

Managing Progressive CKD in People with Diabetes

Presented for IHS Division of Diabetes Treatment and Prevention

Andrew S Narva, MD
National Kidney Disease Education Program



U.S. Department of Health
and Human Services
National Institute of Health

NIDDK | NATIONAL INSTITUTE OF
DIABETES AND DIGESTIVE
AND KIDNEY DISEASES

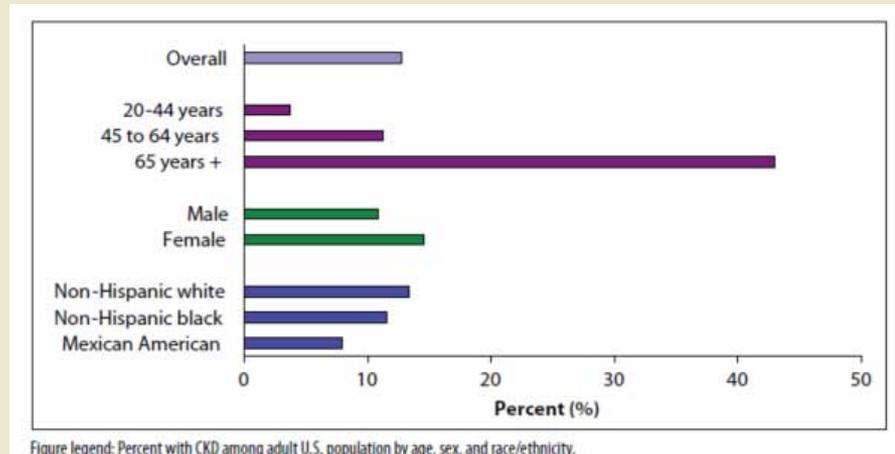
NKDEP
National Kidney Disease
Education Program

- Utilize lab tests for identifying and monitoring CKD and assessing risk for progression
- Formulate a strategy for improving CKD outcomes in the primary care setting.
- Integrate evidence-based care for patients with CKD into clinical practice.
- Review and locate tools for patient education tools for CKD.
- Identify and convey critical information for referral to nephrology

- Chronic Kidney Disease
 - Kidney function:
 - Glomerular filtration rate (GFR) < 60 mL/min/1.73 m² for > 3 months with or without kidney damage
 - AND/OR:
 - Kidney damage:
 - > 3 months, with or without decreased GFR, manifested by either:
 - Pathological abnormalities
 - Markers of kidney damage, i.e., proteinuria (albuminuria):
 - Urine albumin-to-creatinine ratio (UACR) > 30 mg/g

Reference: National Kidney Foundation. K/DOQI Clinical Practice Guidelines for Chronic Kidney Disease: Evaluation, Classification and Stratification. American Journal of Kidney Diseases. 2002; 39: (Suppl 1) S18.

More than 10% of U.S. Adults may have CKD

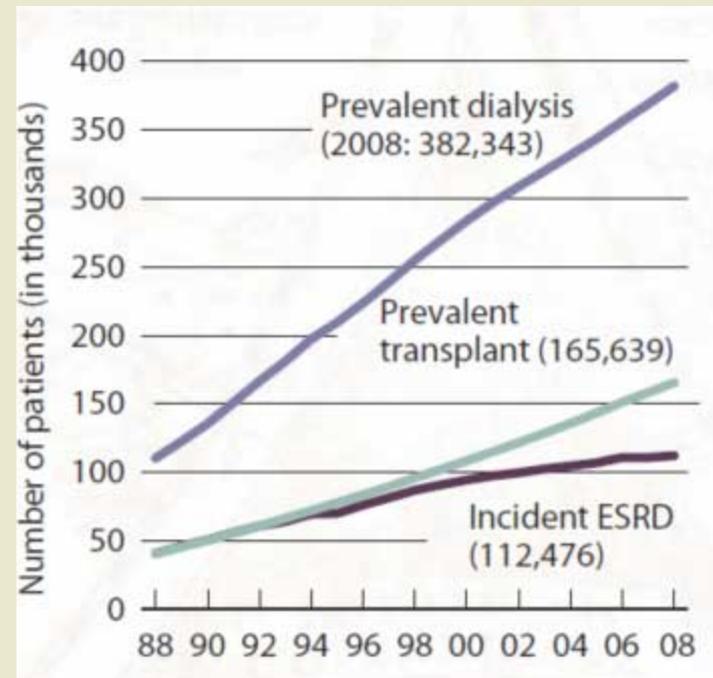


- More than 20 million, aged 20 years or older
- Kidney function declines with age

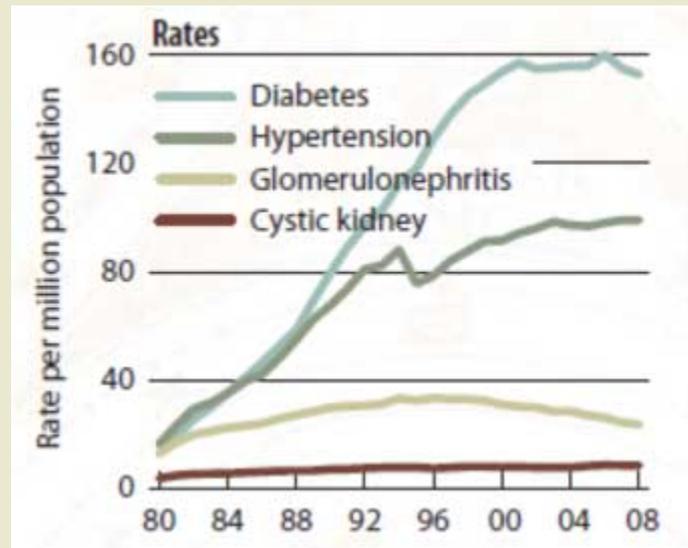
Reference: <http://www.cdc.gov/diabetes/pubs/factsheets/kidney.htm>
(CDC, 2010)

- Prevalent dialysis population
 - Increased 3.6% in 2008
 - Up 34.7% since 2000
- Transplant population
 - Increased 4.4% in 2008
- Incident population
 - Increased 1.4% in 2008

Reference: USRDS Annual Data Report (NIDDK, 2010)



Diabetes is the Leading Cause of ESRD, Followed by Hypertension



Reference: USRDS Annual Data Report (NIDDK, 2010)

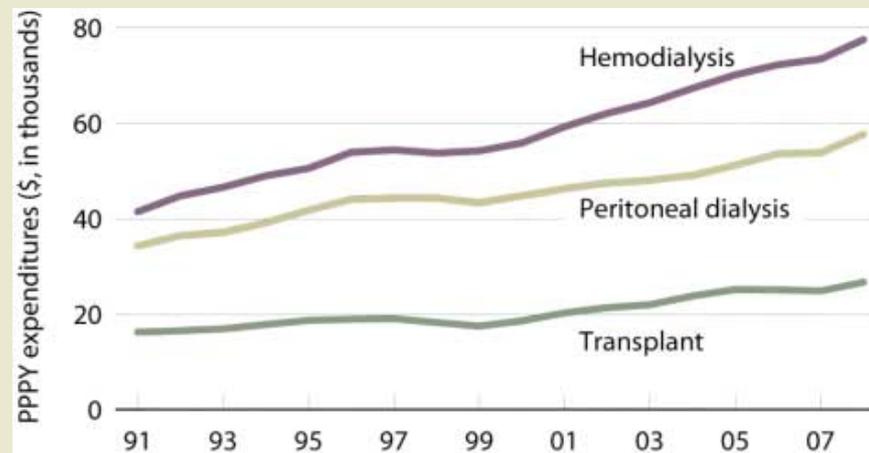
	Incidence	Prevalence	Deaths	Transplants
Total	5967	19201	3263	1011
AI/AN	474	2475	285	57
AZ	2433	7932	1362	
AZ AI/AN	291	1366	165	

Net 15 Annual Report, 2011

Delaying the need for Renal Replacement Therapy (RRT) may be cost-effective.

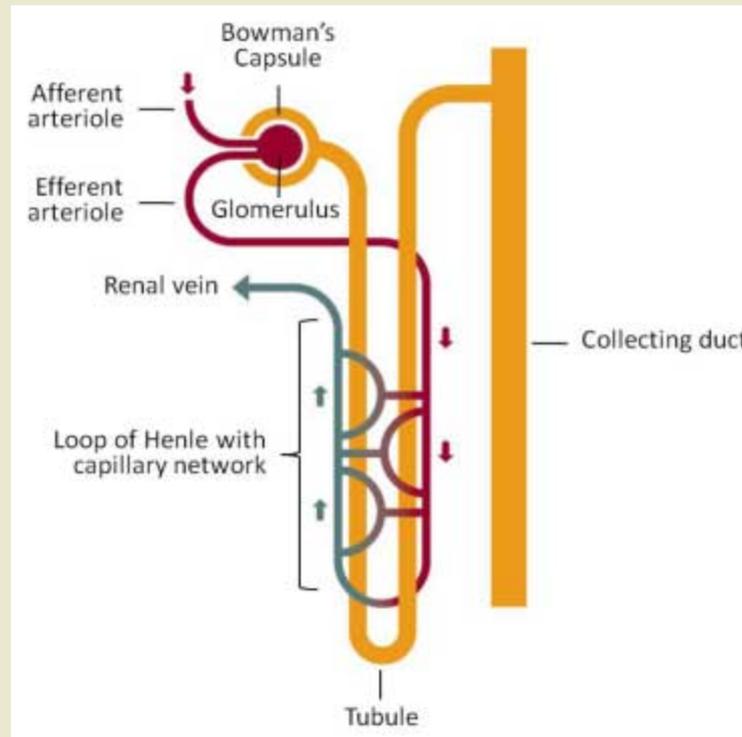
- Total Medicare ESRD expenditures, per person per year (PPPY) in 2008:
 - Hemodialysis - \$77,506
 - Peritoneal Dialysis - \$57,639
 - Transplant - \$26,668 - (after 1st year)

Reference: USRDS Annual Data Report (NIDDK, 2009)



- Identify and Monitor CKD.

