower potassium levels. If the doctor orders for you, it is MOST important that it be taken.

Kidney: One of two organs located at the back of the abdominal cavity, one on each side of the spinal column. Their function is to maintain the chemical balance of the body and regulate the amount of fluids.

MDRD: A special equation used by physicians to calculate the percent function of your kidney.

Metabolism: Process in which foods and medications are broken down for function in the body.

Multi-vitamins: Dialyzed out of the bloodstream; therefore, must be replaced. Generally vitamins are taken daily and should be taken after dialysis.

Negative Pressure: Pulling pressure exerted in the dialysate compartment that causes excess water to be pulled from the blood compartment of the dialyzer across to the dialysate compartment.

Nephrologist: A medical doctor who specializes in the treatment of kidney disease.

Nephron: The functional unit of the kidney which acts to maintain the body's chemical balance. There are approximately 1 million nephrons in each kidney.

Parathyroid Hormone (PTH): A hormone secreted from the parathyroid gland. This is responsible for maintaining calcium and phosphorous at the correct level. It is increased in renal failure.

Peritonitis: Infection in the peritoneal cavity.

Phosphate Binder: One of many medications usually necessary in kidney failure. There are many different medications used as binders. Normally, phosphates are excreted in the urine. When kidney failure occurs, there is a buildup of phosphates in the bloodstream. When the phosphate is elevated (in the blood), it causes bone disease through overproduction of parathyroid hormone. Taking phosphate binders helps keep phosphates at a normal level. It is important to take the full prescribed dosage daily. Since it must bind the phosphate in the food you eat, it should be taken with meals. Phosphate binders may be constipating. Do not take with iron.

Phosphorus: A mineral necessary to the bones. Accumulates to excess in kidney failure. Excess phosphorus is removed with antacids ("binders").

Plasma: The fluid portion of the blood.

Polycystic Kidney Disease: Fluid-filled sacs in your kidneys that cause the kidneys to become very large. This condition is usually inherited.

Positive Pressure: Also referred to as "back pressure" or "venous drip chamber pressure." Pressure exerted on the artificial kidney to cause removal of water from the blood. Increasing the positive pressure increases fluid removal.

Potassium (K+): A mineral necessary to the body, but harmful when found in excess. Hyperkalemia is a condition in which there is an excess of potassium in the body. Hypokalemia is a condition where there is decreased level of potassium in the body.

Protein: An organic compound of amino acids necessary for building and repairing body tissue. It is found in most of the foods we eat.

Pyridoxine: Vitamin B-6, helps in the formation of red blood cells. This vitamin is water soluble and is usually taken after dialysis.

Renal: Referring to the kidneys.

Saline: A salt water solution.

Serum: The fluid portion of the blood remaining after a clot has formed.

Sodium (Na): A mineral found in the body which helps regulate the fluid content of the body.

Systolic: Pressure inside the artery when the heart muscle is contracting; the top number in a blood pressure measurement.

Thrill: Vibration or buzzing sensation felt over the vein of a cannula, graft, or fistula.

Ultrafiltration: The process of removing water from the blood during dialysis by exerting positive or negative pressure on the blood in the artificial kidney.

Ureter: A canal for the discharge of urine.

Veltassa (Patiromer): a drug to lower potassium levels.

Vein: A blood vessel which carries blood back to the heart from other parts of the body.

Venous: Referring to veins and the flow of blood to the heart. This may also refer to the portion of the shunt placed in a vein or the tubing which carries the blood from the artificial kidney back to the patient.

SECTION 9
Immunization

Influenza Vaccine

Pneumococcal Polysaccaride Vaccine

Hepatitis B Vaccine

Influenza Vaccine

1. Why get vaccinated?

Influenza is a serious disease.

It is caused by a virus that spreads from infected persons to the nose or throat of others. The "influenza season" in the U.S., is from November through April each year.

Influenza can cause:

- fever
- cough
- chills
- sore throat
- headache
- muscle aches

People of any age can get influenza. Most people are ill with influenza for only a few days, but some get much sicker and may need to be hospitalized. Influenza causes thousands of deaths each year, mostly among the elderly.

Influenza vaccine can prevent influenza.

2. Influenza vaccine

The viruses that cause influenza change often. Because of this, the influenza vaccine is updated each year by replacing at least one of the vaccine viruses with a newer one. This is done to make sure that the influenza vaccine is as up-to-date as possible.

Protection develops about 2 weeks after the shot and may last up to a year.

