Chronic Kidney Disease

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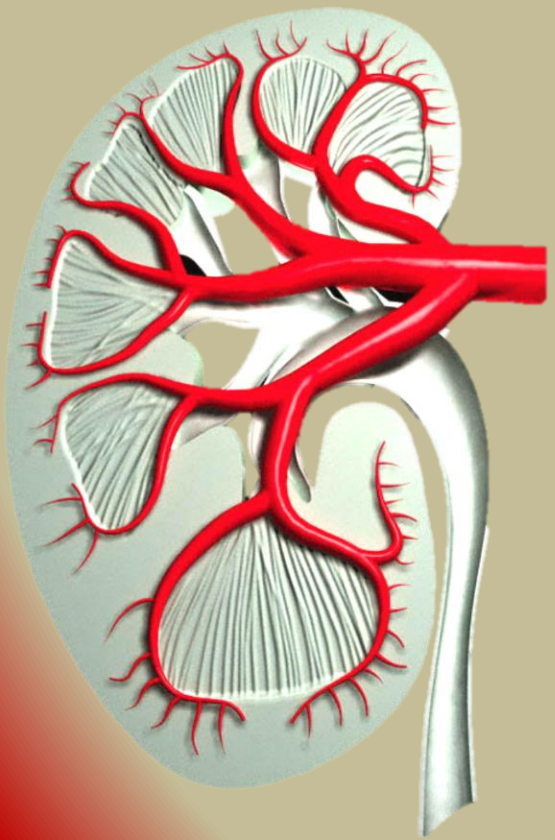


AKDHC
Arizona Kidney Disease & Hypertension Centers

Learning Objectives

- Recognize the importance of early detection and management of Chronic Kidney Disease (CKD)
- Identify the major risk factors for CKD
- Define treatment options to delay progression of kidney disease
- Define renal replacement treatment options for kidney failure

A Growing Concern….

"Chronic Kidney Disease (CKD) is a largely invisible and growing public health problem that is widely under-recognized; and it is rising faster than all noninfectious diseases, including cardiovascular disease."

(National Kidney Foundation, 2019)

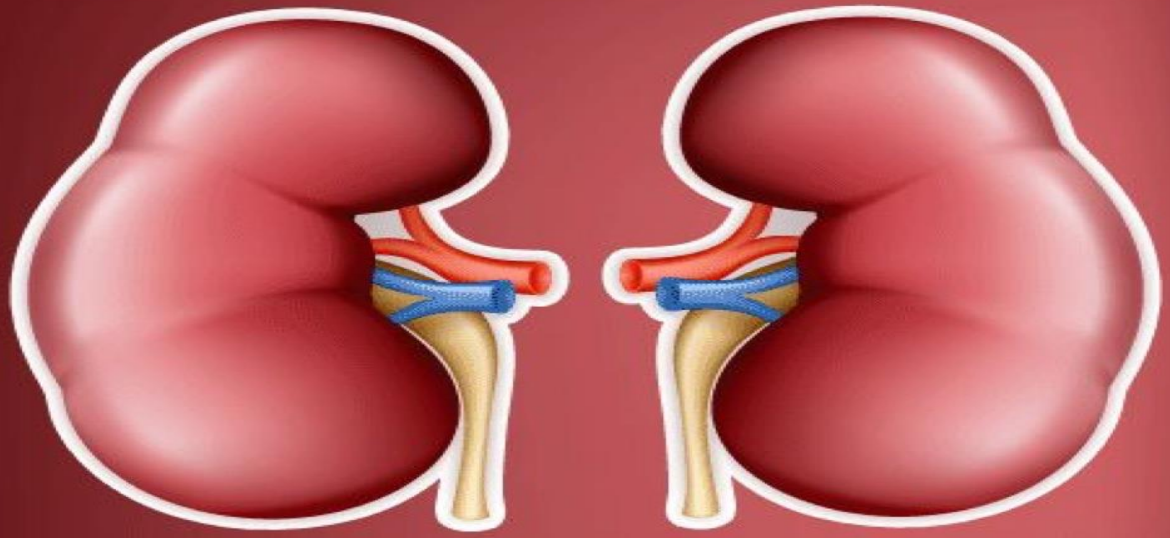
1 in 3 American adults are at risk for Chronic Kidney Disease