CKD Usually Means Fewer Functioning Nephrons



Each Kidney has about One Million Nephrons; Slow Loss may not be Noticeable

- We have a large physiologic reserve.
- Slow, progressive loss of functioning nephrons may not be noticeable.
- The person with CKD may not feel different until more than three quarters of kidney function is lost.

What is the Glomerular Filtration Rate (GFR)?

- GFR is equal to the sum of the filtration rates in all of the functioning nephrons.
- GFR is not routinely measured in clinical settings.
- Estimation of the GFR (eGFR) gives a rough measure of the number of functioning nephrons.

What is the GFR?

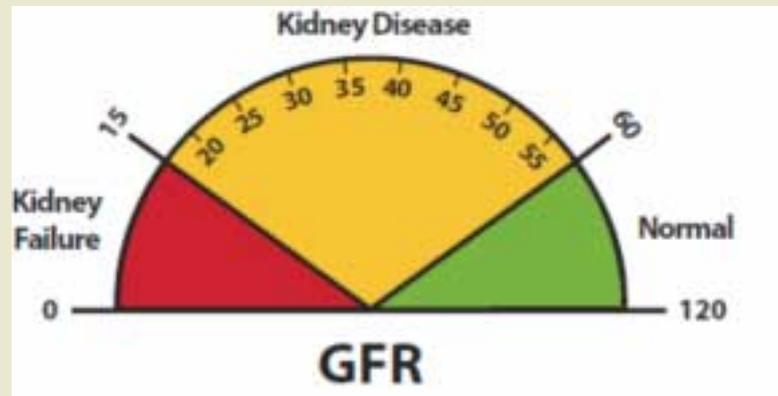
- Cardiac output (CO) = 6 L/min
- x 20% of CO goes to kidneys = 1.2 L/min
- x Plasma is 50% blood volume = 600 mL/min
- x Filtration Fraction of 20% = 120 mL/min

- The Modification of Diet in Renal Disease (MDRD) study equation is widely used for estimating GFR.
- The variables are serum creatinine, age, race, and gender.
- The estimate is normalized to body surface area.
 - $eGFR \text{ (mL/min/1.73 m}^2\text{)} = 175 \times (\text{Scr})^{-1.154} \times (\text{Age})^{-0.203}$
 - $\times (0.742 \text{ if female}) \times (1.212 \text{ if African American})$

Reference: Stevens et al. *J Am Soc Nephrol* 2007; 18:2749-2757; Poggio et al. *Am J Kid Dis* 2005; 46:242-252; Verhave et al. *Am J Kid Dis* 2005; 46:233-241

- eGFR is not the measured GFR.
- The formula to estimate GFR was derived from a population-based study.
- The eGFR is a good estimate of the risk of having decreased kidney function
- Like other risk predictors, when it is the solitary indicator it should be used cautiously, especially when diagnosing “disease”

- Normal: > 60 mL/min/1.73 m²
- Kidney disease: 15–59 mL/min/1.73 m²
- Kidney failure: < 15 mL/min/m²



- Do not use with:
 - Rapidly changing creatinine levels:
 - Example: acute kidney injury
 - Extremes in muscle mass, body size, or altered diet patterns
 - Medications that interfere with the measurement of serum creatinine

- Estimating equations are less reliable at higher GFR
- Kidney function declines with age
- While there is an association between decreased eGFR and morbidity, even in elderly, this association does not mean causality
- Use diagnostic terms denoting disease with caution, especially in older people without evidence of kidney damage (e.g. elderly with eGFR 55)

- Use urine albumin-to-creatinine ratio (UACR) to assess and monitor.

- Urine albumin measures albumin in the urine.
- An abnormal urine albumin level is a marker for glomerular disease, including diabetes.
- Urine albumin is a marker for cardiovascular disease and is a hypothesized marker of generalized endothelial dysfunction.

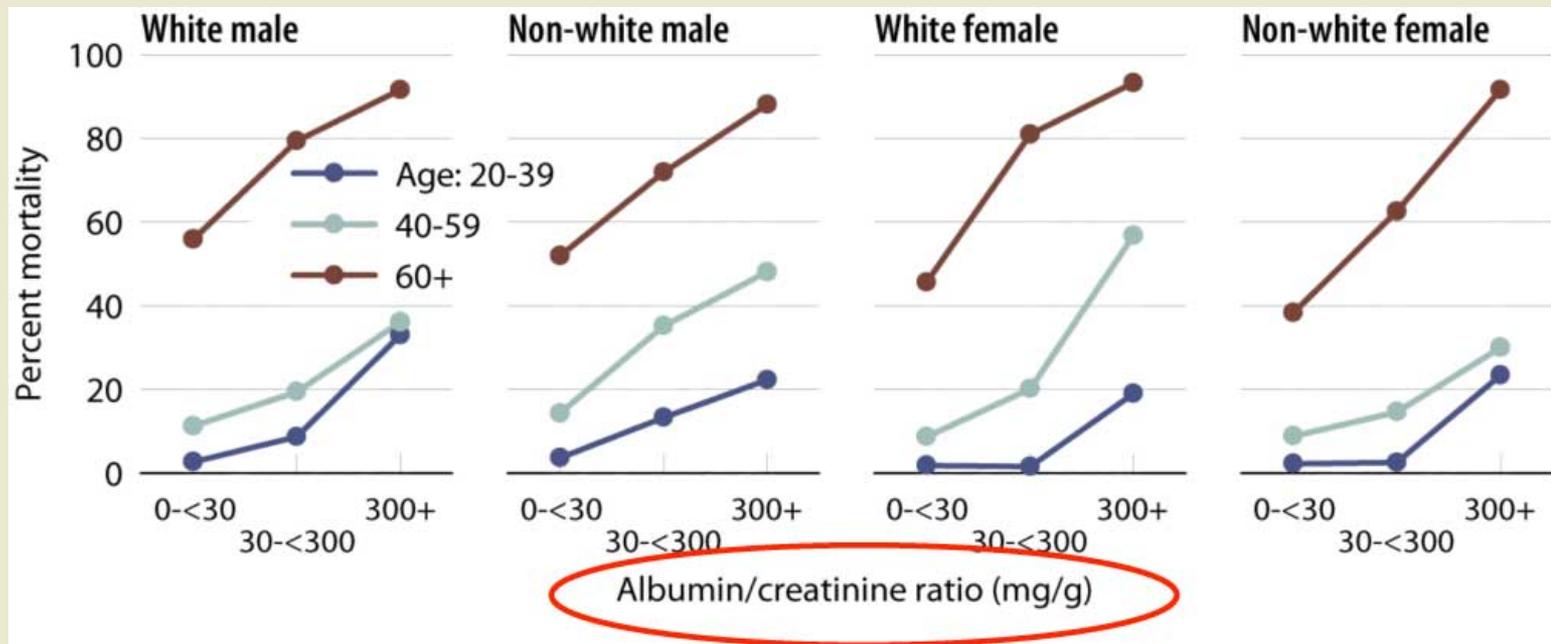
Urine Albumin Results are used for Screening, Diagnosing, and Treating CKD

- Standard of diabetes care (annual screen)
- Diagnosis
 - Forty percent of people are identified with CKD on the basis of urine albumin alone.
- Prognosis
 - Important prognostic marker, especially in diabetes mellitus (DM)
 - Used to monitor and guide therapy
- Tool for patient education and self-management (such as A1C or eGFR)

Albuminuria is Associated with Mortality

- NHANES 1988–1994 participants

Reference: *USRDS Annual Data Report* (NIDDK, 2010)



- UACR uses a spot urine sample.
- In adults, ratio of urine albumin to creatinine correlates closely to total albumin excretion.
- Ratio is between two measured substances (not dipstick).
- Urine albumin (mg/dL) = UACR (mg/g) \cong Albumin excretion in mg/day
- Urine creatinine (g/dL)
- UACR of 30 mg/g is generally the most widely used cutoff for “normal.”

Reference:

http://nkdep.nih.gov/resources/uacr_gfr_quickreference.htm

- UACR is a continuous variable.
- The term albuminuria describes all levels of urine albumin.
- The term microalbuminuria describes abnormal urine albumin levels not detected by dipstick test.
 - 30 mg/g – 300 mg/g
- The term macroalbuminuria describes urine albumin > 300 mg/g.

Your urine albumin result on _____ was _____.

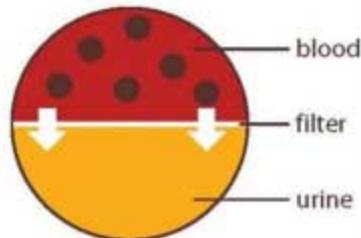
Date

- A urine albumin result *below 30* is normal.
- A urine albumin result *above 30* may mean kidney disease.

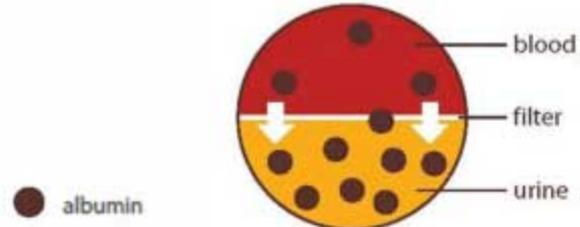
What is urine albumin?

Albumin is a protein found in the blood. A healthy kidney does not let albumin pass into the urine. A damaged kidney lets some albumin pass into the urine. The less albumin in your urine, the better.

