



Effective Health Care Program

Medicines for Early Stage Chronic Kidney Disease

A Review of the Research for Adults With Kidney
Disease and Diabetes or High Blood Pressure



Agency for Healthcare Research and Quality
Advancing Excellence in Health Care • www.ahrq.gov

Is This Information Right for Me?

Yes, this information is right for you if:

- Your doctor has told you that you have early stage chronic kidney disease (CKD). This means that blood and/or urine tests show that your kidneys have signs of damage and do not clean your blood as well as they should.

Or

- Your doctor has told you that you have early stage CKD and one or more conditions that increase your risk for kidney problems. These conditions may include diabetes, high blood pressure, high cholesterol, or heart or blood vessel diseases. You want to know what research says about how you can protect your kidneys from becoming more damaged.

No, this information is not right for you if:

- You are under 18. This information is from research on adults.

What will this summary tell me?

This summary will tell you about medicines for people with early stage chronic kidney disease and diabetes, high blood pressure, high cholesterol, or heart or blood vessel diseases. It will explain what research says about the benefits and possible side effects of these medicines. It can help you talk with your doctor about whether or not one of these medicines may be right for you.

Where does the information come from?

Researchers funded by the Agency for Healthcare Research and Quality (AHRQ), a Federal Government research agency, reviewed 110 studies on treatments for people with chronic kidney disease published between January 1985 and January 2011. The report was reviewed by clinicians, researchers, experts, and the public. You can read the report at www.effectivehealthcare.ahrq.gov/ckd.cfm.

Understanding Your Condition

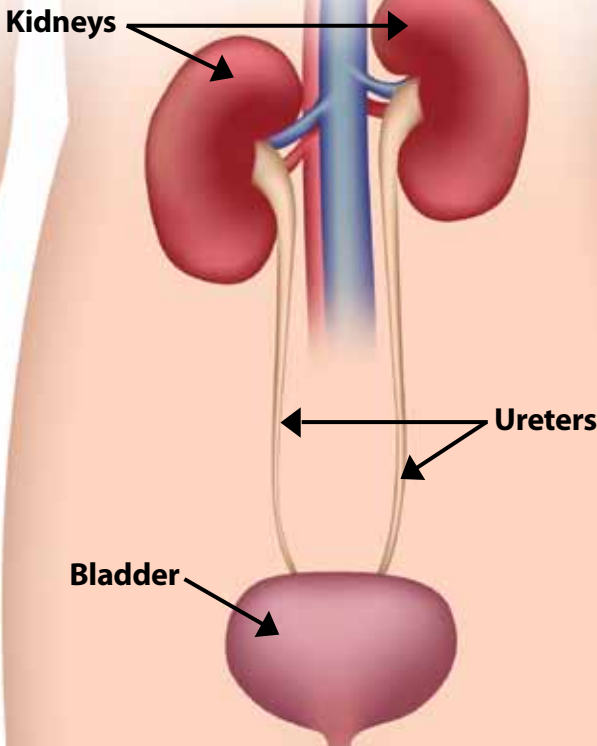
What is chronic kidney disease?

Chronic kidney disease (CKD) is a condition in which your kidneys become permanently damaged and do not work properly.

Your kidneys are important organs that have many functions. The kidneys work to remove wastes, extra fluid, and salt from your body. They do this by cleaning the wastes out of your blood and making urine. Your kidneys also help control your blood pressure and the balance of chemicals in your body. It is important to keep your kidneys healthy.

If your kidneys become damaged, they are not able to work as they should. A person has CKD if his or her kidney function (how well the kidneys work) is reduced for at least 3 months in a row. If not treated, CKD may get worse over time until your kidneys no longer work.

Around 11 out of every 100 adults in the United States have CKD.



Why is CKD dangerous?

When your kidneys do not work properly, they leave behind waste in your blood. The waste can build up and make you feel sick. It can cause problems with your heart and can increase your risk of bone loss, broken bones, anemia (a low number of red blood cells, which carry oxygen throughout the body), complete kidney failure, and other serious problems. It can also lead to death.

How do I know if I have CKD?