30 million Americans are estimated to have Chronic Kidney Disease

80% of those at risk are UNAWARE

KIDNEYS

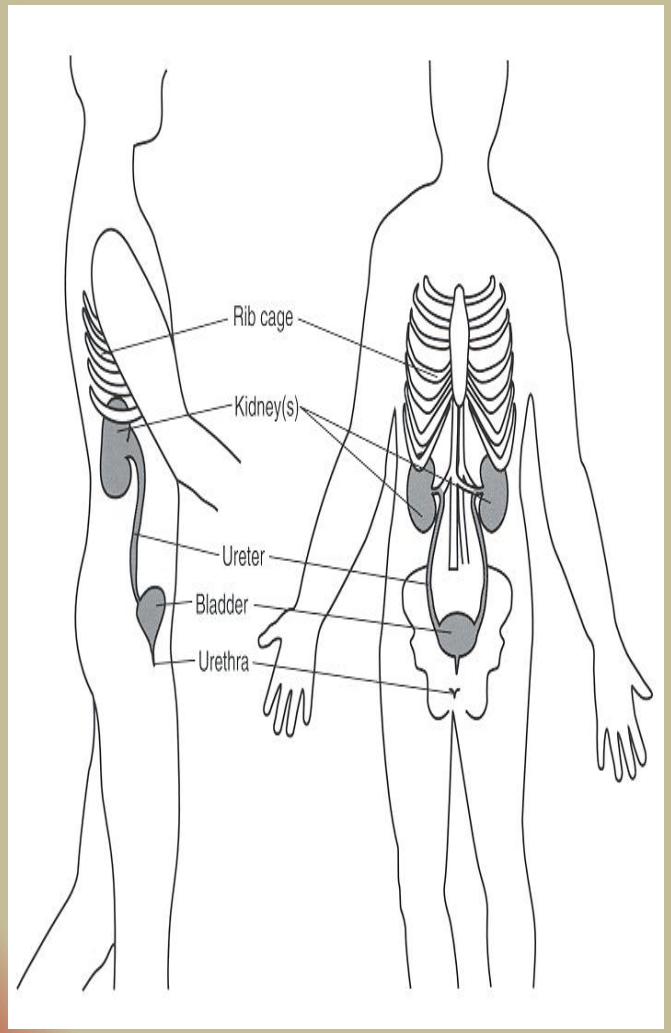
ARE THE **HARDEST WORKER** IN YOUR BODY



KIDNEYS HAVE NO VACATION

They work 24 hours a day, 7 days a week to clean the blood. Each day, **50 gallons** of blood are filtered through **140 miles** of kidney tubes and millions of filters, about four times as much as the amount that passes through any other organ.

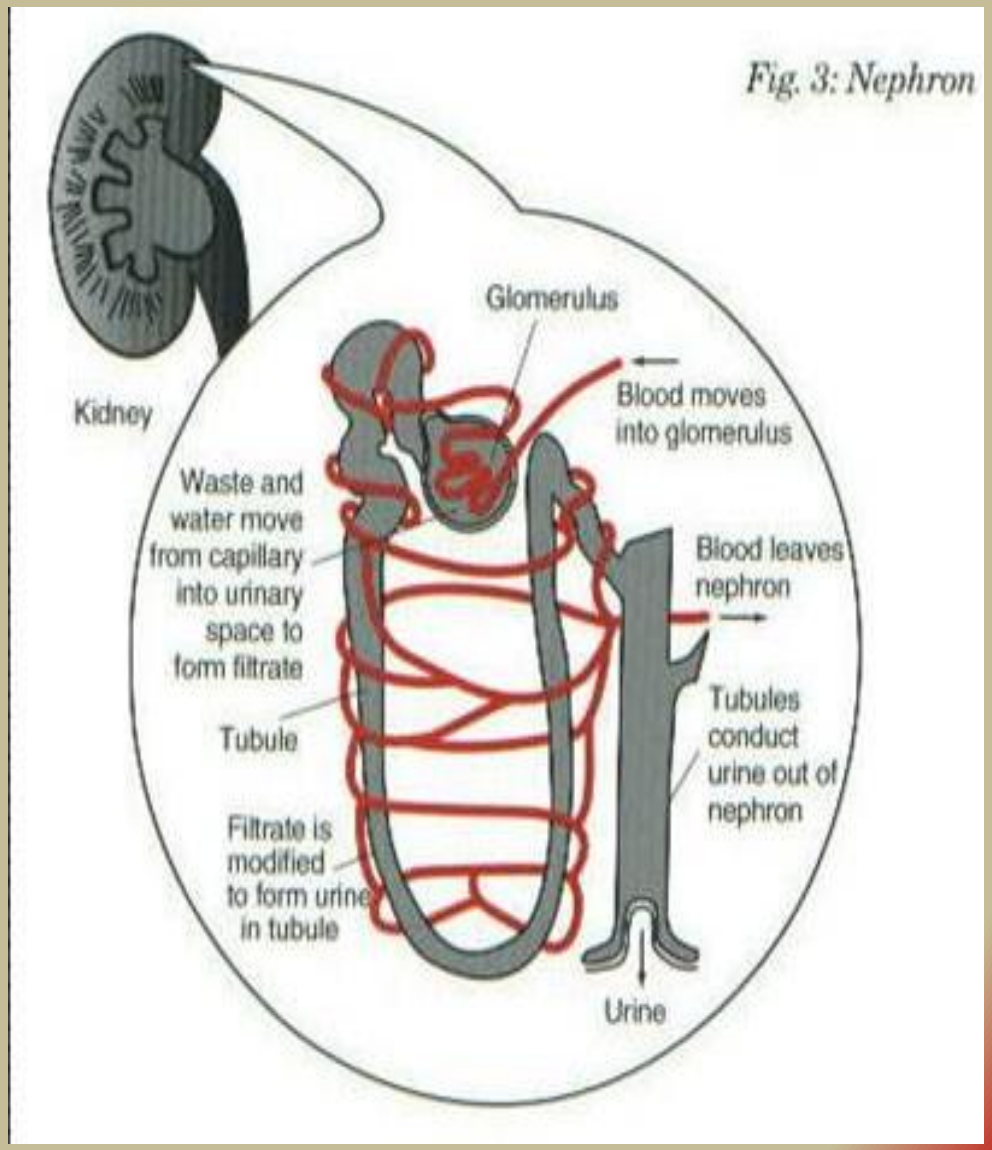
Anatomy Overview



- **Vital organs** size of closed fist
- Total blood supply circulates
  12 - 14 times an **hour**
- You can lose up to **90%** of kidney function without realizing it
- Most people can live nearly normal life with as little as **20%** of total kidney function

Kidney - Nephron

Each kidneys has about one million cleansing parts called **nephrons**



What do kidneys do?