Inside a *healthy* kidney



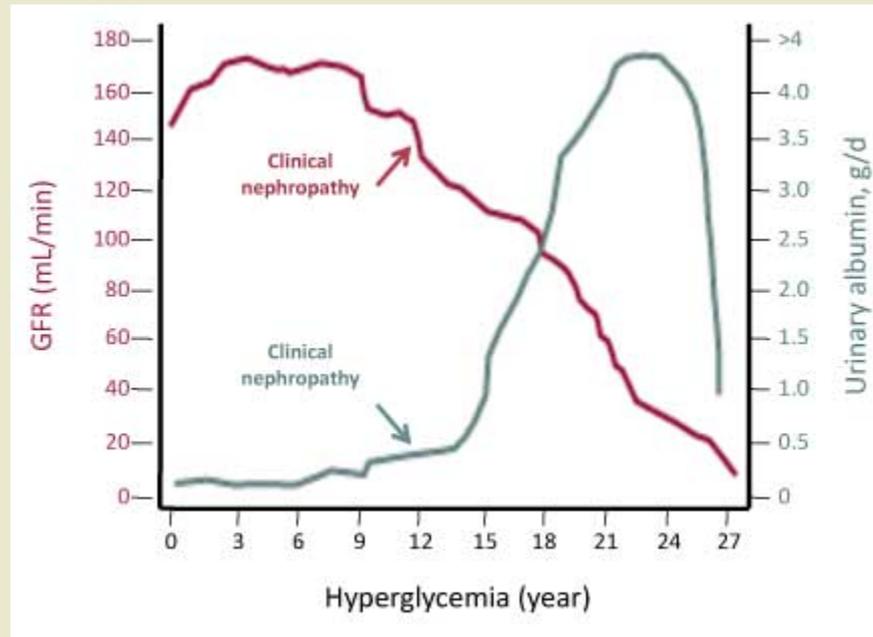
Inside a *damaged* kidney



- Hyperfiltration
 - The initial response to hyperglycemia is an increase in GFR, followed by slow decline.
- Hypertrophy of glomerulus and tubule
 - Nephrons may be damaged or destroyed.
- Diabetic kidney disease generally, but not always, associated with progressive albuminuria.
 - Monitor eGFR and UACR.

Reference: Molitch et al., 2010; Retnakaran et al., 2006

Natural History of Diabetic Nephropathy: Hyperglycemia Causes Hyperfiltration, may be Followed by Albuminuria



Reference: Adapted from Friedman, 1999

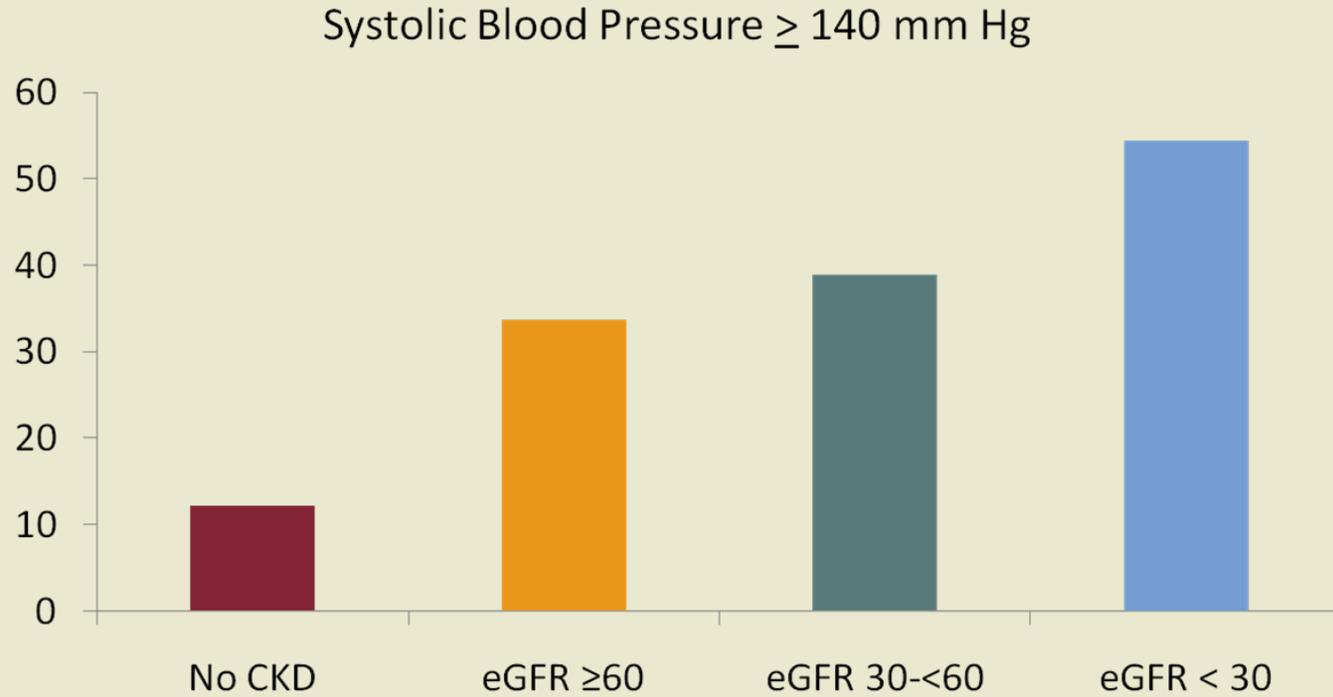
- Ensure the diagnosis is correct
- Monitor progression
- Implement appropriate therapy to slow progression
- Screen for CKD complications
- Educate the patient about CKD
- Prepare appropriately for kidney failure

- eGFR is probably too narrow a basis on which to make diagnosis and prognosis (stage)
- Use of numbered stages promises more than it delivers. Instead use descriptive terms: moderate, severe, kidney failure
- Don't use measures which are not proven to associated with risk to inflate burden of CKD
- Expect a multifactor predictor similar to Framingham
 - eGFR, UACR, age, DM status, BP control, new biomarkers

- Hypertension, Diabetes, Urine Albumin,
- And Cardiovascular Disease

CKD Complications and Risk for CVD Increase as Kidney Function Declines

- Fewer functioning nephrons may mean:
 - Blood pressure is harder to control.
 - More frequent low sugars for people with diabetes.
 - Inadequate erythropoietin and anemia.
 - Inadequate activation of vitamin D (abnormal calcium and phosphorus metabolism) and bone disease and vascular calcification.
 - Toxins build up in the blood, including acid (hydrogen), nitrogen, phosphorus and potassium.



NHANES 1999–2006

Reference: Adapted from USRDS 2009 Annual Data Report

- Target of < 130/80 mmHg has been recommended but without strong evidence.
- Target of <140/90 mmHg appears best supported.
- Uncontrolled hypertension (systolic blood pressure > 160) is a major challenge.

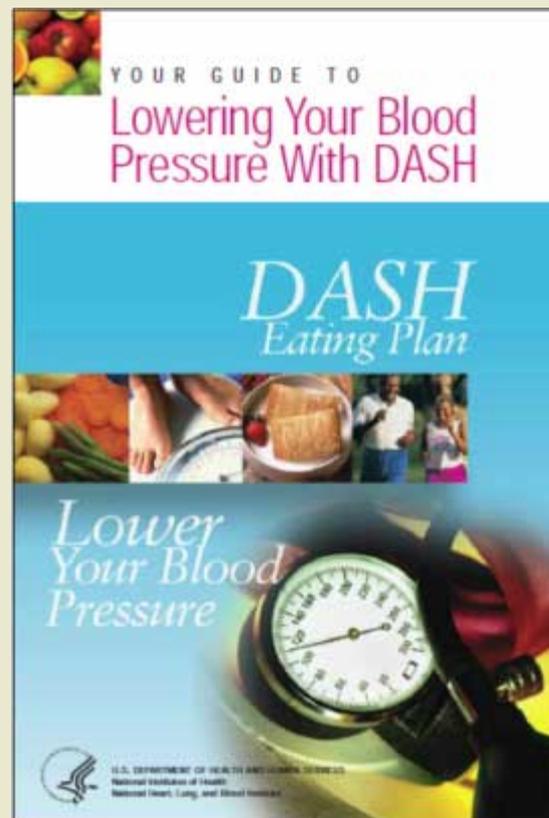
Lifestyle Modifications help Lower Blood Pressure in the General Population

Modification	Recommendation	Lowers Systolic Blood Pressure by (Range)
Weight reduction	<ul style="list-style-type: none"> •Maintain normal body weight •Body mass index (BMI) 18.5–24.9 kg/m² 	5–20 mm Hg / ↓ 10 kg ~ 4 mm Hg / ↓ 5 kg
DASH	<ul style="list-style-type: none"> •Increase potassium (fruits and vegetables) and calcium (dairy) •DASH may be too high in protein, potassium and phosphorus for CKD 	8–14 mm Hg
Physical activity	<ul style="list-style-type: none"> •At least 30 minutes most days 	4–9 mm Hg
Moderate alcohol consumption	<ul style="list-style-type: none"> •Women: ≤ 1 drink per day •Men: ≤ 2 drinks per day 	2–4 mm Hg
Sodium restriction	<ul style="list-style-type: none"> •2,300 mg per day •1,500 mg per day for hypertension, diabetes, and CKD 	2–8 mm Hg

Reference: Chobanian et al., 2003; Neter et al., 2003; Dietary Guidelines, 2010

Reference:

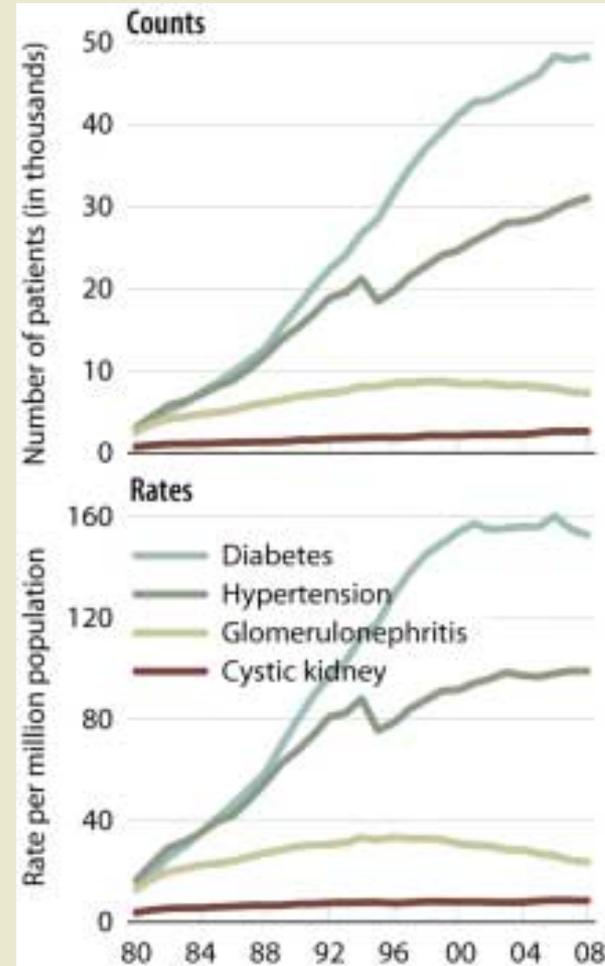
http://www.nhlbi.nih.gov/health/public/heart/hbp/dash/new_dash.pdf



