
SCHOOL OF PUBLIC HEALTH
UNIVERSITY AT ALBANY State University of New York

**Public Health Live – *T²B²***

**Chronic Kidney Disease in Diabetes: Early Identification and Intervention**

National Kidney Foundation

MSSM
MOUNT SINAI SCHOOL OF MEDICINE

## Guest Speaker

- **Joseph Vassalotti, MD, FASN**
  **Chief Medical Officer**
  **National Kidney Foundation**

## Thanks to our Sponsors:

- **School of Public Health, University at Albany**
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- **NYS Community Health Partnership**
- **Milestones in Public Health Grant from Pfizer, Inc.**

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- **NYS Association of County Health Officials**
- **NYS Nurses Association**

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**Please visit**

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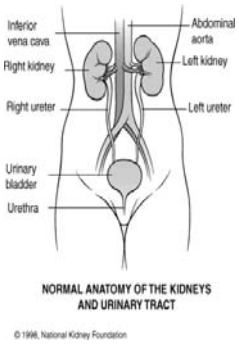
**to fill out your evaluation and post test.**

**Nursing Contact Hours, CME, CHES are available.**

***Thank you!***

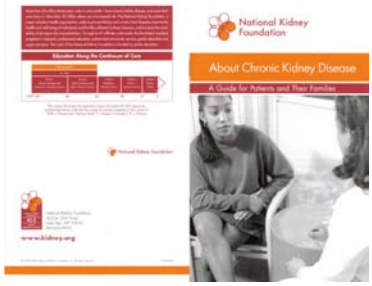



## What are the Kidneys?

1. Two bean shaped organs
2. Each about the size of your fist
3. Located in the flanks, just below the rib cage
4. Weight is about 1 % of the total body weight, yet 25 % or so of blood flow. Thus, kidneys are efficient filtration organs.

## Chronic Kidney Disease

### What is Chronic Kidney Disease?




## Diabetes and Kidney Disease

- Diabetes is the most common cause of kidney disease.
- Awareness of CKD is low.
- Use of CKD tests is low.
- Outcomes of CKD include loss of kidney function, complications, kidney failure and death.
- Early Detection allows more time for interventions to prevent or delay complications and slow loss of kidney function.

## Vignette Without Early Identification

- 42-year-old African-American obese man presented to the hospital for treatment of left lower extremity cellulitis, a skin infection.
- The past history was remarkable for 18 years of diabetes, treated with insulin and complicated by neuropathy, retinopathy, and hypertension. Left ankle Charcot joint was followed by orthopedics for several years. He received laser treatments to both eyes for diabetic retinopathy.

## Vignette Without Early Identification

- There was a family history of CKD in his mother, who also has diabetes.
- Physical exam: BP 152/92, P=80 and regular. Heart and lung examinations were normal. There was +3 peripheral edema. The left calf was warm, erythematous, and tender.

## Vignette Without Early Identification

- Urinary albumin-creatinine ratio > 300 mg/g
- Serum creatinine 6.2 mg/dl
- Estimated GFR 13 ml/min/1.73 $m^2$ by simplified MDRD formula
- Chronic Kidney Disease: Stage 5

## Vignette Summary without Early Evaluation

- 42-year-old African-American man with Stage 5 CKD Diabetic Kidney Disease.
- The course of the illness was likely over several years.
- There were many opportunities to diagnose and treat CKD over an 18-year course of type-1 diabetes.

## Vignette Summary without Early Evaluation

- This patient is now faced with dialysis and transplant preparation. There is a better way!
- Early identification allows more time for interventions to prevent or delay complications and slow loss of kidney function

## Chronic Kidney Disease: A Public Health Problem That Needs a Public Health Action Plan

1. The CKD burden is high.
2. The CKD burden is unfairly distributed.
3. Upstream measures could reduce the burden.
4. Preventative strategies are not yet in place.

*Schoolwerth AC, et al: Prev Chronic Dis 3:A57, 2006*

PREVENTING CHRONIC DISEASE
PUBLIC HEALTH RESEARCH, PRACTICE, AND POLICY

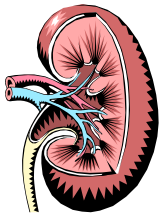
## Public Perceptions of Kidney Disease


Medical miracle and a moral burden of a small committee
They Decide Who Lives, Who Dies

**Life Magazine November 1962**

## Why Chronic Kidney Disease?

- The word "kidney" is widely understood by lay people.
- CKD is a uniform term with specific criteria for diagnosis and classification.
- Avoid semantics of *chronic renal insufficiency*, *pre-dialysis*, etc.
- Kidney failure (ESRD) for precision and patient acceptance.