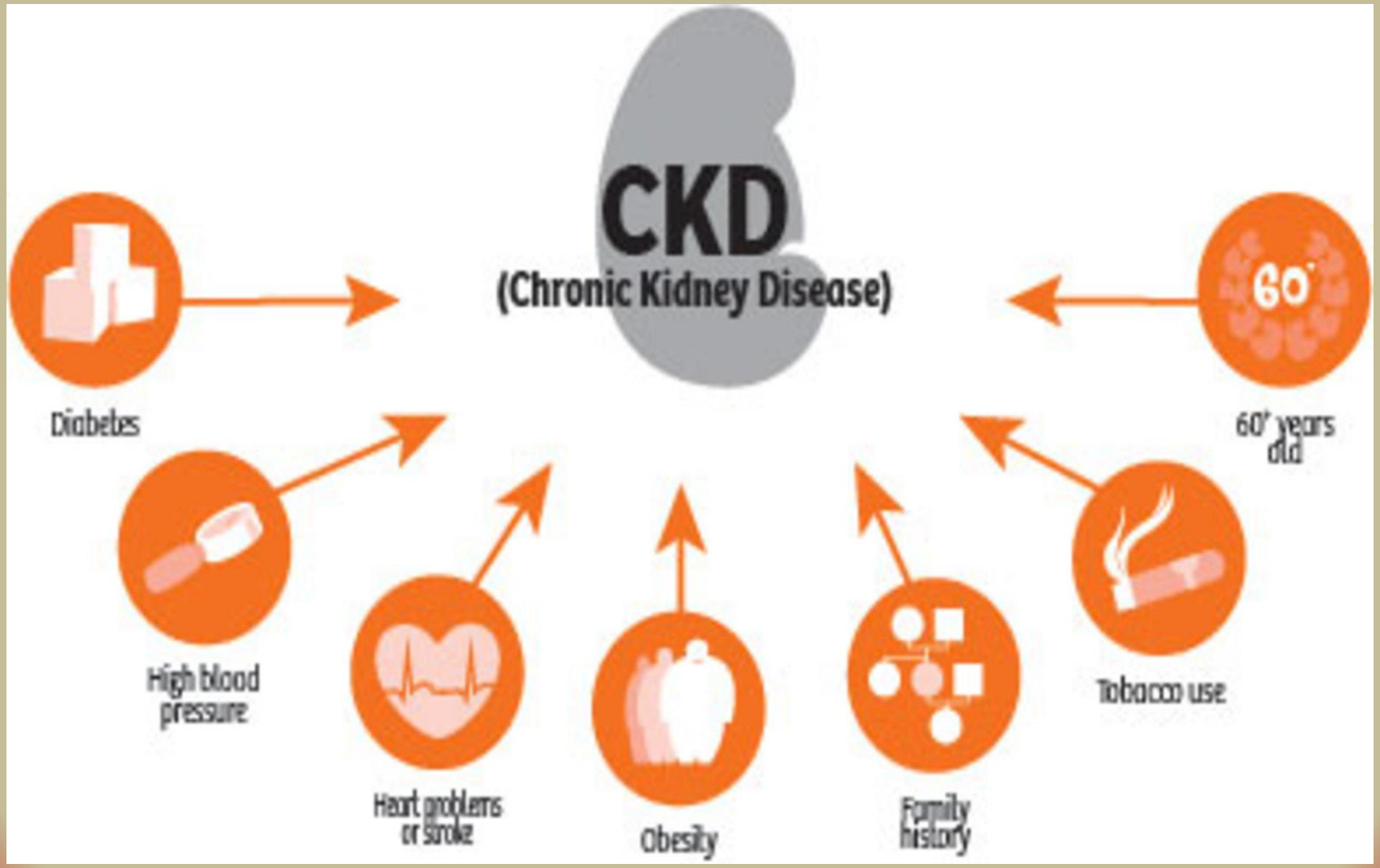
- Remove waste products from the blood 
- Remove extra fluid 
- Electrolyte & acid base balance
- Produce Hormones
  -  Regulate Blood pressure
  - Stimulate Red Blood Cell production 
  - Activate Vitamin D 

What is CKD?

- Gradual loss of kidney function present for more than 3 months.