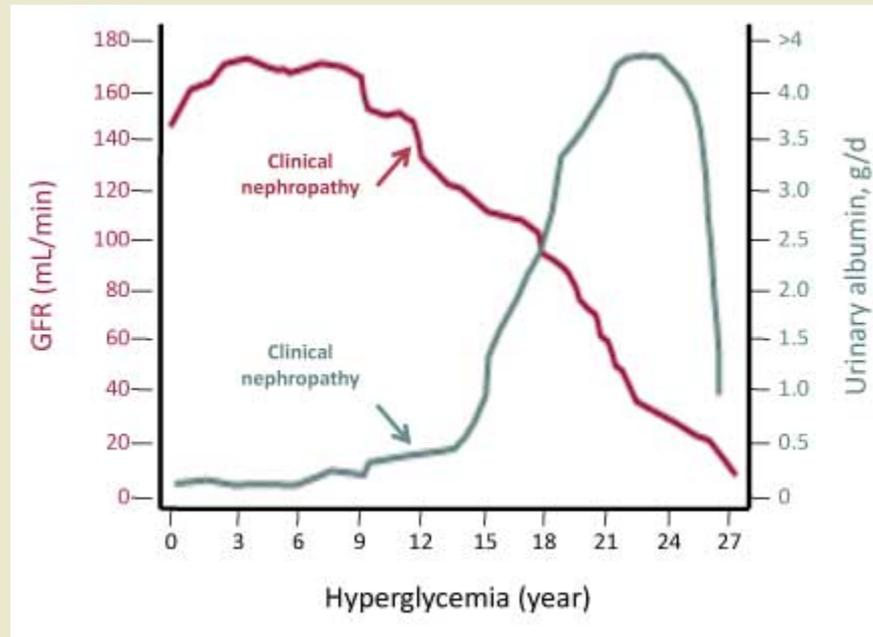
Summary: The DASH Diet may help Prevent CKD, but it is not Generally Used with CKD

- DASH and DASH-Sodium patterns lower blood pressure.
- The lowest sodium level is the most effective, even with the usual (control) diet.
- The DASH pattern may be too high in protein, potassium, and phosphorus for CKD.

- Incidence



Natural History of Diabetic Nephropathy: Hyperglycemia Causes Hyperfiltration, may be Followed by Albuminuria



Reference: Adapted from Friedman, 1999

- There is evidence that control of newly diagnosed diabetes may help prevent CKD:
 - Type 1 diabetes (DM 1):
 - Diabetes Control and Complications Trial (DCCT)
 - Type 2 diabetes (DM 2):
 - United Kingdom Prospective Diabetes Study (UKPDS)

UKPDS: Control of Newly Diagnosed Type 2 DM may Lower Risk of Albuminuria

- Newly diagnosed, first 10 years
 - Median age: 54 years (48–60 years)
- Intensive control defined as A1C < 7.0% (compared to 7.9%)
- 34% reduction in albuminuria
- Long-term data not as clear

Good Control of Diabetes of Long Duration may not be as Effective in Slowing CKD

- The evidence is not strong.
- Control still matters for other organs.
- Advanced Glycated Endproducts (AGEs) may have altered or destroyed slow turnover proteins (glomerular barrier).

- Goal for the general population:
 - A1C < 7%
- Less stringent goal may be appropriate for:
 - Frequent severe hypoglycemia
 - Limited life expectancy
 - Advanced microvascular (CKD) or macrovascular complications

- Dietary protein may increase GFR and renal blood flow rates. Animal protein may have greater effect than plant protein.
- Dietary protein is a source of nitrogen, phosphorus, potassium, and metabolic acids that need to be filtered and excreted by the kidneys.
- Animal protein intake may be a risk factor for increased urine albumin excretion in hypertension and diabetes.

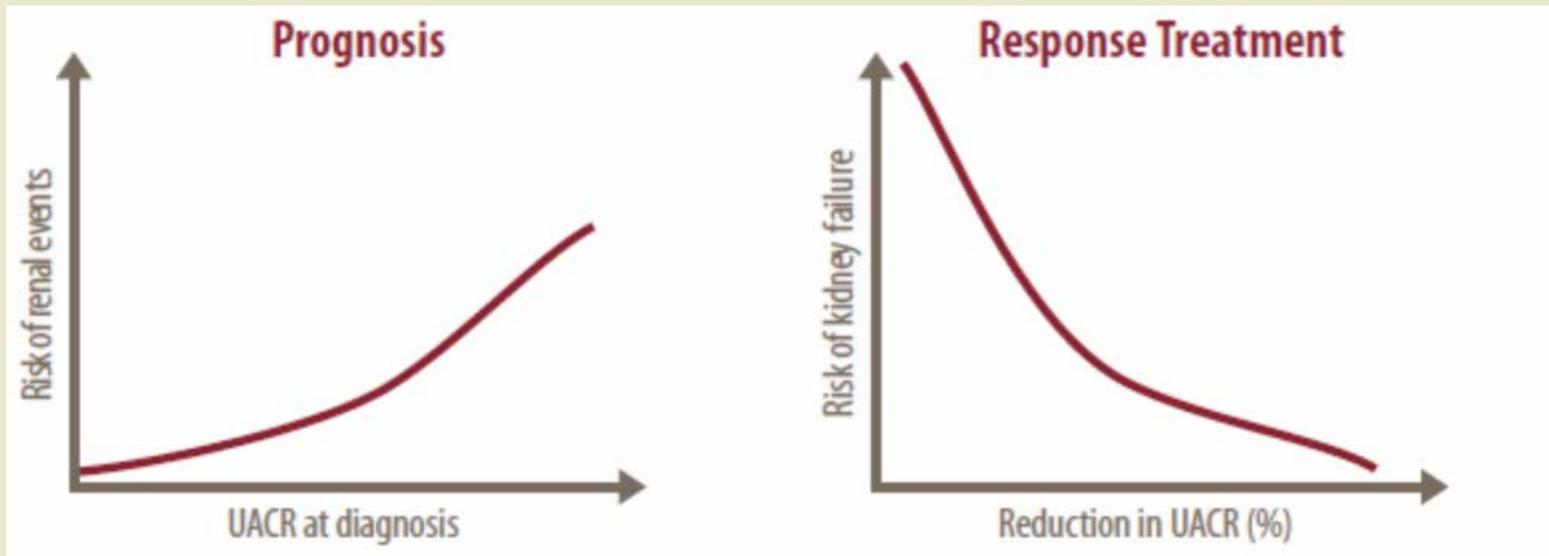
- RDA = 0.8 g protein/kg body weight (wt)
- American Diabetes Association (2008) recommendations:
 - Normal kidney function: 15–20% protein calories (usual)
 - Early CKD: “reduction” to 0.8–1.0 g/kg body wt
 - Advanced CKD: 0.8 g/kg body wt
- American Dietetic Association Evidence Library for Chronic Kidney Disease (accessed 2/4/2011):
 - 0.8–0.9 g/kg body wt
 - Protein-restriction may improve urine albumin (albuminuria)

- Spontaneous Improvement or Increased Frequency of Hypoglycemia May Indicate CKD is Progressing.

- Known risk factors:
 - Hypertension
 - Diabetes
 - Smoking
 - Obesity
- Possible risk factors:
 - High sodium intake
 - Excessive protein intake
 - Hyperlipidemia
 - Inflammation

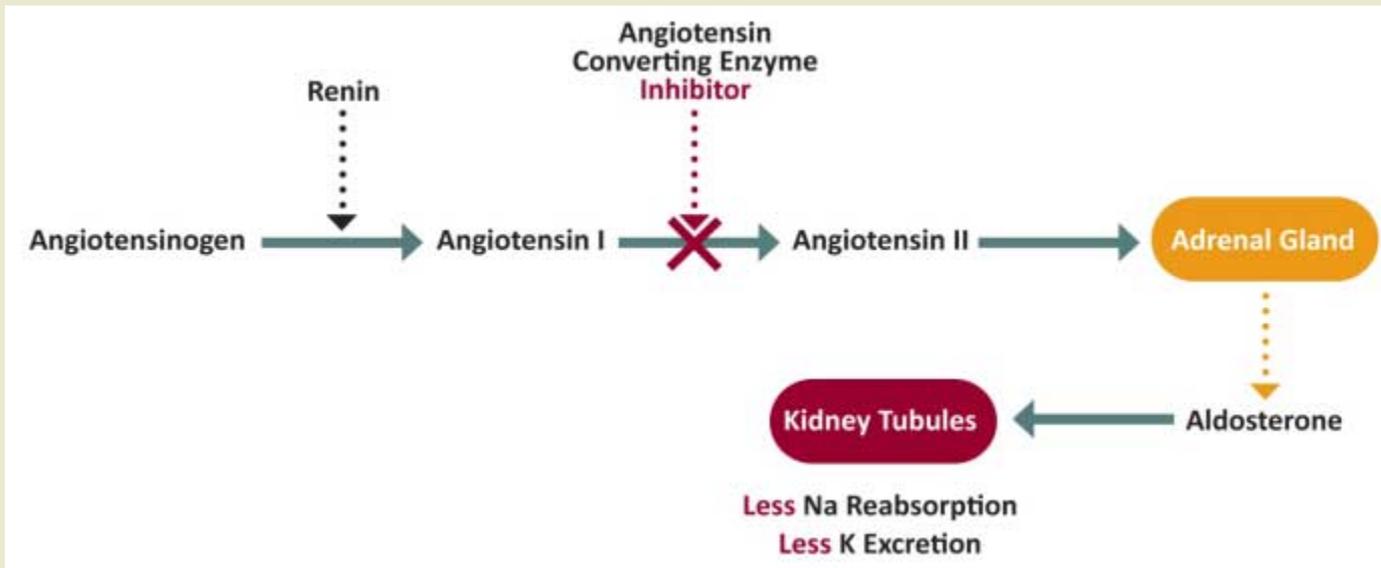
Reference: De Jong & Brenner, 2004

- Chronic Renal Insufficiency Cohort Study RENAAL



- Their effects are beyond blood pressure control.
- They also reduce protein in the urine.
- Sometimes these medications are prescribed to lower urine albumin levels in normotensive people.