Your doctor can test your blood or urine to find out how well your kidneys are working. These tests check how much waste is in your blood or how much protein is in your urine. A high amount of waste in your blood or protein in your urine can be a sign of kidney damage.

What is early stage CKD?

Your doctor may tell you that you have “early stage” CKD if your kidneys have only lost a small amount of their function. In early stage CKD, the goal of treatment is to slow the damage to the kidneys.

If your kidneys no longer work well enough to remove wastes, you may have “end stage” CKD. People with end stage CKD will eventually need dialysis (pronounced die-AL-uh-sis; a treatment that uses a machine to clean the wastes from your blood) or a kidney transplant.

For most people, kidney function slowly gets worse as they age. Damaged kidneys can lose function faster.

What are the symptoms of CKD?

People with early stage CKD very rarely have any symptoms. Because symptoms often do not show up in the early stages, many people do not know they have CKD until their kidney function is very low.

Symptoms of end stage CKD may include loss of appetite, weight change, nausea, and swelling in the ankles and feet. End stage CKD can also make you feel sick and tired and have itchy or dry skin.



What causes CKD?

The most common causes of CKD are high blood pressure and high blood sugar from diabetes. CKD is also found in people with high cholesterol and people who have heart and blood vessel diseases.

About Your Options

What medicines may help?

There are four types of medicine that can help people with CKD:

- Angiotensin-converting enzyme inhibitors (ACEIs)
- Angiotensin II receptor blockers/antagonists (ARBs)
- Beta-blockers
- Statins

ACEIs, ARBs, and beta-blockers are all types of medicine used to lower blood pressure, but they work in different ways. ACEIs and ARBs may slow kidney damage even in people who do not have high blood pressure. Statins are a type of medicine used to lower cholesterol.

ACEIs

Brand Name(s)*	Drug Name
Accupril®	Quinapril
Aceon®	Perindopril
Altace®	Ramipril
Capoten®	Captopril
Lotensin®	Benazepril
Mavik®	Trandolapril
Monopril®	Fosinopril
Prinivil® or Zestril®	Lisinopril
Univasc®	Moexipril
Vasotec®	Enalapril

*All of these ACEIs come in generic forms.

ARBs

Brand Name	Drug Name
Atacand®	Candesartan
Avapro®	Irbesartan
Benicar®	Olmesartan
Cozaar®*	Losartan
Diovan®	Valsartan
Micardis®	Telmisartan
Teveten®	Eprosartan

*The only ARB that comes in a generic form is Cozaar®.

Beta-Blockers

Brand Name(s)	Drug Name
Bystolic®	Nebivolol
Coreg®*	Carvedilol
Corgard®*	Nadolol
Inderal® or Inderal LA®*	Propranolol
Levitol®	Penbutolol
Lopressor®	Metoprolol
Sectral®*	Acebutolol
Tenormin®*	Atenolol
Toprol XL®*	Metoprolol
Trandate®*	Labetalol
Zebeta®*	Bisoprolol

*These beta-blockers come in generic forms.

Statins	
<i>Brand Name*</i>	<i>Drug Name</i>
Crestor®	Rosuvastatin
Lipitor®	Atorvastatin
Mevacor®	Lovastatin
Pravachol®	Pravastatin
Zocor®	Simvastatin

*All of these statins come in generic forms except Crestor®.

What does research say about which medicines lower the risk of progressing to end stage CKD?

- For some people who have early stage CKD, ACEIs and ARBs lower their risk of progressing to end stage CKD. This benefit was only seen in people who have protein in their urine and who also have high blood pressure and diabetes.

What does research say about other ways these medicines can help people with CKD?

- ACEIs lower the risk of death in people with CKD who have protein in their urine and who also have heart or blood vessel diseases.
- ACEIs lower the risk of death in people with CKD who have protein in their urine and who also have diabetes with other risk factors for heart disease.
- Beta-blockers lower the risk of death and heart attack in people who have CKD and heart failure.
- Statins lower the risk of death, heart attack, and stroke in people who have CKD and high cholesterol.

What are the possible side effects of these medicines?