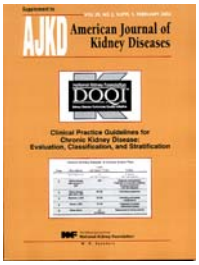


## "You can't find what you are not looking for."

**Yogi Berra**

## CKD Identification

- **Structural or functional abnormalities of the kidneys for ≥3 months, as manifested by either:**
- **Urinary albumin-creatinine Ratio ≥ 30 mg/g**
- **eGFR <60 ml/min/1.73 m2, with or without kidney damage**




*Levey AS, et al: Definition and classification of chronic kidney disease: A position statement from Kidney Disease: Improving Global Outcomes (KDIGO). Kidney Int 67:2089-2100, 2005*

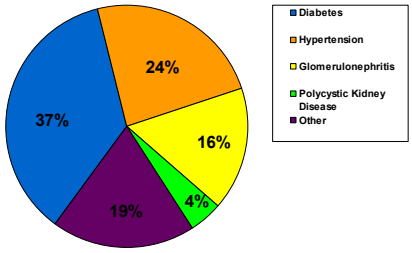
## Stages of CKD

| Stage | Description | GFR (ml/min/1.73²) | US Prevalence in Millions |
|---|---|---|---|
| 1 | Kidney damage and normal or ↑ GFR | ≥ 90 | 3.6* |
| 2 | Kidney damage and Mild ↓ GFR | 60-89 | 6.5* |
| 3 | Moderate ↓ GFR | 30-59 | 15.5* |
| 4 | Severe ↓ GFR | 15-29 | 0.7* |
| 5 | Kidney Failure usually need dialysis | <15 | 0.5+ |

**26,000,000**

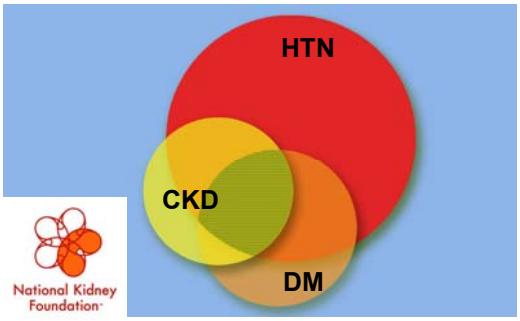
**Extrapolation in adults using NHANES 1999-2004, JAMA 16:180-8, 2007*
*+US Renal Data System 2008 Annual Data Report*

## Causes of Kidney Failure




**Diabetes is the Predominant Cause of Kidney Failure**
*US Renal Data System 2005 Annual Data Report*

## Cardiovascular Kidney Diabetes



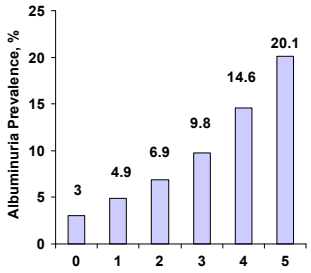

## What Makes CKD Different

- **Cardiovascular disease is the number one killer**
- **Chronic Kidney Disease multiplies CVD risk**
- **For every CVD risk factor (Diabetes and Hypertension), clinicians must test for CKD**

## What Makes CKD Different

- **The patients are sicker**
  1. ***Risk factor levels are higher***
  2. ***Control is worse and treatment is more complex***
  3. ***Outcomes are worse***
  4. ***Costs are higher***
- **With CKD, patient management is different**
- **Treatments are available and effective today**

## CKD Risk Factor Levels Are Higher



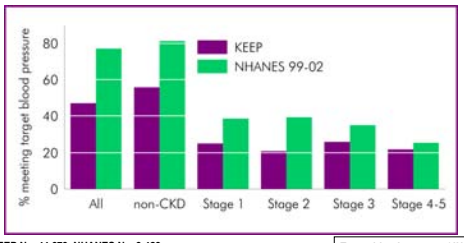

* Cardiometabolic Syndrome Components:

waist ≥ 102 cm in men
waist ≥ 88 cm in women
fasting glucose > 110 mg/dl
HDL-C < 40 mg/dl in men
HDL-C < 50 mg/dl in women
triglycerides > 140 mg/dl
BP > 130/85 mmHg