ACEi Medications Block the RAAS and Increase the risk for Hyperkalemia



Potassium Restriction is not Indicated in the Absence of Hyperkalemia

- Specific level of eGFR does not determine need for dietary potassium restriction.
- Restriction is to help achieve and maintain a safe serum potassium level (< 5 mEq/L).
- The level of potassium restriction should be individualized.

Intentional Weight Loss is Associated with Decreased Proteinuria

- Literature review showed weight loss was associated with decreased proteinuria.
 - Dietary restrictions
 - Exercise
 - Anti-obesity medications
 - Bariatric surgery
- No data to evaluate effect on CKD progression.

- In the Netherlands, higher sodium intake was associated with increased urine albumin excretion.
- In a 2006 literature review, increasing salt consumption was associated with worsening urine albumin.

- Control blood pressure
- Reduce sodium intake
- Achieve good control of diabetes early; may help prevent albuminuria
- Reduce weight (if obese)
- Reduce protein intake, if excessive
- Achieve tobacco cessation

- CVD is the leading cause of morbidity and mortality in people with CKD.

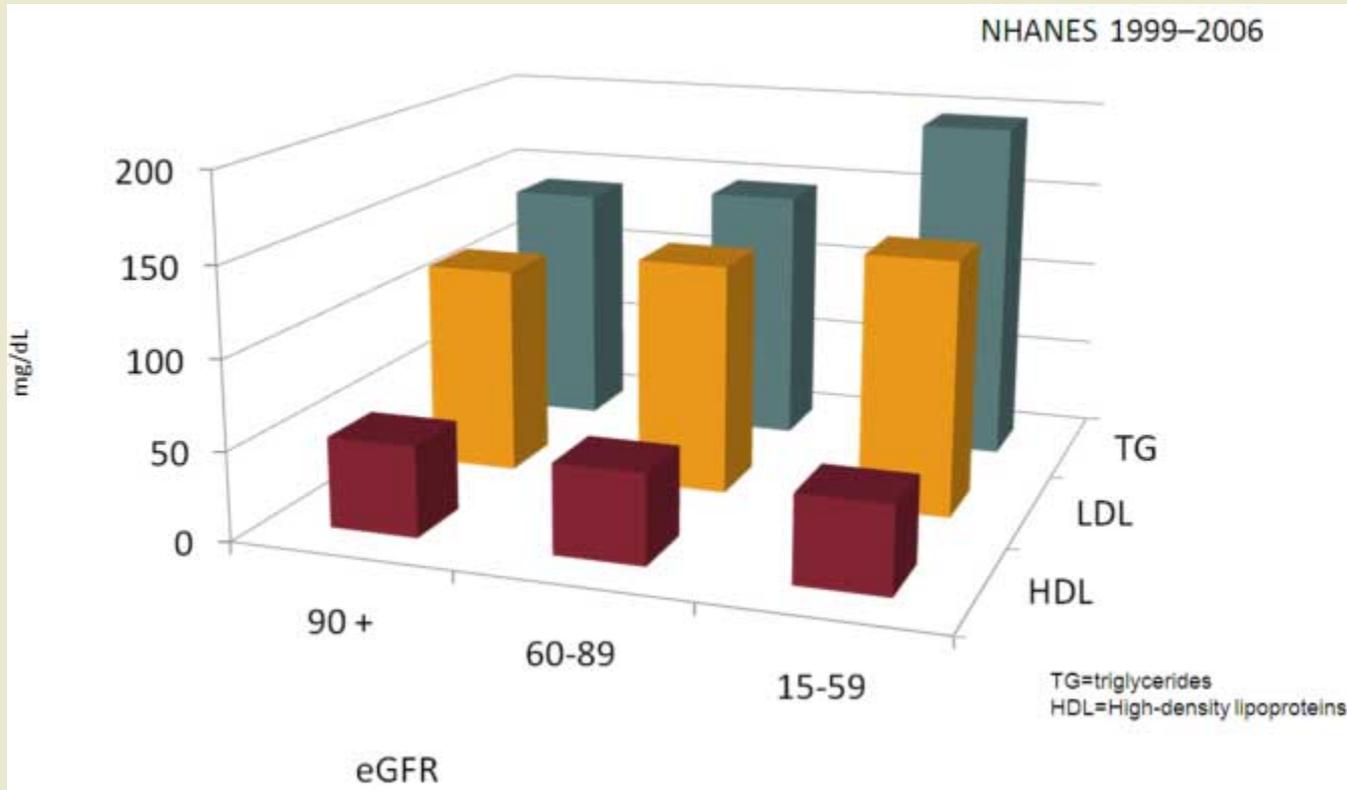
Traditional risk factors:

- Hypertension
- Diabetes
- Dyslipidemia
- Smoking
- Age
- Inflammation

Nontraditional risk factors:

- Albuminuria
- Anemia
- Abnormal metabolism of calcium and phosphorus

Lipid Abnormalities may Increase as eGFR Declines



Reference: Adapted from Astor et al., 2008

- Statins reduce hepatic cholesterol synthesis.
- Statins significantly reduce all-cause and CVD mortality in persons with CKD.
- Their use does not appear to slow CKD progression but may reduce proteinuria.
- Monitor for potential side effects.
- Muscle toxicity or elevated liver function tests may be seen with statin use.

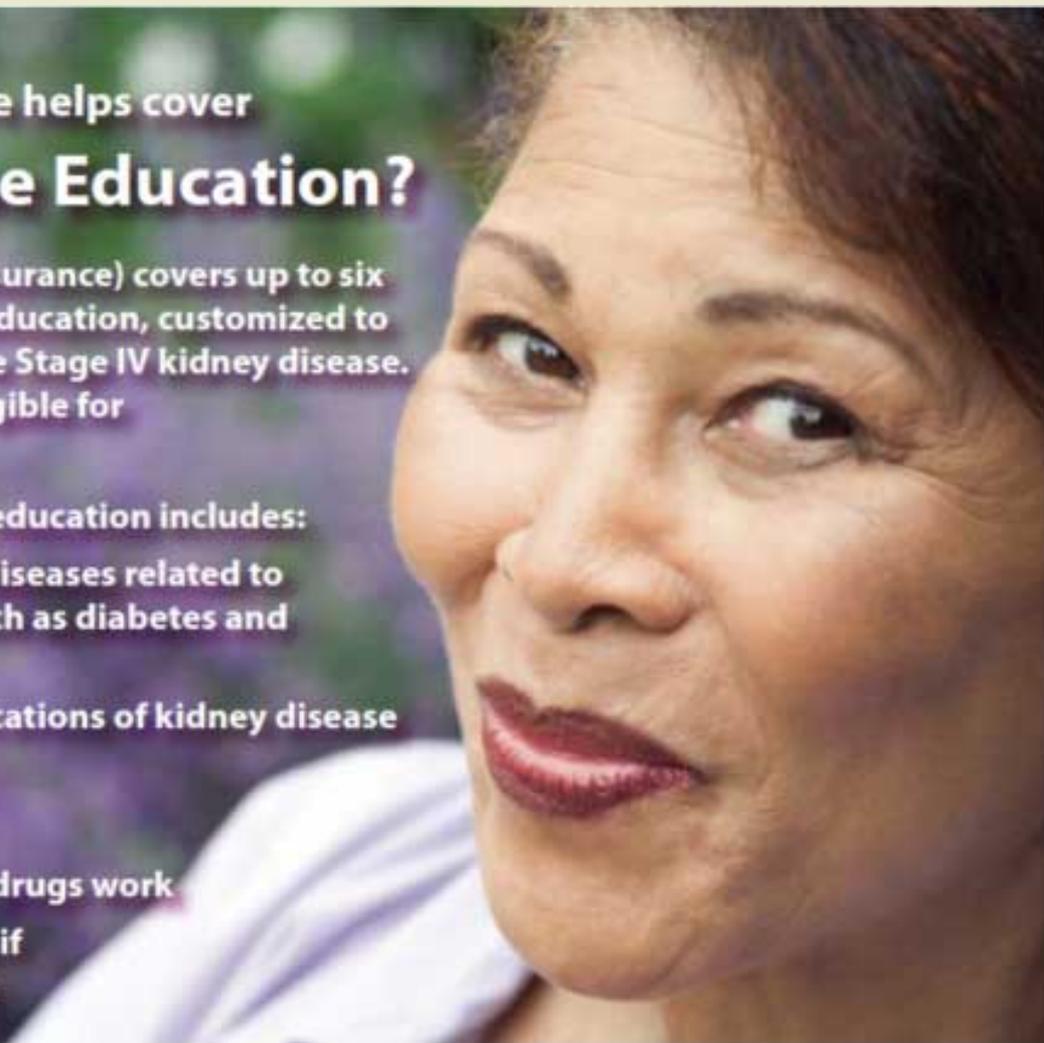
- Anemia:
 - Inadequate erythropoietin and iron
 - Hemoglobin and iron indices
- Hyperkalemia:
 - Limit dietary potassium when serum level is elevated.
- Hypoalbuminemia:
 - Poor oral intake (spontaneous reduction in protein)
 - Inflammation

- Metabolic acidosis:
 - Maintaining serum CO₂ > 22 mEq/L may be beneficial.
 - Animal protein is a source of metabolic acids.
 - Acidosis may be treated with supplemental bicarbonate.
- Bone disease in CKD:
 - Calcium, phosphorus, vitamin D, parathyroid hormone:
 - Use corrected calcium with hypoalbuminemia.
 - Vitamin D supplementation may increase risk of hypercalcemia and hyperphosphatemia.

- Management changes as CKD develops and progresses to kidney failure.

- Kidneys cannot maintain homeostasis.
- Kidney failure is associated with fluid, electrolyte, and hormonal imbalances and metabolic abnormalities.
- End-stage renal disease (ESRD) means patient is on dialysis or has a kidney transplant.

