

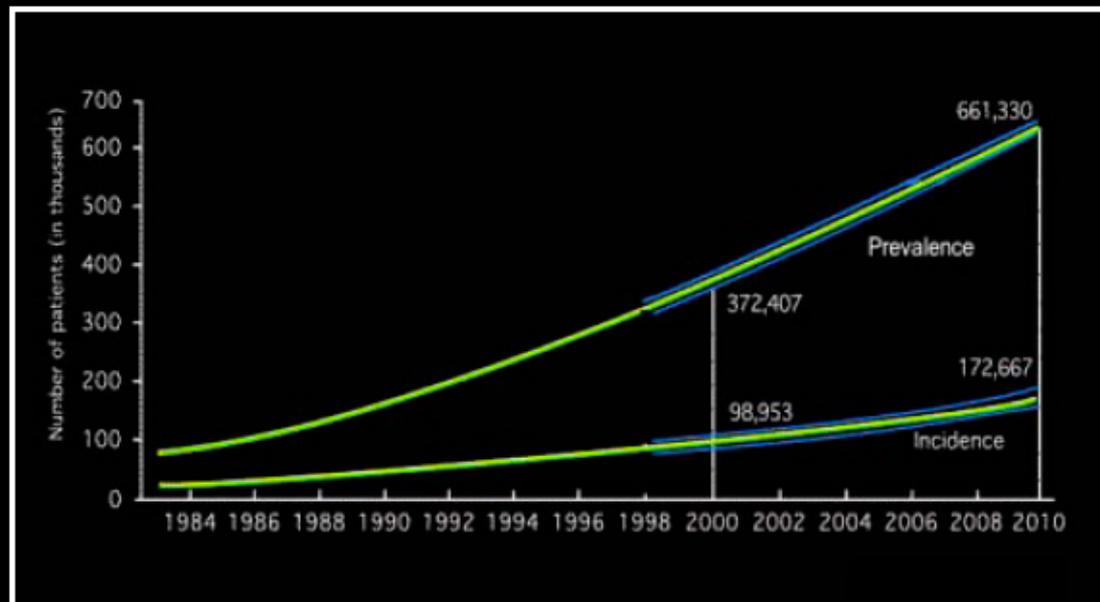
# KEY POINTS IN THE TREATMENT OF CHRONIC KIDNEY DISEASE



# Background



## Kidney Failure is a Rapidly Growing Problem



USRDS, 2000

# The Burden of CKD

- ▣ CKD affects 26 million Americans
- ▣ Prevalence is 11-13%
- ▣ It consumes 28% of the Medicare Budget
  - This was 6.9% in 1993
  - Costs for 2013 were \$42 Billion dollars
- ▣ DM+ CKD increases mortality rate 6 fold
- ▣ CKD disproportionately affects African Americans and Hispanics

<http://usrds.org>

# Who is At Risk for CKD

- ▣ Hypertension
- ▣ Diabetes
- ▣ CAD
- ▣ Family History  
CKD
- ▣ African American
- ▣ Elderly
- ▣ Morbid Obesity