**Cardiometabolic Syndrome Components***

*Chen J, et al. Ann Int Med 140:167-174, 2004*

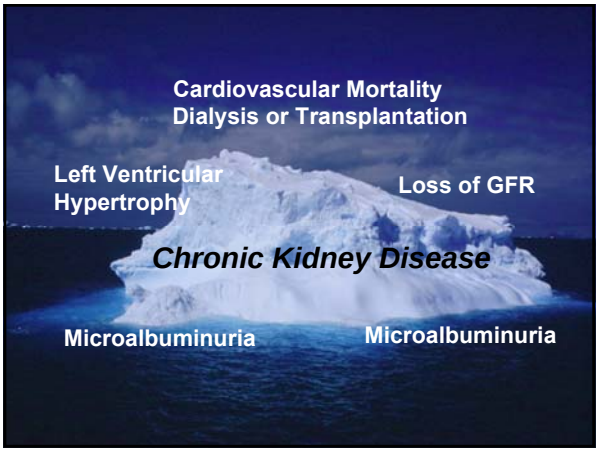
## CKD Control is Worse




KEEP N = 44,673. NHANES N = 9,423.

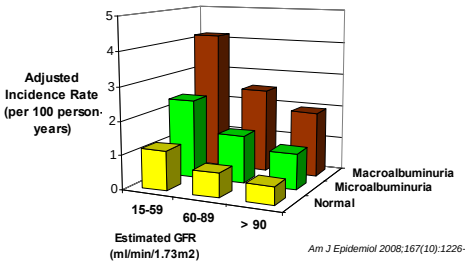
**Target blood pressure by JNC 7 in KEEP and NHANES**

Target blood pressure (JNC 7)
DM or CKD:
Systolic: <130 mmHg or
Diastolic: <80 mmHg
No DM or CKD:
Systolic: <140 mmHg or
Diastolic: <90 mm Hg



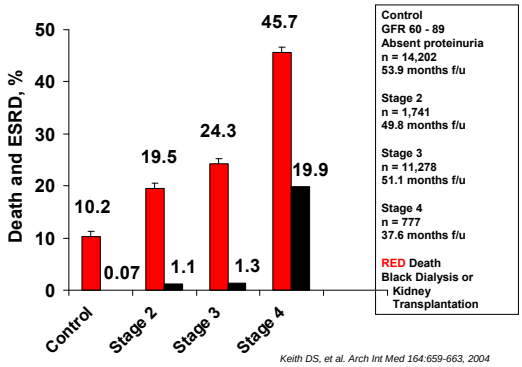

## Adjusted* Cardiovascular Mortality Risk by eGFR and albuminuria

*adjusted to the incidence rates of a 60 year-old, non-Hispanic white male.




*Am J Epidemiol 2008;167(10):1226-1234*

## CKD Outcomes Are Worse




Control
GFR 60 - 89
Absent proteinuria
n = 14,202
53.9 months f/u

Stage 2
n = 1,741
49.8 months f/u

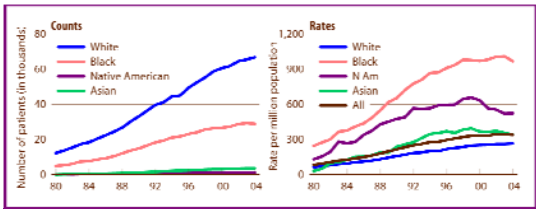
Stage 3
n = 11,278
51.1 months f/u

Stage 4
n = 777
37.6 months f/u

RED Death
Black Dialysis or Kidney Transplantation

*Keith DS, et al. Arch Int Med 164:659-663, 2004*

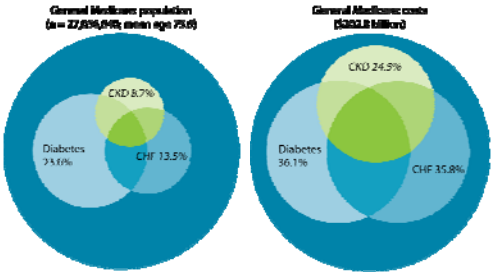
## CKD Outcomes Are Worse Incidence of Kidney Failure




Healthy People 2010 Goal: 217

*US Renal Data System 2006 Annual Data Report*

## CKD Costs Are Higher




**CKD 8.7 % of the Medicare population, yet they consumed 24.5 % of expenditures in 2006 ($ 50 billion). CKD is a disease and cost multiplier.**