- eGFR < 30
- Medicare B:
 - Individual pays 20%, deductible applies
- Qualified providers: physicians, physician assistants, nurse practitioners, and clinical nurse specialists
- Up to six sessions covered



Did you know Medicare helps cover **Kidney Disease Education?**

Medicare Part B (Medical Insurance) covers up to six sessions of kidney disease education, customized to meet your needs, if you have Stage IV kidney disease. Ask your doctor if you're eligible for these important sessions.

Here's what kidney disease education includes:

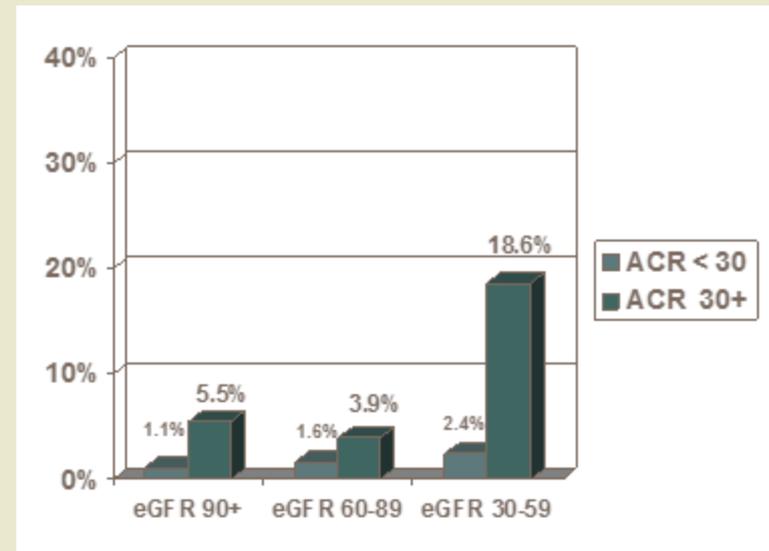
- How to manage other diseases related to your kidney disease such as diabetes and high blood pressure
- How to prevent complications of kidney disease
- How the kidneys work
- What to eat and drink
- How your prescription drugs work
- What options you have if your kidneys get worse

- CKD remains underdiagnosed.
- Implementation of recommended care is poor.
- Many clinicians feel inadequately educated:
 - Uncertain about how to interpret diagnostic tests
 - Unclear about clinical recommendations
 - Low confidence in their ability to successfully manage CKD
 - Indications for, and process of, referral poorly defined

“Have you ever been told by a doctor or other health care professional that you had weak or failing kidneys?”

- NHANES 1999-2000 4101 participants:
 - < 20% of patients with moderate to severe CKD said yes.
 - Most had seen a physician within the past year.

Adapted from: Coresh, et. al.
JASN 2005



Limited Awareness & Objective Knowledge N=401

Unaware of CKD diagnosis	31%
Do not understand CKD implications, e.g. heart disease	34%
Do not understand kidney functions, e.g. urine production	34%
Do not understand terminology, GFR	32%

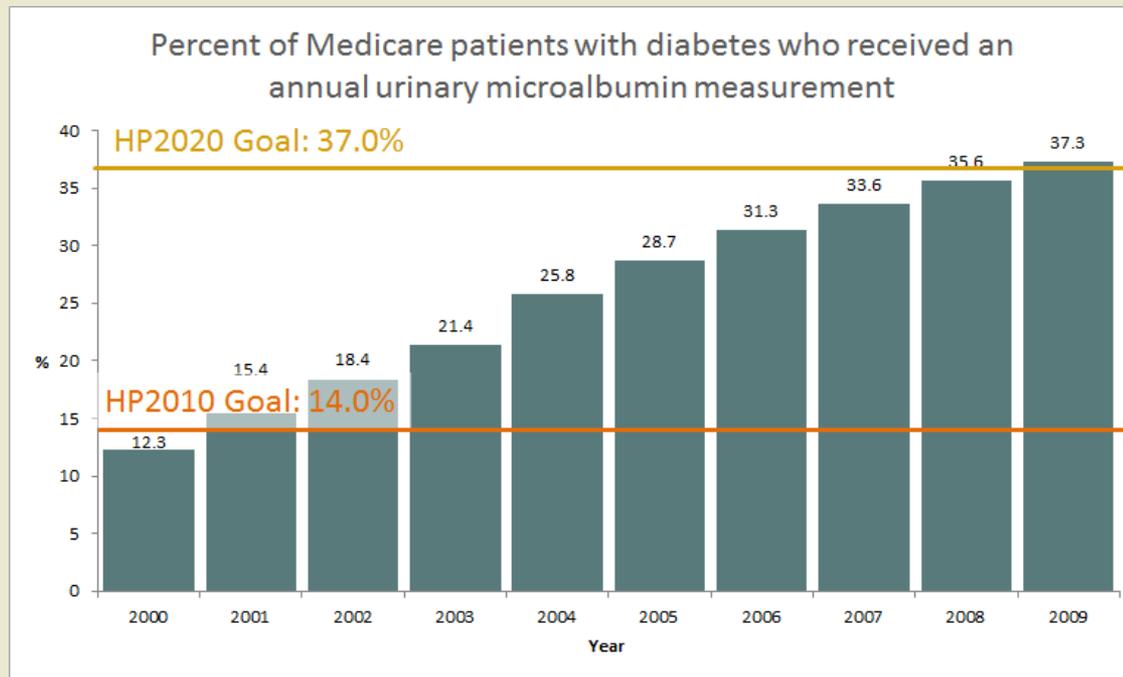
Low Self-Rating Perceived Knowledge N=676

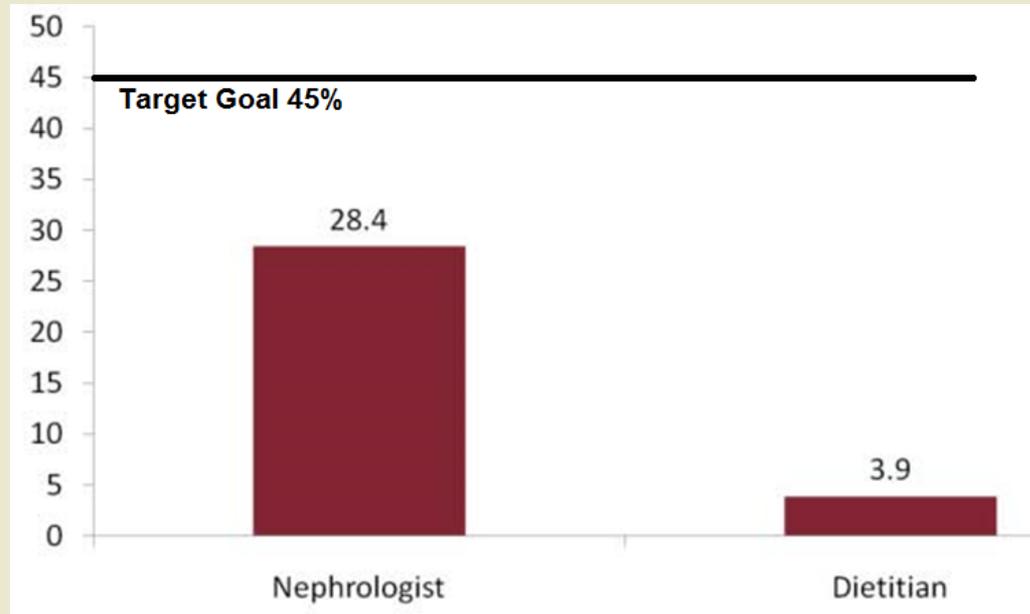
No Knowledge of Hemodialysis / Peritoneal Dialysis	43% / 57%
Little or No Knowledge Re: Diagnosis	35%

Increase proportion of persons with CKD	Baseline	Target
CKD 2: who know they have impaired renal function	7.3%	11.3%
CKD 4.1: who receive recommended medical evaluation with serum creatinine, lipids, and microalbuminuria	25.8%	28.4%
CKD 4.2: with type 1 or type 2 diabetes and CKD who receive recommended medical evaluation with serum creatinine, microalbuminuria, HbA1c, lipids, and eye exams	23.1%	25.4%

Reduce proportion of persons with CKD	Baseline	Target
CKD 6.1: who have elevated blood pressure	74.1%	66.7%
CKD 6.2: who have elevated lipid levels	29.6%	26.6%

Increase the proportion of persons with diagnosed diabetes who obtain an annual urinary microalbumin measurement.