# Two Screening Tests

▣ eGFR



▣ ACR

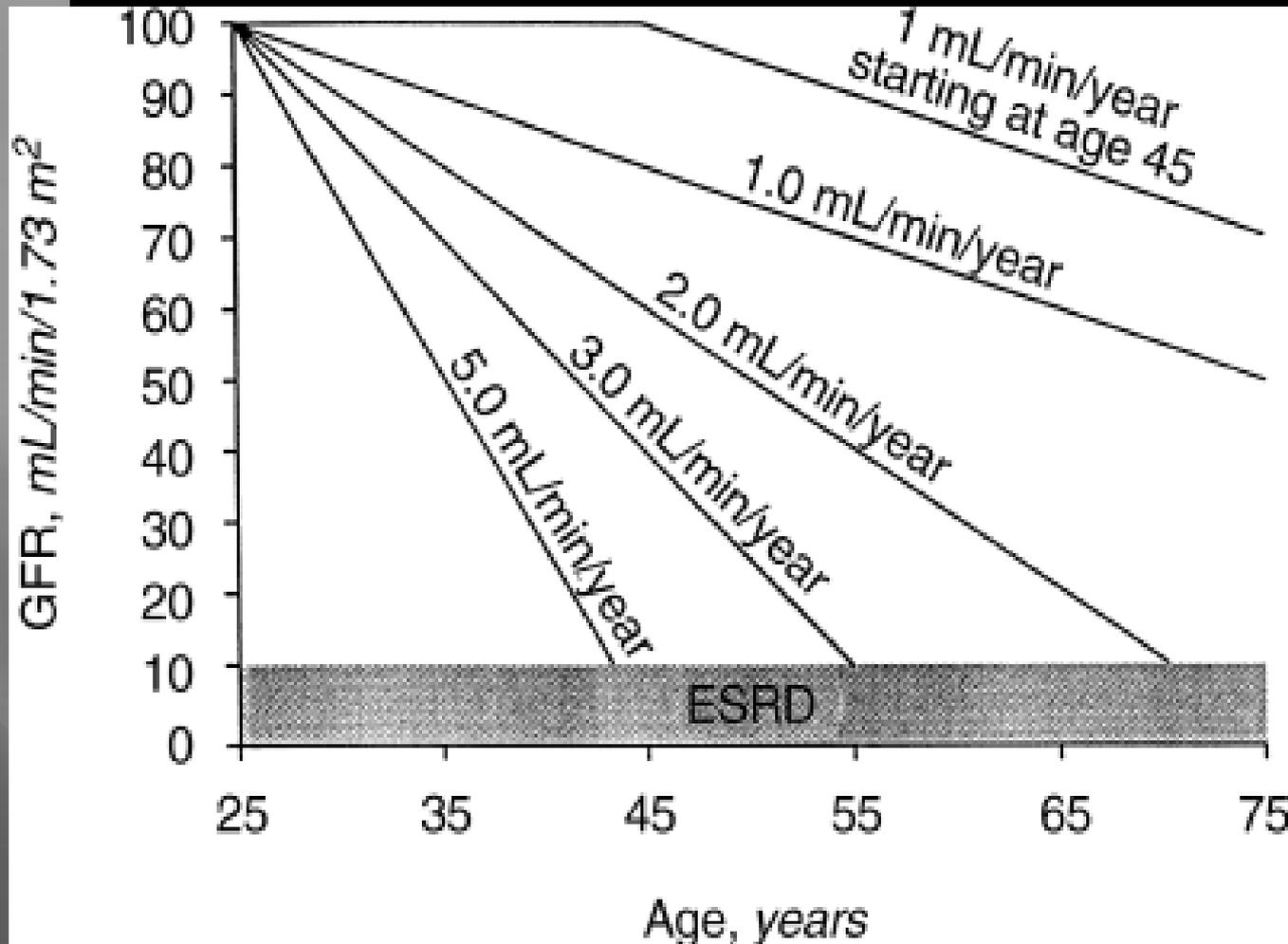
- Albumin/  
Creatinine ratio



# Classification of CKD

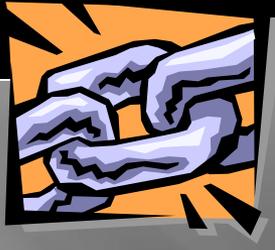
Kidney Function Stage	GFR (mL/min/1.73m <sup>2</sup> )	Albuminuria Stage		
		Normal (urine ACR mg/mmol) Male: < 2.5 Female: < 3.5	Microalbuminuria (urine ACR mg/mmol) Male: 2.5-25 Female: 3.5-35	Macroalbuminuria (urine ACR mg/mmol) Male: > 25 Female: > 35
1	≥90	Not CKD unless haematuria, structural or pathological abnormalities present		
2	60-89			
3a	45-59			
3b	30-44			
4	15-29			
5	<15 or on dialysis			