- 5 Stages of CKD

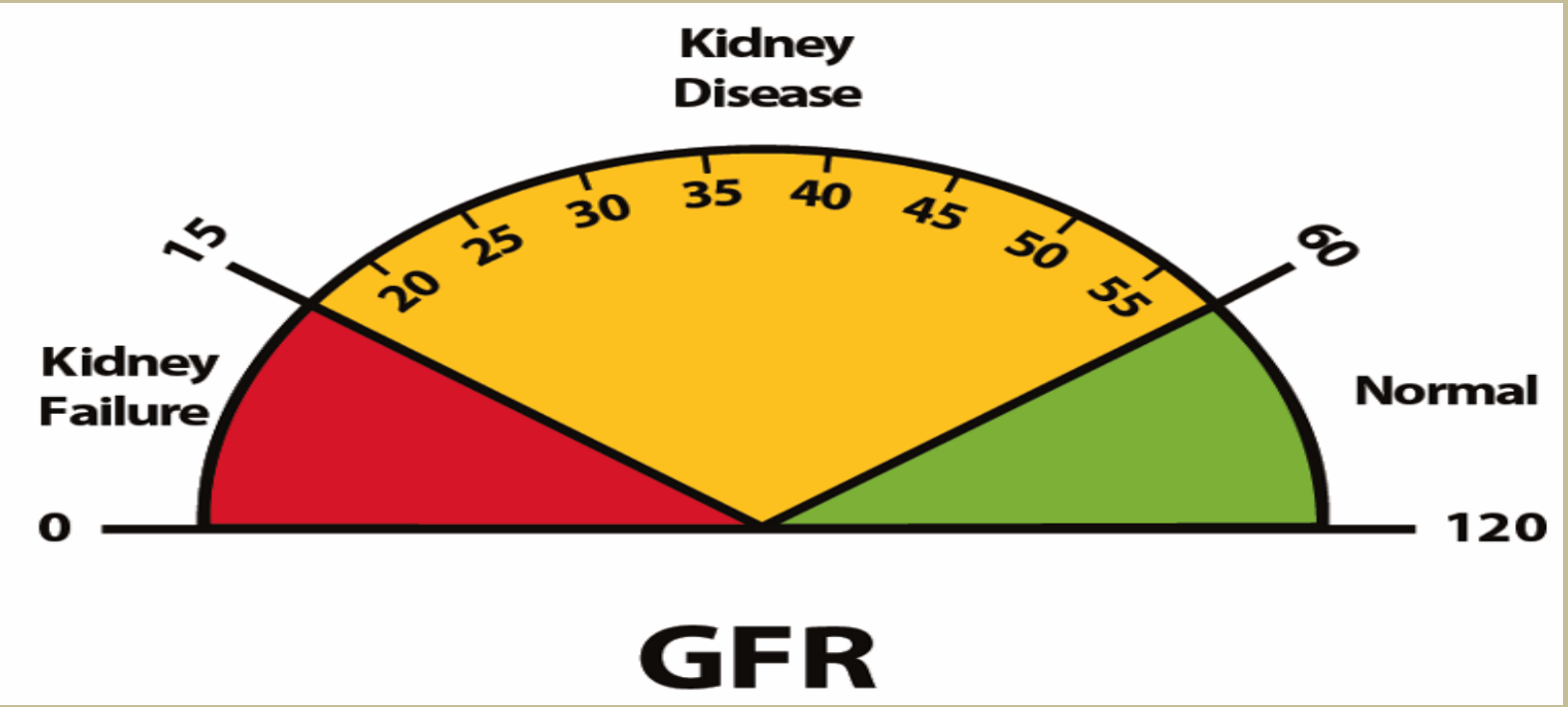
Causes of Chronic Kidney Disease



Other Causes of CKD

- Glomerulonephritis
- Systemic Lupus Erythematosus
- Polycystic Kidney Disease
- Pyelonephritis
- Abuse of over-the-counter and illegal drugs

How it all starts…
Detecting kidney failure



Glomerular filtration rate – measurement of how well kidneys are filtering blood.

Stages of CKD

Stage	Description/GFR	Focus of Care Signs / Symptoms
1	Kidney damage with normal or ↑ GFR>90	Diagnose and treat, slow progression, screen and control risk factors, treat comorbid conditions (CVD risk) Few or no symptoms
2	Mild ↓ GFR: 60-89	Estimate progression Few or no symptoms
3	Moderate ↓ GFR: 30-59	Evaluate and treat complications Few, if any symptoms. Anemia is present
4	Severe ↓ GFR: 15-29	Prepare for RRT, Epo, Phos. binders Few or no symptoms, anemia is present
5	Kidney Failure: GFR<15	Renal Replacement Therapy Uremic symptoms present

Lab Tests to Monitor Kidney Function

- Serum creatinine
- Estimated glomerular filtration rate (eGFR)
- Complete Blood Count (CBC)
- Urine Protein
- Blood Urea Nitrogen (BUN)
- Blood Electrolyte tests
  - Potassium
  - Sodium
  - Phosphate
  - Calcium
  - Magnesium

Additional Tests May Include:

Renal Ultrasound

Renal Biopsy

How can I protect My Kidneys?