3. Who should get influenza vaccine?

People at risk, for getting a serious case of influenza or influenza complications, and people in close contact with them (including all household members) should get the vaccine. An annual flu shot is recommended for these groups:

- Everyone 50 years of age or older
- Residents of long-term care facilities housing persons with chronic medical conditions
- Anyone who has a serious long-term health problem with:
  - heart disease
  - kidney disease
  - lung disease
  - metabolic disease, such as diabetes asthma, anemia, and other blood disorders

Anyone whose immune system is weakened because of:

  - HIV/AIDS or other diseases that affect the immune system
  - long-term treatment with drugs such as steroids
  - cancer treatment with x-rays or drugs

- Anyone 6 months to 18 years of age on long-term aspirin treatment (who could develop Reye's Syndrome if they catch influenza)
- Women who will be past the 3rd month of pregnancy during the influenza season
- Physicians, nurses, family members, or anyone else coming in close contact with people at risk of serious influenza

Others who should consider getting influenza vaccine include:

- People who provide essential community services
- Travelers to the Southern hemisphere between April and September, or those traveling to the tropics any time
- Students and staff at schools and colleges, to prevent outbreaks
- Anyone who wants to reduce their chance of catching influenza

4. When should I get influenza vaccine?

The best time to get influenza vaccine is from October to mid-November. A new shot is needed each year.

- People 9 years of age and older need one shot
- Children less than 9 years old need two shots, given one month apart, the first time they get vaccinated against influenza

Influenza vaccine can be given at the same time as other vaccines, including pneumococcal vaccine.

5. Can I get influenza even though I get the vaccine this year?

Yes. Influenza viruses change often, and they might not always be covered by the vaccine. But people who do get influenza despite being vaccinated often have a milder case than those who did not get the shot.

Also, to many people "the flu" is any illness with fever and cold symptoms. They may expect influenza vaccine to prevent these illnesses. But influenza vaccine is effective only against illness caused by influenza viruses and not against other causes of fever and colds.

6. Some people should consult with a doctor before getting influenza vaccine.

Consult with a doctor before getting an influenza vaccination if you:

1. ever had a *serious* allergic reaction to eggs or a previous dose of influenza vaccine or
2. have a history of Guillain-Barre Syndrome (GBS)

If you are moderately or severely ill at the time the shot is scheduled, you should usually wait until you recover before getting influenza vaccine. Talk to your doctor or nurse about rescheduling the vaccination.

7. What are the risks from influenza vaccine?

A vaccine, like any medicine, is capable of causing serious problems, such as severe allergic reactions; the risk of a vaccine causing serious harm, or death, is extremely small. Almost all people who get influenza vaccine have no serious problems from it. The viruses in the vaccine are killed, so you cannot get influenza from the vaccine.

Mild problems:

- soreness, redness, or swelling where the shot was given
- fever
- aches

If these problems occur, they usually begin soon after the shot and last 1-2 days.

Severe problems:

- Life-threatening allergic reactions are very rare. If they do occur, it is within a few minutes

to a few hours after the shot

- In 1976, swine flu vaccine was associated with a severe paralytic illness called Guillain-Barre Syndrome (GBS). Influenza vaccines since then have not been clearly linked to GBS. However, if there is a risk of GBS from current influenza vaccines, it is estimated at 1 or 2 cases per million persons vaccinated. This is much less than the risk of severe influenza, which can be prevented by vaccination.

8. What there is a moderate or severe reaction?

What should I look for?

- Any unusual condition, such as a high fever or behavior changes. Signs of a serious allergic reaction can include difficulty breathing, hoarseness or wheezing, hives, paleness, weakness, a fast heart beat or dizziness.

What should 1 do?

- Call a doctor, or get the person to a doctor right away
- Tell your doctor what happened, the date and time it happened, and when the vaccination was given
- Ask your doctor, nurse, or health department to file a Vaccine Adverse Event Reporting System (VAERS) form, or call VAERS yourself at **1-800-822-7967**

9. How can I learn more?

- Ask your doctor or nurse. They can give you the vaccine package insert or suggest other sources of information
- Call your local or state health department
- Contact the Centers for Disease Control and Prevention (CDC)
  - Call **1-800-232-2522** (English)
  - Call **1-800-232-0233** (Espanol)
  - Visit the National Immunization program's website at **http://www.cdc.gov/nip**

Pneumococcal Polysaccaride Vaccine

1. Why get vaccinated?

Pneumococcal disease is a serious disease that causes much sickness and death. In fact, pneumococcal disease kills more people in the United States each year than all other vaccine-preventable diseases combined. Anyone can get pneumococcal disease. However, some people are at greater risk from the disease. These include people 65 and older, the very young, and people with special health problems such as alcoholism, heart or lung disease, kidney failure, diabetes, HIV infection, or certain types of cancer.

Pneumococcal disease can lead to serious infections of the lungs (pneumonia), the blood (bacteremia), and the covering of the brain (meningitis). About 1 out of every 20 people who get pneumococcal pneumonia dies from it, as do about 2 people out of 10 who get bacteremia and 3 people out of 10 who get meningitis. People with the special health problems mentioned above are even more likely to die from the disease.