# SMALL CHANGES MAKE A BIG DIFFERENCE

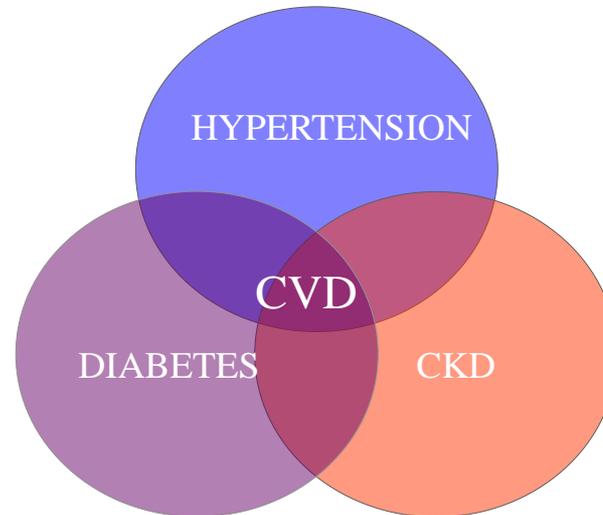


• A GFR loss of > 1 mL/min/year beginning at age 25 can result in end-stage renal disease within a normal lifespan.

# The Link Between Heart Disease, Diabetes, and CKD



**HTN AND DM ARE THE LEADING CAUSE OF CKD**



# CKD IS A CORONARY DISEASE EQUIVALENT

- ▣ Two New England Journal publications indicate that Cardiovascular survival is directly related to a patient's kidney function!!



NS Anavekar, et al. N Engl J Med 2004;351:1285-95  
AS Go, et al. N Engl J Med 2004;351:1295-305

# THE KIDNEY COMPASS

## “Get Your Bearings on Kidney Disease”

HYPERTENSION

BONE DISEASE



ANEMIA

DIABETES

PROTEINURIA

***SAVE YOUR KIDNEYS AND SAVE YOUR HEART***



# KEY POINTS IN:

- ▣ Diagnosis
- ▣ Recognition of Complications
- ▣ Medication Safety
- ▣ Treatment
- ▣ Preparation for Vascular Access
- ▣ When to Refer



# Case Vignette

- ▣ GD is a 63 year old African American female with poorly controlled HTN, DM, increased lipids, obesity, GERD , gout, and sleep apnea. She has not had an MI (yet) She smokes ½ PPD
- ▣ Meds include Amlodipine 10 qd, HCTZ 25 qd, Clonidine 0.3 bid, Atorvastatin 10, Metoprolol 100 bid, Insulin glargine 30 at HS, Metformin 1000 po bid, Allopurinol 300 qd, L, Omeprazole 20 qd, and CPAP at 12 cm (Note: she is not on an ACE)

# Case Continued

- ▣ BP is 150/86;
- ▣ Labs: HbA1C is 10.4; Hb is 9.5, HDL is 35, LDL is 115, triglycerides are 295; Ca is 9.8; Microalbumin/creatinine ratio is 54.5; Creatinine is 1.7: GFR = 39
- ▣ GD has stage 3 CKD and most of it's complications.
- ▣ What should we do for this patient?

# DIAGNOSIS



- ▣ Microalbumin/Creatinine >30
- ▣ GFR < 60
- ▣ GD has Stage 3B;A2 CKD
- ▣ This puts her at moderately high risk