- See a Nephrologist (Kidney Doctor)
- Control blood sugar (Diabetes)
- Control elevated blood pressure (Hypertension)
- Reduce protein in your diet (Renal Diet)
- Maintain health levels of fat (Cholesterol)
- Exercise
- Quit smoking
- Medications (Avoid nephrotoxic)
- Get educated
- Take active role in managing your health

Managing Kidney Disease

- Early detection is Key.
- The sooner you know you have kidney disease, the better!
- Work with a Nephrologist & care team to monitor your kidney health.
- Making changes when you have no symptoms is hard, but it's worth it.
- Work with a dietician to develop a meal plan.
- Take medications as prescribed.
- Ask questions

CKD Program

Nephrologists are the experts in managing CKD

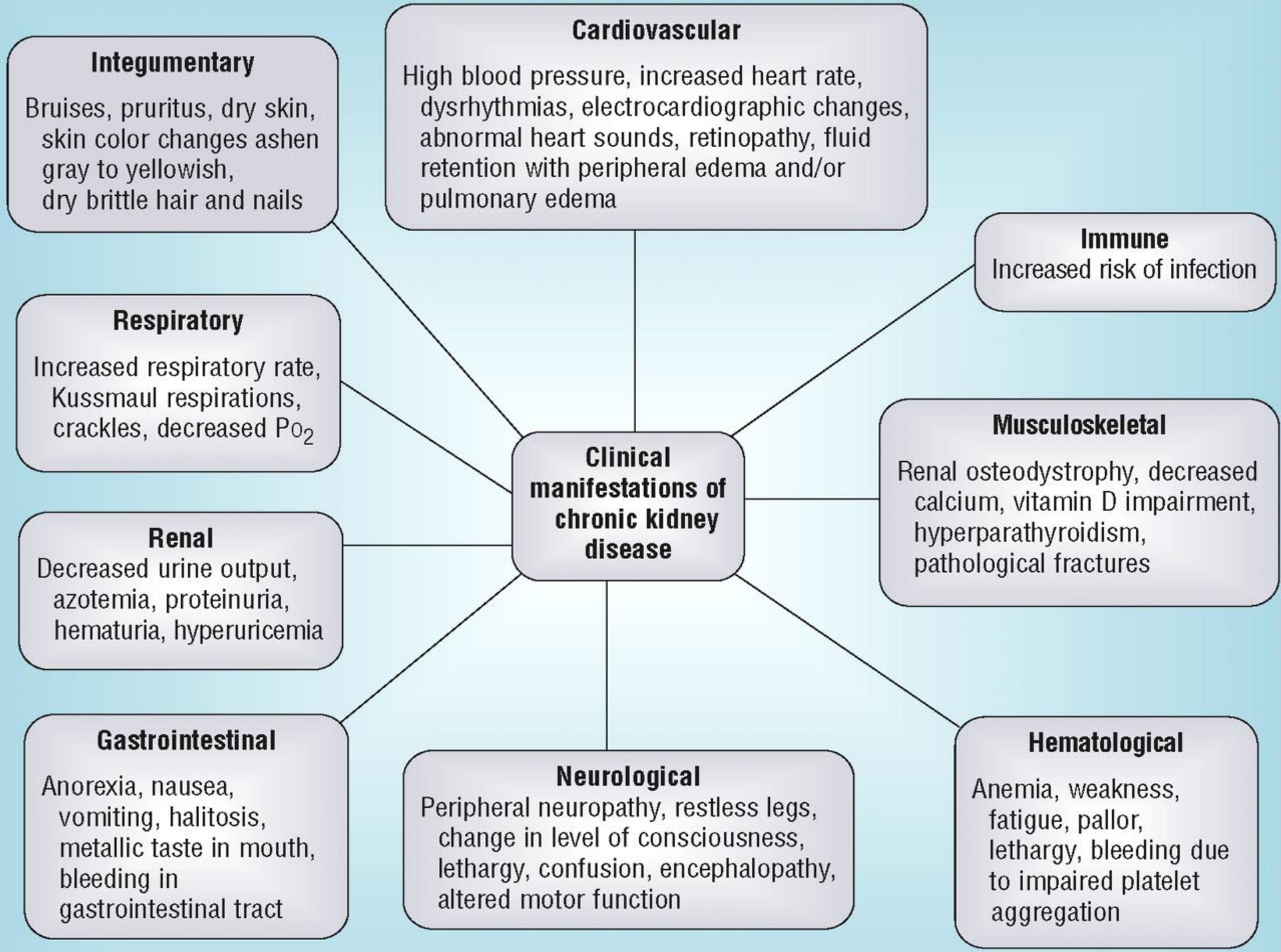
Desired outcome = decrease progression of CKD & adequate preparation for renal replacement therapy

- 34 Offices + 19 Satellite locations in Arizona
- 5 Outpatient Access Centers
- Kidney Disease Education
- Chronic Care Management
- In office Lab services
- Care Coordination Services
- Transplant Referral
- Renal Nutrition & Vitamin Services
- Research Program
- Anemia & Iron Management
- Vascular Access Program

Symptoms of CKD

You may experience when your kidneys don't work properly

- A change in how often you urinate
- Edema – swelling of face, feet, belly, & other areas
- Loss of appetite or nausea
- Bad taste in mouth
- Feeling tired or weak
- Headaches
- Dry, itchy skin
- Mental changes such as inability to concentrate or confusion


Clinical manifestations of chronic kidney disease
Integumentary
Bruises, pruritus, dry skin, skin color changes ashen gray to yellowish, dry brittle hair and nails
Cardiovascular
High blood pressure, increased heart rate, dysrhythmias, electrocardiographic changes, abnormal heart sounds, retinopathy, fluid retention with peripheral edema and/or pulmonary edema
Immune
Increased risk of infection
Respiratory
Increased respiratory rate, Kussmaul respirations, crackles, decreased Po_2
Musculoskeletal
Renal osteodystrophy, decreased calcium, vitamin D impairment, hyperparathyroidism, pathological fractures
Renal
Decreased urine output, azotemia, proteinuria, hematuria, hyperuricemia
Gastrointestinal
Anorexia, nausea, vomiting, halitosis, metallic taste in mouth, bleeding in gastrointestinal tract
Neurological
Peripheral neuropathy, restless legs, change in level of consciousness, lethargy, confusion, encephalopathy, altered motor function
Hematological
Anemia, weakness, fatigue, pallor, lethargy, bleeding due to impaired platelet aggregation

What happens if My Kidneys Fail?