Drugs such as penicillin were once effective in treating these infections; but the disease has become more resistant to these drugs, making treatment of pneumococcal infections more difficult. This makes prevention of the disease through vaccination even more important.

The pneumococcal polysaccharide vaccine (PPV) protects against 23 types of pneumococcal bacteria. Most healthy adults who get the vaccine develop protection to most or all of these types within 2 to 3 weeks of getting the shot. Very old people, children under 2 years of age, and people with some long-term illnesses might not respond as well or at all.

2. Who should get the vaccine?

- All adults 65 years of age or older
- Anyone over 2 years of age who has a long-term health problem such as:
  - heart disease

- sickle cell disease
- alcoholism
- leaks of cerebrospinal fluid
- lung disease
- diabetes
- cirrhosis

- Anyone over 2 years of age who has a disease or condition that lowers the body's resistance to infection such as:
  - Hodgkin's disease
  - kidney failure
  - nephrotic syndrome
  - HIV infection or AIDS
  - damaged spleen, or no spleen
  - organ transplant
  - lymphoma, leukemia
  - multiple myeloma
- Anyone over 2 years of age who is taking any drug or treatment that lowers the body's resistance to infection, such as:
  - long-term steroids
  - certain cancer drugs
  - radiation therapy
- Alaskan Natives and certain Native American populations.

3. How many doses of PPV are needed?

Usually one dose of PPV is all that is needed.

However, under some circumstances a second dose may be given.

- A second dose is recommended for those people aged 65 and older who got their first dose when they were under 65, if 5 or more years have passed since that dose
- A second dose is also recommended for people who have a damaged spleen or no spleen.
  - have sickle-cell disease
  - have HIV infection or AIDS
  - have cancer, leukemia, lymphoma, multiple myeloma
  - have kidney failure
  - have nephrotic syndrome
  - have had an organ or bone-marrow transplant are taking medication that lowers immunity (such as chemotherapy or long-term steroids)

Children 10 years old and younger may get this second dose 3 years after the first dose. Those older than 10 should get it 5 years after the first dose.

4. Other facts about getting the vaccine

Otherwise healthy children who often get ear infections, sinus infections, or other upper respiratory diseases do not need to get PPV because of these conditions.

PPV may be less effective in some people, especially those with lower resistance to infection. But these people should still be vaccinated, because they are more likely to get seriously ill from pneumococcal disease.

Pregnancy: The safety of PPV for pregnant women *has not yet been studied*. There is no evidence that the vaccine is harmful to either the mother or the fetus, but pregnant women should consult with their doctor before being vaccinated. Women who are at high risk of pneumococcal disease should be vaccinated before becoming pregnant, if possible.

5. What are the risks from PPV?

PPV is a very safe vaccine.

About half of those who get the vaccine have very mild side effects, such as redness or pain where the shot is given.

Less than 1% develop a fever, muscle aches, or more severe local reactions.

Severe allergic reactions have been reported very rarely.

As with any medicine, there is a very small risk that serious problems, even death, could occur after getting a vaccine.

Getting the disease is much more likely to cause serious problems than getting the vaccine.

6. What if there is a serious reaction?

What should I look for?

- Severe allergic reaction (hives, difficulty breathing, shock)

What should I do?

- Call a doctor, or get to a doctor right away
- Tell your doctor what happened, the date and time it happened, and when the vaccination was given
- Ask your doctor, nurse, or health department to file a Vaccine Adverse Event Reporting System (VAERS) form, or call VAERS yourself at **1-800-822-7967**

7. How can I learn more?

- Ask your doctor or nurse. They can give you the vaccine package insert or suggest other sources of information.
- Call your local or state health department
- Contact the Centers for Disease Control and Prevention (CDC):
  - Call **1-800-232-7468** (English) OR
  - Call **1-800-232-0233** (Spanish) OR
  - Visit the CDC National Immunization Program website at **http://www.cdc.gov/nip**

Hepatitis B Vaccine

1. Why get vaccinated?

Hepatitis B is a serious disease.

The hepatitis B virus can cause short-term (acute) illness that leads to:

- loss of appetite
- tiredness
- pain in muscles, joints, and stomach
- diarrhea and vomiting
- jaundice (yellow skin pain in muscles, or eyes)

It can also cause long-term (chronic) illness that leads to:

- liver damage (cirrhosis)
- liver cancer
- death

About 1.25 million people in the U.S. have chronic hepatitis B virus infection. Each year it is estimated that:

- 200,600 people, mostly young adults, get infected with hepatitis B virus
- More than 11,000 people have to stay in the hospital because of hepatitis B from chronic hepatitis B
- 4,000 to 5,000 people die

Hepatitis B vaccine can prevent hepatitis B.