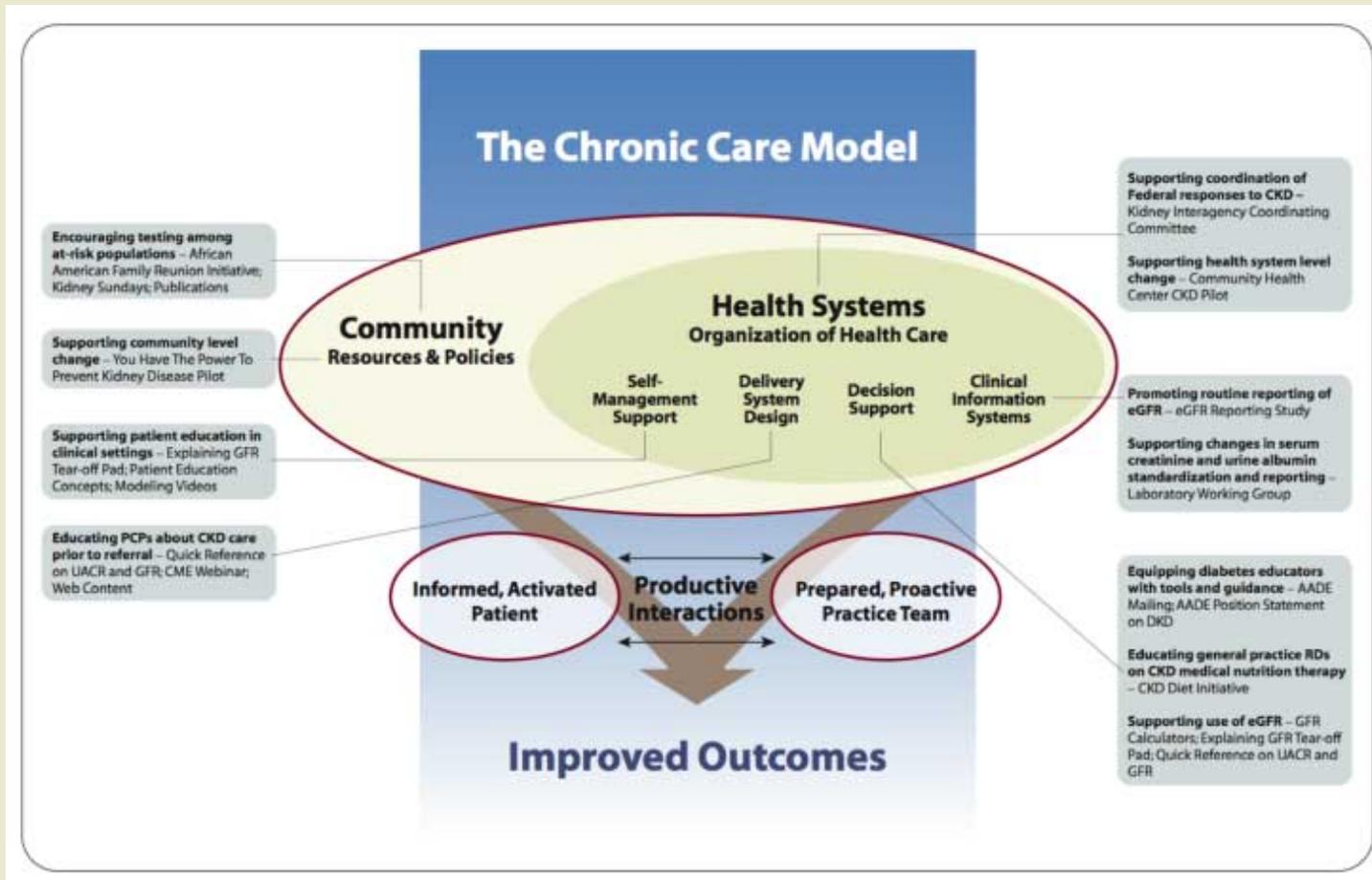
Healthy People 2010: Increase the proportion of treated chronic kidney failure patients who have received counseling on nutrition, treatment choices, and cardiovascular care 12 months before the start of renal replacement therapy.

Reference: USRDS Annual Data Report (NIDDK, 2010)

- Defining optimal care is not the primary barrier to improved outcomes.
- Delivering appropriate care to those who need it is the problem we must overcome.

- Delay the need for renal replacement therapy.
- Recognize and test at-risk patients: monitor eGFR and UACR.
- Screen for anemia (Hgb), malnutrition (albumin), metabolic bone disease (Ca, Phos).
- Treat cardiovascular risk, especially with smokers and hypercholesterolemia.
- Refer to dietitian for nutritional guidance.
- Educate patients about CKD and treatment.

- NKDEP aims to reduce the morbidity and mortality caused by kidney disease and its complications by:
 - Improving early detection of CKD.
 - Facilitating identification of patients at greatest risk for progression to kidney failure.
 - Promoting evidence-based interventions to slow progression of kidney disease.
 - Supporting the coordination of Federal responses to CKD.



Chronic Kidney Disease

What Does it Mean for Me?



NKDEP
National Kidney Disease
Education Program

Indian Health Service
DIVISION OF DIABETES
TREATMENT & PREVENTION

How well are your kidneys working?

Explaining Your Kidney Test Results

Your GFR result on _____ was _____
(Date)

- A GFR of 60 or higher is in the normal
- A GFR below 60 may mean kidney disease
- A GFR of 15 or lower may mean kidney failure

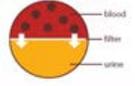
What is GFR?
GFR stands for glomerular filtration rate, filter blood.

Your urine albumin result on _____ was _____
(Date)

- A urine albumin result below 30 is normal
- A urine albumin result above 30 may mean kidney disease

What is urine albumin?
Albumin is a protein found in the blood. In the urine, a damaged kidney lets some albumin through.

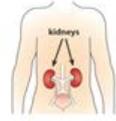
Inside a healthy kidney



Your blood pressure result on _____ was _____
(Date)

Controlling your blood pressure may help

What your kidneys do
You have two kidneys. Their main job is to filter wastes and extra water out of your blood to make urine.



How your kidneys are checked
Two tests are used to check for kidney disease.

- A blood test checks your GFR, which tells how well your kidneys are filtering.
- A urine test checks for albumin in your urine, a sign of kidney damage.

Why your kidneys are being checked
You need to have your kidneys checked because you can't feel kidney disease. Kidney tests are very important for people who have diabetes, high blood pressure, or heart disease. These conditions can hurt your kidneys.

What happens if you have kidney disease
Kidney disease can be treated. The sooner you know you have kidney disease, the sooner you can get treatment to help delay or prevent kidney failure. Treating kidney disease may also help prevent heart disease.

Treatment goals are to:

- Keep your GFR from going down
- Lower your urine albumin

No matter what your results are:

- Keep your blood pressure, blood glucose, and blood cholesterol in your target range.
- Choose foods that are healthy for your heart and cut back on salt.
- Be more physically active.
- If you smoke, take steps to quit.
- Take medicines the way your provider tells you to.

Notes: _____

For more information, visit www.nkdep.nih.gov or call 1-866-4-KIDNEY (1-866-454-3439).

NKDEP
National Kidney Disease
Education Program

NIDDK
National Institute of Diabetes
and Digestive and Kidney Diseases

Indian Health Service
Division of Diabetes
Treatment & Prevention

NIDDK, Turning Discovery Into Health.
Revised March 2013 • NIDDK Publication No. 13-0107 • www.nkdep.nih.gov

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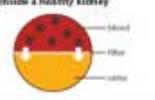
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Albumin is a protein found in the blood and urine. A damaged kidney lets some albumin pass into the urine.

Inside a healthy kidney



Your blood pressure result on _____ was _____

Controlling your blood pressure may help protect your kidneys.

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- A urine test checks for albumin in your urine, a sign of kidney damage.

Why your kidneys are being checked
You need to have your kidneys checked because you can't feel kidney disease. Kidney tests are very important for people who have diabetes, high blood pressure, or heart disease. These conditions can hurt your kidneys.

What happens if you have kidney disease
Kidney disease can be treated. The sooner you know you have kidney disease, the sooner you can get treatment to help delay or prevent kidney failure. Treating kidney disease may also help prevent heart disease.

Treatment goals are to:

- Keep your GFR from going down
- Lower your urine albumin

No matter what your results are:

- Keep your blood pressure, blood glucose, and blood cholesterol in your target range.
- Choose foods that are healthy for your heart and cut back on salt.
- Be more physically active.
- If you smoke, take steps to quit.
- Take medicines the way your provider tells you to.

Notes:





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For more information, visit www.nidk.nih.gov or call 1-800-4-A-KIDNEY (1-800-424-2526).
This National Kidney Disease Education Program (NKDEP) is an initiative of the National Institutes of Health.
NIDDK, Training Division is the lead.
November 2011 • 5010-F-1000-11-1000 • www.nidk.nih.gov



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For Providers

Educating Patients About Chronic Kidney Disease

Four Key Concepts and Talking Points

1 Talk to patients about their kidneys, CKD, and their risk.

What is CKD? CKD (chronic kidney disease) means the kidneys are damaged and may no longer filter blood well. This damage happens over many years. As more damage occurs, the kidneys are unable to keep the body healthy—then dialysis or a kidney transplant may be needed to maintain health.

How can I lower my risk for CKD? The steps you take to manage your diabetes and high blood pressure also help protect your kidneys. Choosing healthy foods, quitting smoking, and being more physically active are all important steps.

2 Communicate the importance of testing and how CKD is diagnosed.

What are the symptoms of CKD? Most people with CKD have no symptoms until their kidneys are about to fail. The only way to know if you have kidney disease is to get tested. The sooner kidney disease is found, the sooner you can take steps to begin treatment and keep your kidneys healthier longer.

How do you check for CKD? A blood test and a urine test are used to find kidney disease. Because you are at risk, you should get those tests regularly.

GFR—A blood test measures how much blood your kidneys filter each minute, which is known as your glomerular filtration rate (GFR).

Urine Albumin—A urine test checks for albumin in your urine. Albumin is a protein that can pass into the urine when the filters in the kidneys are damaged.

3 Explain the progressive nature of CKD and the basics of treatment.

Can CKD get better? CKD usually will not get better and is likely to get worse. Treatment helps slow kidney disease and keep the kidneys healthier longer.

How is CKD treated? Treatment includes keeping blood pressure at the level set by your provider, eating foods with less salt and the right amount of protein, and controlling blood sugar if you have diabetes.

Are there medications for CKD? People with CKD often take medicines to lower blood pressure, control blood sugar, and lower blood cholesterol. Two types of blood pressure medications—ACE inhibitors and ARBs—can slow CKD and delay kidney failure, even in people who do not have high blood pressure.

4 Begin to speak about dialysis and transplantation.

Will I ever need dialysis? With proper management, you may never need dialysis or, at least, not for a very long time. But if your kidneys fail, we will need to choose a treatment that can replace the job of your kidneys to maintain health. There are two types of dialysis—one is done at home daily and the other is done in a dialysis center three times a week.

Is kidney transplant an option? You may be able to receive a kidney transplant. The donated kidney can come from an anonymous donor who has recently died or from a living person. A kidney transplant is a treatment—not a cure.