When kidney function falls to 10-15% of normal, renal replacement therapy is required

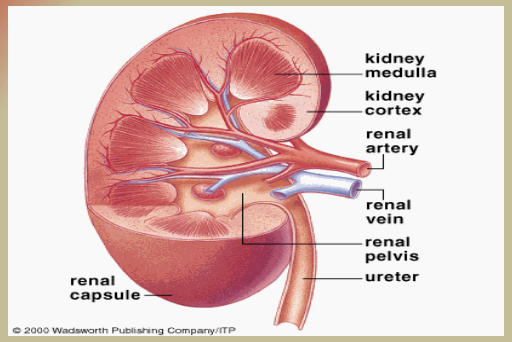
Renal Replacement Therapy Options

Hemodialysis

Peritoneal Dialysis

Kidney Transplant

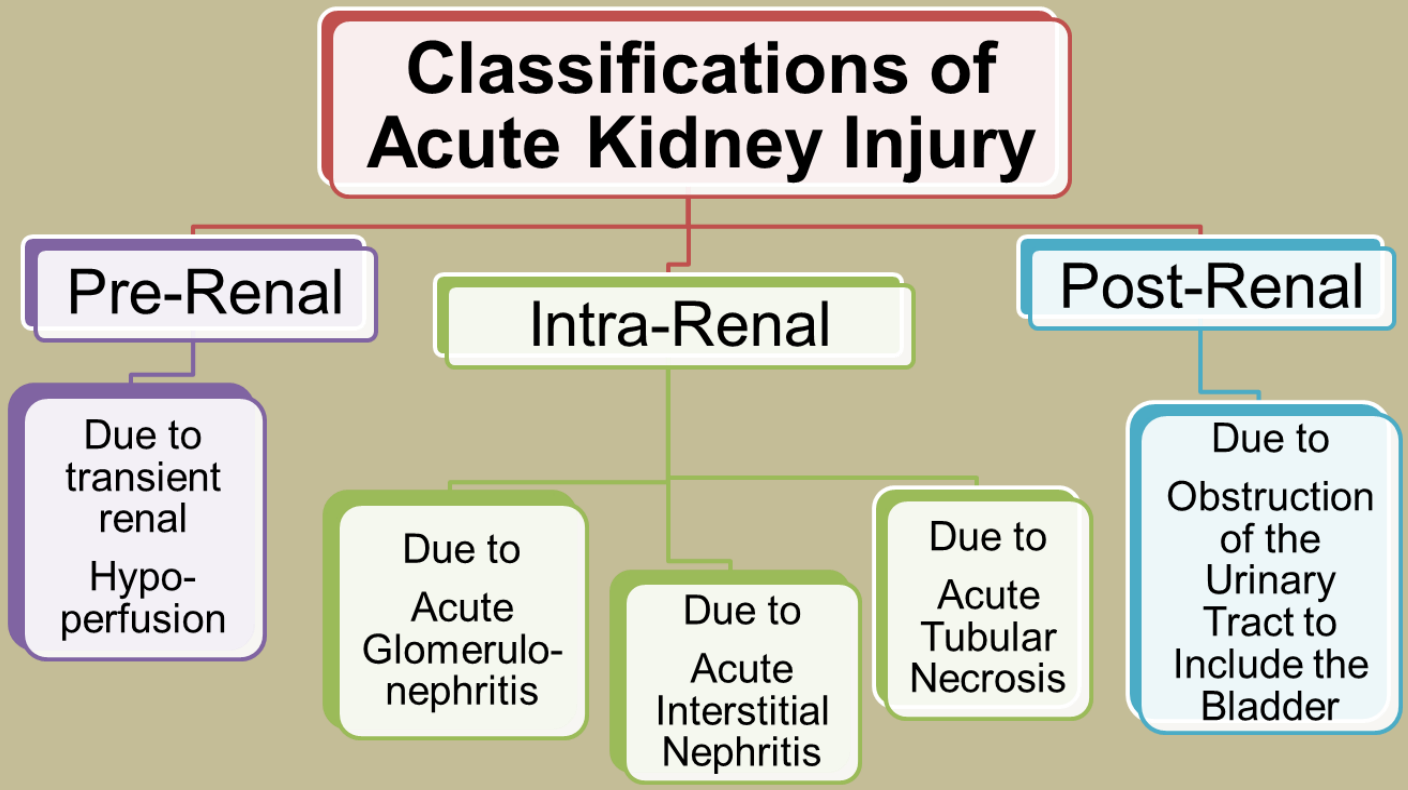
Palliative Care



Renal Failure

- Acute Kidney Injury (AKI)
  - Sudden onset and may be reversible
  - Can be caused by accidents, drugs or poisons
- End Stage Renal Disease (ESRD)
  - Develops slowly over time and is not reversible

Causes of Acute Kidney Injury



Pre- renal - reduced blood flow to the kidney
Intra -renal damage to kidney tissues, structure and function
Post -renal -obstruction in flow of urine form the kidney

Who Is At Risk for AKI?