It is the first anti-cancer vaccine because it can prevent a form of liver cancer.

2. How is hepatitis B virus spread?

Hepatitis B virus is spread through contact with the blood and body fluids of an infected person. A person can get infected in several ways, such as:

- during birth when the virus passes from an infected mother to her baby
- by having sex with an infected person
- by injecting illegal drugs
- by being stuck with a used needle on the job
- by sharing personal items, such as a razor or toothbrush with an infected person

People can get hepatitis B virus infection without knowing how they have it. About 1/3 of hepatitis B cases in the United States have an unknown source.

3. Who should get the hepatitis vaccine and when?

1. Everyone 19 years of age and younger

2. Adults over 18 who are at risk

Adults at risk for hepatitis B virus infection include people who have more than one sex partner, men who have sex with other men, injection drug users,

health care workers, and others who might be exposed to infected blood or body fluids.

If you are not sure whether you are at risk, ask your doctor or nurse.

If you miss a dose or get behind schedule, get the next dose as soon as you can. There is no need to start over.

- The second dose given at least 1 month after the first dose
- The third dose must be given at least 2 months after the second dose and at least 4 months after first
- The third dose should not be given to infants younger than 6 months of age

Adolescents 11 to 15 years of age may need only two doses of hepatitis B vaccine, separated by 4-6months.

Ask your health care provider for details. Hepatitis B vaccine may be given at the same time as other vaccines.

People who are moderately or severely ill at the time the shot is scheduled should usually wait until they recover before getting hepatitis B vaccine.

Ask your doctor or nurse for more information.

5. What are the risks from hepatitis B vaccine?

A vaccine like any medicine, is capable of causing serious problem allergic reactions. The risk of hepatitis vaccine causing serious harm, or death, is extremely small.

Getting hepatitis B vaccine is much safer than getting hepatitis B disease.

Most people who get hepatitis B vaccine do not have any problems with it.

Mild problems:

- soreness where the shot was given, lasting a day or two (up to 1 out of 11 children and adolescents, and about 1 out of 4 adults)
- mild to moderate fever (up to 1 out of 14 children and adolescents and 1 out of 100 adults)

Severe problems

- serious allergic reaction (very rare).

4. Some people should not get hepatitis B vaccine or should wait

People should get 3 doses of hepatitis B vaccine according to the following schedule:

Hepatitis B Vaccination Schedule	Infant whose mother is infected with hepatitis B virus	Infant whose mother is not infected with hepatitis B virus	Older child, adolescent, or adult
First Dose	Within 2 hours of birth	Birth - 2 months of age	Any time
Second Dose	1-2 months of age	1-4 months of age (at least 1 month after first dose)	1-2 months after first dose
Third Dose	6 months of age	6-18 months of age	4-6 months after first dose

6. What if there is a moderate or severe reaction? What should I look for?

Any unusual condition, such as a serious allergic reaction, high fever or behavior changes. Signs of a serious allergic reaction can include difficulty breathing, hoarseness or wheezing, hives, paleness, weakness, a fast heart beat or dizziness. If such a reaction were to occur, it would be within a few minutes to a few hours after the shot.

What should I do?

- Call a doctor or get the person to a doctor right away
- Tell your doctor what happened, the date and time it happened, and when the vaccination was given
- Ask your doctor, nurse, or health department to file a Vaccine Adverse Event Reporting system (VAERS) form, or call VAERS yourself at **1-800-822-7967**

7. The National Vaccine Injury Compensation Program

In the rare event that you or your child has a serious reaction to a vaccine, a federal program has been created to help you pay for the care of those who have been harmed.

For details about the National Vaccine Injury Compensation Program, call **1-800-338-2382** or visit the program's website at **http://www.hrsa.gov/bhpr/vicp**

How can I learn more?

- Ask your doctor or nurse. They can give you the vaccine package insert or suggest other sources of information
- Call your local or state health immunization program
- Contact the Centers for Disease Control and Prevention (CDC):
  - Call **1-800-232-2522** or **1-888-443-7232** (English)
  - Call **1-800-232-0233** (Espanol)
  - Visit the National Immunization Program's website at http://www.cdc.gov/nipor CDC's Hepatitis Branch website at **http:// www.cdc.gov/ncidod/diseases/hepatitis**

Resources

The organizations below can give you more information on kidney disease and kidney failure. They may also guide you to local resources, such as support groups.

- New Orleans Nephrology Associates:
  www.nonakidney.com

- Fresenius patient website:
  www.FreseniusKidneyCare.com

- American Association of Kidney Patients (800) 749-2257
  www.aaKD.org

- American Kidney Fund (800) 638-8299
  www.KidneyFund.org

- National Kidney Foundation (800) 622-9010
  www.Kidney.org

- Davita patient website:
  www.Davita.com