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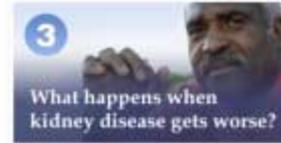


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For a more detailed version of these talking points or to order this tool kit, visit www.nidk.nih.gov or call 1-800-4-A-KIDNEY (1-800-424-2526).
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IHS Collaboration on NKDEP's Kidney Disease Education Lesson Series



 <p>1 Kidney disease basics</p> <ul style="list-style-type: none">• Lesson objectives• Session starter• Topics & Points to Cover• Materials/Content for Learners• Background/Clinical Information for Educators• Sample Outcome Assessment Questions• Additional Resources for Download	 <p>2 Managing your kidney disease</p> <ul style="list-style-type: none">• Lesson objectives• Session starter• Topics & Points to Cover• Materials/Content for Learners• Background/Clinical Information for Educators• Sample Outcome Assessment Questions• Additional Resources for Download	 <p>3 What happens when kidney disease gets worse?</p> <ul style="list-style-type: none">• Lesson objectives• Session starter• Topics & Points to Cover• Materials/Content for Learners• Background/Clinical Information for Educators• Sample Outcome Assessment Questions• Additional Resources for Download
 <p>4 Choices for treating kidney failure</p> <ul style="list-style-type: none">• Lesson objectives• Session starter• Topics & Points to Cover• Materials/Content for Learners• Background/Clinical Information for Educators• Sample Outcome Assessment Questions• Additional Resources for Download	 <p>5 Getting ready for treatment</p> <ul style="list-style-type: none">• Lesson objectives• Session starter• Topics & Points to Cover• Materials/Content for Learners• Background/Clinical Information for Educators• Sample Outcome Assessment Questions• Additional Resources for Download	 <p>6 Living with kidney failure</p> <ul style="list-style-type: none">• Lesson objectives• Session starter• Topics & Points to Cover• Materials/Content for Learners• Background/Clinical Information for Educators• Sample Outcome Assessment Questions• Additional Resources for Download

CKD Diet Counseling Referral Form

CKD Diet Counseling (Medical Nutrition Therapy) Referral Form

NAME _____ DATE OF BIRTH _____ MEDICAL RECORD # (If applicable) _____

REASON FOR REFERRAL

Medical nutrition therapy for chronic kidney disease. Specific concerns or questions:

CKD DIAGNOSTIC CODE 585.____

BLOOD PRESSURE _____ **WEIGHT** _____ **HEIGHT** _____

RECENT WEIGHT CHANGE? YES NO

FOR DIABETICS YEAR OF DIAGNOSIS _____ **A1C** _____ MONTH/YEAR _____

LABORATORY ASSESSMENT (MOST RECENT VALUES)

PROTEINURIA NOT PRESENT IF PRESENT, SINCE _____ MONTH/YEAR

UACR (URINE ALBUMIN-TO-CREATININE RATIO) _____ MONTH/YEAR

eGFR (ESTIMATED GLOMERULAR FILTRATION RATE) _____ MONTH/YEAR

CKD Diet Counseling Referral Form (cont.)

K HCO₃ BUN Ca Phos Hgb
 LDL HDL TG iPTH Vit D Alb

CURRENT MEDICATIONS (or attach list)

KNOWLEDGE DOES THE PATIENT KNOW HE/SHE HAS KIDNEY DISEASE? YES NO DON'T KNOW
 DOES THE PATIENT KNOW THE SEVERITY? YES NO DON'T KNOW
 IS THE PATIENT AWARE THAT HE/SHE MAY NEED DIALYSIS? YES NO DON'T KNOW
 PREVIOUS DIET COUNSELING FOR CKD? YES NO DON'T KNOW

ADDITIONAL INFORMATION

REFERRED BY _____

SIGNATURE _____ DATE _____

PHONE _____ EMAIL _____



- Treat primary kidney diseases such as glomerulonephritis.
- Prepare for renal replacement therapy, especially when eGFR is less than 30.
- Assist with diagnostic challenges.
- Rapid decrease of eGFR.
- Assist with therapeutic challenges related to CKD complications such as blood pressure, anemia, abnormal mineral metabolism and bone disorders, hyperkalemia, hyperphosphatemia, malnutrition, and secondary hyperparathyroidism.
- Assist with acute kidney injury.

Nephrology Referral

NAME _____ **DATE OF BIRTH** _____ **FACILITY/PRACTICE AND RECORD NUMBER** _____

REASON FOR REFERRAL

FOR DIABETICS YEAR OF DIAGNOSIS _____ RECENT A1C _____ MONTH/YEAR _____

COMPLICATIONS RETINOPATHY: BDR PDR NOT PRESENT NO DILATED EXAM
 NEUROPATHY PVD OTHER _____

ALBUMINURIA NOT PRESENT IF PRESENT, SINCE _____ MONTH/YEAR _____
 MOST RECENT UACR _____

HEMATURIA NOT PRESENT IF PRESENT, SINCE _____ MONTH/YEAR _____

URINE SEDIMENT

eGFR MOST RECENT

eGFR	MONTH/YEAR

BLOOD PRESSURE AT LAST VISIT _____ USUAL RANGE _____

ADDITIONAL EVALUATION ANA _____ RF _____ CRP _____ C4 _____ HbA1c _____ AntiCCP _____
 UPEP _____ UPEP _____ RENAL US _____
 OTHER _____

FAMILY HISTORY KIDNEY DISEASE NO YES IF YES, HOW RELATED _____
 OTHER CONDITIONS AND HOW RELATED _____

CURRENT MEDICATIONS (or attach list)

KNOWLEDGE DOES THE PATIENT KNOW HE/SHE HAS KIDNEY DISEASE? YES NO DON'T KNOW
 DOES THE PATIENT KNOW THE SEVERITY? YES NO DON'T KNOW
 IS THE PATIENT AWARE THAT HE/SHE MAY NEED DIALYSIS? YES NO DON'T KNOW

ADDITIONAL INFORMATION

REFERRED BY _____ DATE _____
 CONTACT TELEPHONE _____ EMAIL _____

For more information about why these data are important to share with the nephrologist, visit www.nkdep.nih.gov.



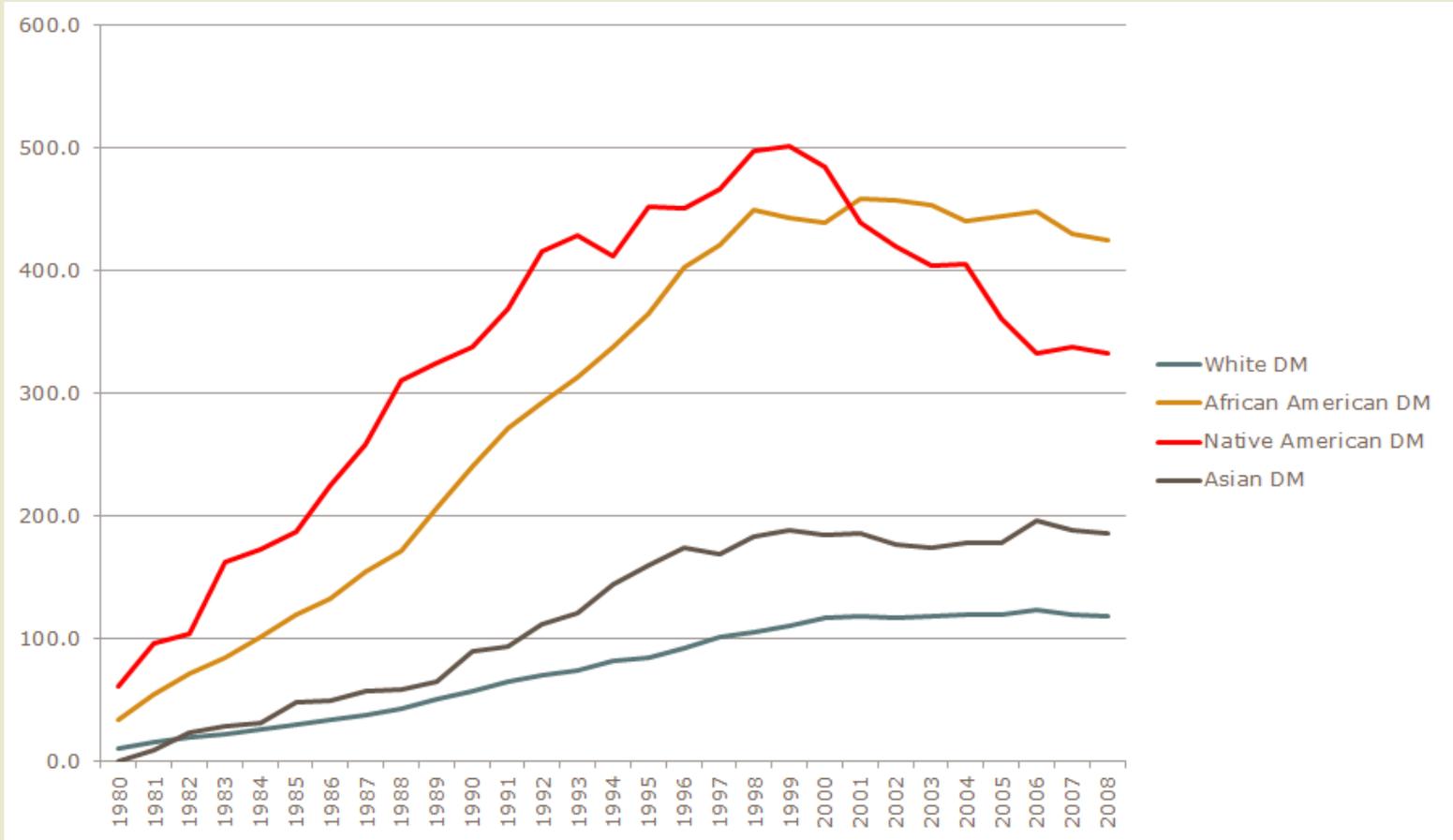
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- CKD is part of primary care.
- Changing patterns of care requires changing “the system” (CCM).
- Improvement in care results from changes implemented by physicians and non-physician health professionals.
- Implemented through diabetes care delivery system; not specialty clinic based.
- Surveillance and prevention are part of multisystem chronic disease control.
- Emphasis on ensuring that patient received care from competent and interested individual, not referral.

Incident Rates of ESRD due to Diabetes 1980-2008

per million population, by age, gender, race, & ethnicity



- Improving the care of people with CKD requires changing clinical practice in settings where high risk populations are served.
- Improving care of patients prior to referral to subspecialty care is necessary to provide better long term outcomes and to promote self-management.
- Indian Health Care is a model for improving care for people with diabetes and kidney disease.
- NKDEP will collaborate closely with I/T/U to develop effective models for CKD intervention within the primary care setting.



andrew.narva@nih.gov

All materials available:
<http://nkdep.nih.gov/>