ACEIs and ARBs

- The U.S. Food and Drug Administration (FDA) lists these most common side effects of ACEIs and ARBs:
 - Dry cough
 - Headache
 - Dizziness
 - Trouble sleeping
 - Feeling tired
- Researchers found that:
 - ACEIs and ARBs cause about the same amount of headaches and dizziness.
 - People who take ACEIs are more likely to get a dry cough than people who take ARBs.

The FDA lists the following warnings for ACEIs and ARBs:

Although it is rare, ACEIs and ARBs can cause sudden swelling of the tongue, lips, throat, hands, or feet. This is called “angioedema” (pronounced an-gee-o-uh-DEE-mah). If this happens, call your doctor right away. This could be an emergency.

ACEIs and ARBs can also cause a high amount of potassium in your blood, which can be dangerous. This is also rare. Your doctor may take blood tests to check your potassium level while you are taking one of these medicines.

When taken with ACEIs and ARBs, nonsteroidal anti-inflammatory drugs like Advil®, Motrin®, Aleve®, and Celebrex® can worsen your kidney function. Talk with your doctor before taking any of these medicines if you are taking an ACEI or an ARB.

Beta-blockers

- The FDA lists these most common side effects of beta-blockers:
 - Feeling tired
 - Upset stomach
 - Headache
 - Dizziness or light-headedness
 - Constipation
 - Diarrhea
 - Weight gain

Statins

- The FDA lists these most common side effects of statins:
 - Aching muscles and joints
 - Nausea
 - Constipation
 - Diarrhea

Statins can cause muscle pain and, in rare cases, can damage your muscles. Statins can also damage your liver, although this is rare. Your doctor may do a blood test to check your liver when you begin taking a statin.

What else can I do?

Because having diabetes or high blood pressure can damage your kidneys, talk with your doctor about other things you can do to help these conditions, such as:

- Eating a healthy diet that is low in sodium (salt)
- Not smoking
- Keeping a healthy weight
- Being physically active
- Controlling your blood sugar if you have diabetes

Researchers studied whether eating certain diets (a diet with less protein or a diet with less iron and fewer carbohydrates, among other things) lowered the risk of moving from early stage CKD to end stage CKD or death. Eating these special diets did not appear to make a difference, but there is not enough research to know this for certain.

What should I talk about with my doctor?

There are several things to consider when choosing medicines that may help your CKD. Talk with your doctor about:

- The benefits and possible side effects of ACEIs, ARBs, beta-blockers, and statins
- What medicines you take for other conditions and how they might interact with a new medicine
- How long you will need to take the medicine
- How often you will need blood and urine tests to check your kidney function
- The costs of the medicines and how they fit into your budget

What are the costs of these medicines?

ACEIs, ARBs, beta-blockers, and statins have a wide range of prices. Many of these medicines come in generic forms, which are cheaper than the brand-name forms.

Your costs for these medicines depends on:

- Your health insurance
- The dose (amount of medicine) you need
- Whether the medicine is available in a generic form



Ask your doctor

- What is causing my CKD?
- Could another condition I have be making my CKD worse?
- Would an ACEI, ARB, beta-blocker, or statin help me?
- What serious side effects should I look for?
- Are there less expensive medicines that I can take?
- How long will it take to see a difference in my kidneys?
- How often should we check my kidneys?
- What will we do if the medicine does not help my CKD?
- What else can I do to help my CKD?

Other questions:

Write the answers here:



Source

The information in this summary comes from the report *Chronic Kidney Disease Stages 1–3: Screening, Monitoring, and Treatment*, January 2012.

The report was produced by the University of Minnesota Evidence-based Practice Center through funding by the Agency for Healthcare Research and Quality (AHRQ). For a copy of the report or for more information about AHRQ and the Effective Health Care Program, go to www.effectivehealthcare.ahrq.gov/ckd.cfm.

Additional information came from the MedlinePlus® Web site, a service of the National Library of Medicine and the National Institutes of Health. This site is available at www.nlm.nih.gov/medlineplus.

This summary was prepared by the John M. Eisenberg Center for Clinical Decisions and Communications Science at Baylor College of Medicine, Houston, TX. Patients with mild kidney disease and diabetes or hypertension reviewed this summary.