- Elderly
- Septic
- Post-surgical (especially cardiovascular)
- Exposed to nephrotoxic agents
- Suffering from major trauma
- Experiencing Multiple Organ Dysfunction Syndrome (MODS) or Multisystem Organ Failure (MSOF)
- **“Acute on Chronic”**

What is End Stage Renal Disease?

- End Stage Renal Disease (ESRD) is permanent kidney damage due to injury or disease
  - Kidney function at 15% or less

Hemodialysis

- Cleans and filters blood
- Removes metabolic waste, toxins, and extra fluid
- Helps control blood pressure and the proper balance of electrolytes such as potassium, sodium, and chloride

Hemodialysis

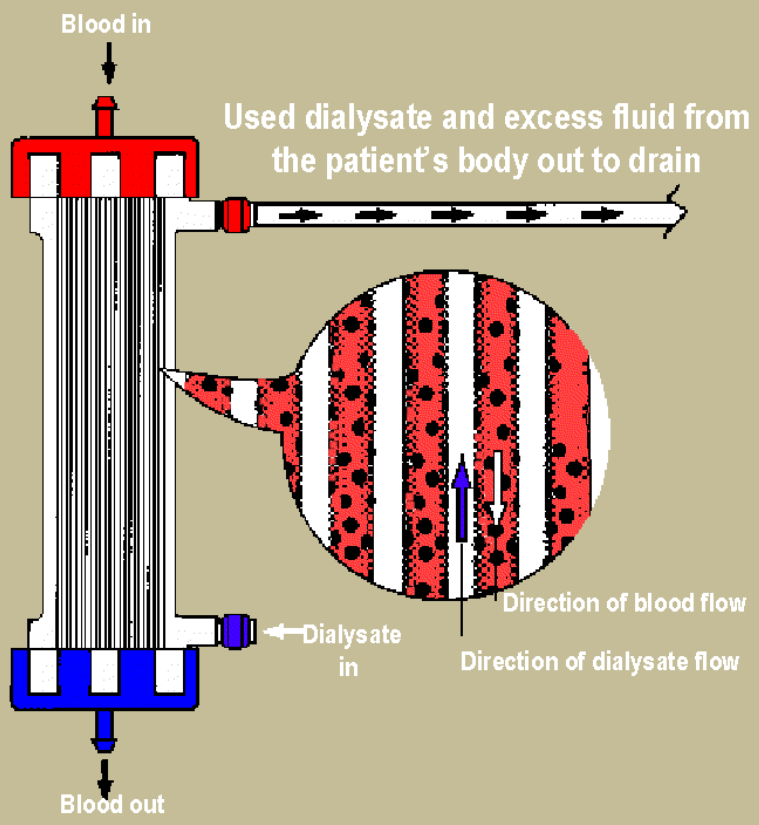
PROS

- Trained professionals with you at all times
- Socialization – you can interact with others on dialysis
- You don’t have to care for and store a machine
- Treatments are usually three times per week.

CONS

- Your treatments are scheduled by the dialysis clinic
- Needles required
- Dietary restrictions
- Difficult to travel

Dialysis - Hemo



- **How It Works**
  - During treatment blood travels from the patient through the dialyzer via needles and bloodlines
  - The dialyzer filters out wastes and extra fluids
  - The filtered blood flows through the bloodlines back to the patient
  - Requires a vascular access

Home Hemodialysis

PROS

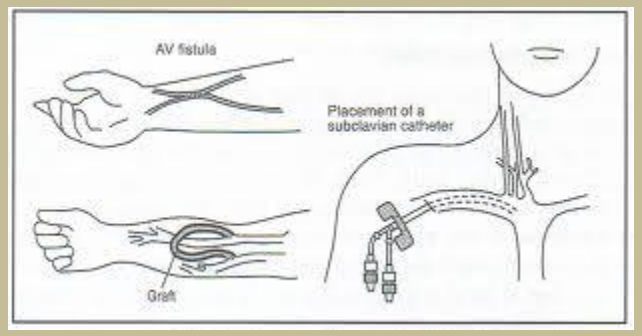
- The same person helps you each treatment
- You control your treatment schedule
- You don't have to travel to/from dialysis center three times/week.
- You have phone access to care team

CONS

- You & your partner will need to be trained for several weeks.
- You'll need to have room to store machine & supplies
- You are your partner will learn to troubleshoot emergencies