*US Renal Data System 2008 Annual Data Report*

## Early Identification Allows More Time for Interventions to Prevent or Delay CKD Progression and Complications

## CKD Intervention: Clinical Action Plan

| | Stage 1-2 | Stage 3 | Stage 4 | Stage 5 |
|---|---|---|---|---|
| **GFR** | **>60** | **30-59** | **15-29** | **<15** |
| **BP<130/80 mm Hg, ACEI/ARB** | | | | |
| **Glycemic control** | | | | |
| **CVD risk reduction: Dyslipidemia management, Tobacco cessation** | | | | |
| **Avoid NSAIDS/Contrast** | | | | |
| **Anemia** | | | | |
| **Nutrition** | | | | |
| **Renal bone disease** | | | | |
| **Vascular access & Transplantation** | | | | |

*ACEI = Angiotensin Converting Enzyme Inhibitor* *ARB = Angiotensin Receptor Blocker*

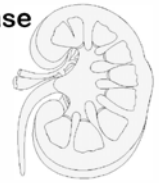
## Vignette Summary Without Early Evaluation

- **42-year-old African-American man with Stage 5 CKD Diabetic Kidney Disease.**
- **The course of the illness was likely over several years.**
- **There were many opportunities to diagnose and treat CKD over an 18-year course of type-1 diabetes.**
- **This patient is now faced with dialysis and transplant preparation. There is a better way!**
- **Early identification allows more time for interventions to prevent or delay complications and slow loss of kidney function.**

Guidelines for Vaccinating

## Kidney Dialysis Patients and Patients with Chronic Kidney Disease

**June 2006**



**summarized from Recommendations of the Advisory Committee on Immunization Practices (ACIP)**

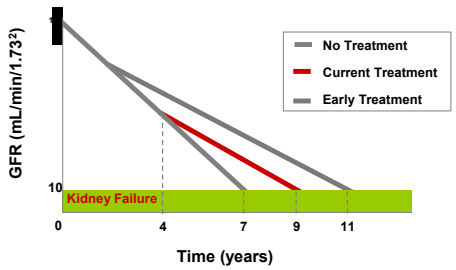
**Available for download at:**
**http://www.cdc.gov/vaccines/pubs/downloads/b_dialysis_guide.pdf**

## ACIP Vaccination Recommendations for the ESRD Patient

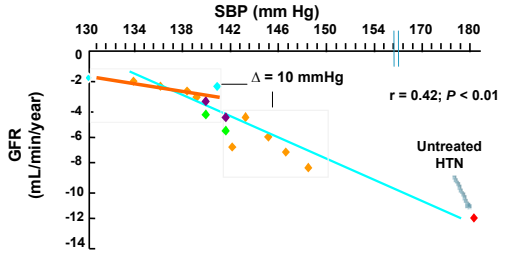
| Vaccine | Recommended | May Use if Otherwise Indicated | Contraindicated |
|---|---|---|---|
| Anthrax | | X* | |
| DTaP/Tdap/Td | | X* | |
| Hib | | X* | |
| Hepatitis A | | X* | |
| Hepatitis B | X (see p. 2) | | |
| Influenza (TIV) | X (see p. 3) | | |
| Influenza (LAIV) | | | X (see p. 4) |
| Japanese Encephalitis | | X* | |
| MMR | | X* | |
| Meningococcal | | X* | |
| Pneumococcal | X (see p. 4) | | |
| Polio (IPV) | | X* | |
| Rabies | | X* | |
| Rotavirus | | X* | |
| Smallpox | | X* | |
| Typhoid | | X* | |
| Varicella | | X* | |
| Yellow Fever | | X* | |

*No specific ACIP recommendation for this vaccine exists for renal dialysis patients and patients with chronic renal disease.

## Early Intervention Can Make a Difference




## Summary of Studies on CKD Intervention




Modified from Bakris GL et al. *Am J Kidney Dis*. 2000;36:646-661.

RENAAL, *NEJM*, 2002; IDNT, *NEJM*, 2002, AASK trial, *JAMA*, 2002, AIPRI, *NEJM*, 1996, MDRD, *NEJM*, 1994, REIN, *Lancet*, 1998, ABCD, *Diabetes Care* (suppl) 2000, *Kidney Int*, 1996, *Hypertension*, 1997

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