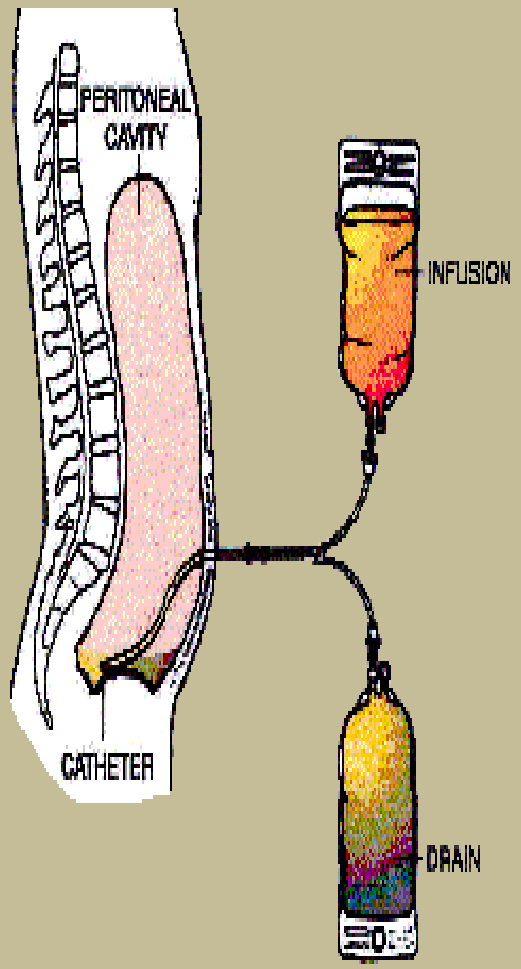
Vascular Access

Provides a way to safely remove & return your blood to your body during hemodialysis.



- **Fistula** – (Best Option) surgically connects your artery to vein, beneath the skin
- **Graft** – (Next option) surgically connects your vein and artery with an artificial tube.
- **Catheter** – (Short term option) sterile plastic tube inserted into a vein in the neck.

Peritoneal Dialysis



- Uses lining of abdomen (peritoneal membrane) to filter and clean blood
- Peritoneal catheter required.
  Soft tube is placed into the lower part of abdomen
- Cleansing solution (dialysate) travels through a special tube (PD catheter) into abdomen

Peritoneal Dialysis

PROS

- Increased freedom, can be done in many locations makes it easier to travel
- Schedule can be more flexible
- Fewer dietary restrictions
- No needles

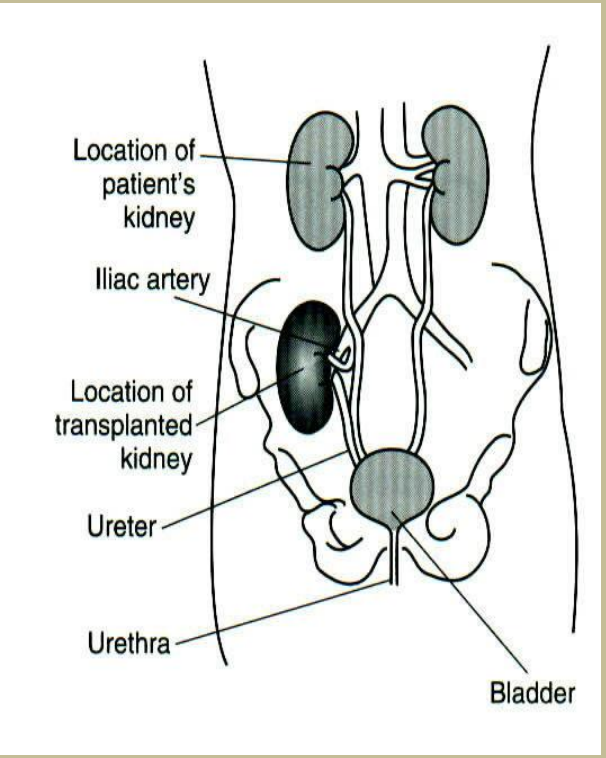
CONS

- Increase risk of infection (Peritonitis)
- Catheter in abdomen
- Treatments every 4-6 hours daily
- Need space to store supplies

Transplantation

- Surgically implanted kidney
- Donor Kidneys
  - Living donor - highest success rate. Any person that matches may choose to donate (donor may be related or non-related)
  - Cadaveric - organs from a person being kept on life support (declared brain dead)
- Extensive pre-transplant work-up to ensure the compatibility of donor and recipient

Transplantation



- Anti-suppressant drugs used post transplant to prevent rejection of the new kidney
- Follow-up checkups to monitor the patient's condition

Palliative Care or No Treatment

- **Palliative Care** – specialized type of care to help people living with CKD manage symptoms & stress while receiving treatment or NO TREATMENT.

- A family member or patient may choose **NO TREATMENT**
- Considerations
    - Other medical conditions
    - Age
    - Quality of life
- Death will result from NO TREATMENT

Keys to Success with CKD

3 keys to a long life with CKD

Positive Attitude

Get Educated

Take Action

The more you know about kidney disease and your health, the better you are able to make choices that are best for you and your family.


TIME FOR
REVIEW

How many adults in the US have chronic kidney disease?

- 200,000
- 600,000
- 1,000,000
- 12,000,000
- 30,000,000

You're at risk for kidney disease if you have?

- **Diabetes**
- **Family History of kidney failure**
- **High Blood Pressure**
- **All of the above**

Which of the following are main functions of your kidneys?

- **To clean the blood**
- **To support healthy bones and tissues**
- **To keep your blood pressure normal**
- **All the above**

What happens if your kidneys stop working?

- **You go on dialysis**
- **You need a kidney transplant**
- **Nothing**
- **Either the first or second option**

What can you do to keep your kidneys healthy?

- **Don't overuse over-the-counter painkillers**
- **Watch your blood pressure**
- **Eat healthy and exercise**
- **All of the above**

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References

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