# She also has all the complications

**HYPERTENSION**

**ANEMIA**



**BONE LOSS**

**DIABETES**

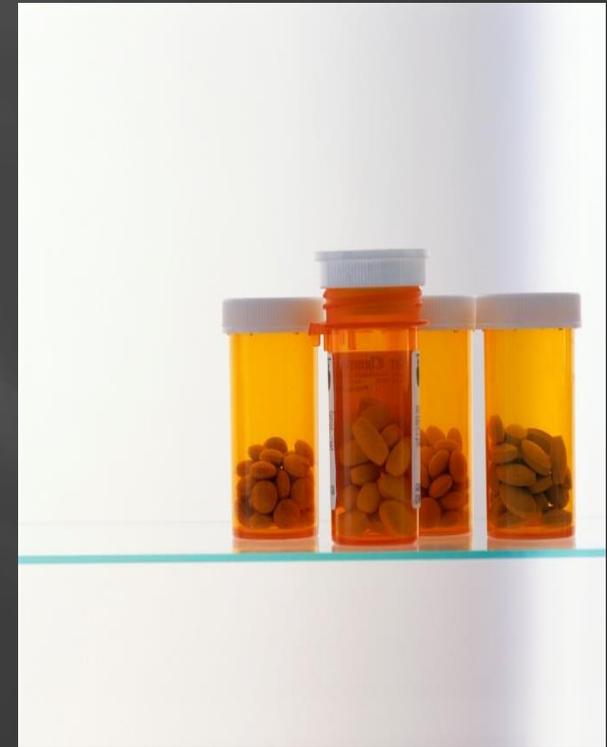
**PROTEINURIA**

**HYPERLIPIDEMIA**



# MEDICATION REVIEW

- ▣ There are meds that are dangerous to her: We stop them or modify dose
- ▣ GD is taking OTC NSAIDS for her back pain
  - We stop this and all NSAIDS and Cox-2
- ▣ Metformin can cause lactic acidosis. We stop if  $GFR < 30$
- ▣ We reduce her Allopurinol
- ▣ We avoid Bisphosphonates



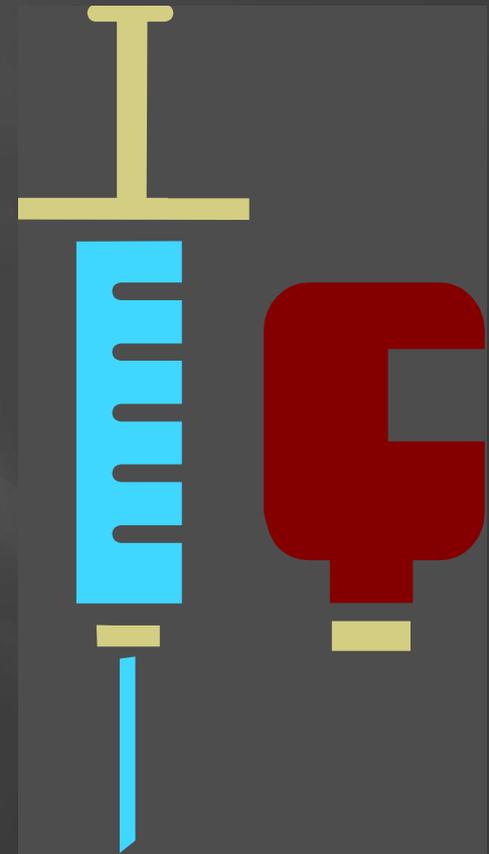
# What should we do for the Hypertension?

- ▣ ACE is added to reduce proteinuria and delay CKD progression.
  - GFR decreases to 32 but stays there. Creat is 2.1
  - K<sup>+</sup> is good at 4.0
  - We leave her on the ACE
- ▣ Her BP goes down to 130/70
- ▣ We stop her clonidine as it is no longer needed



# For Her Diabetes

- ▣ She starts a diet and exercise program
  - We encourage patient centered goal setting (Motivational Interviewing)
- ▣ We intensify her insulin regimen
- ▣ We add Sitagliptin, liraglutide, or glypizide to her insulin
- ▣ Her HbA1C drops to 6.8 over 6 months



# We Protect her Heart

- ▣ We increase her statin to Atorvastatin 40 mg qd
- ▣ We start ASA 81 mg qd
- ▣ We give her the ACS quit smoking line number
- ▣ We add Niaspan 500 qd or Omega 3's One gram bid to raise HDL and decrease Triglycerides
- ▣ She quits smoking, Her HDL is now 43, LDL 68 and Triglycerides 130



# For Her Anemia

- ▣ Colonoscopy is normal
- ▣ MCV is nl at 85
- ▣ Fe is 50; TIBC is 200 for a saturation of 25%
- ▣ We start Erythropoietin 20,000 units q 2 weeks
- ▣ We start oral iron
- ▣  $\sqrt{\text{CBC, Fe/TIBC}}$  monthly. We hold EPO if Hb > 12.0
- ▣ Hb rises to 11.5 and she feels much better
- ▣ Transferrin saturations stay normal at above 20%



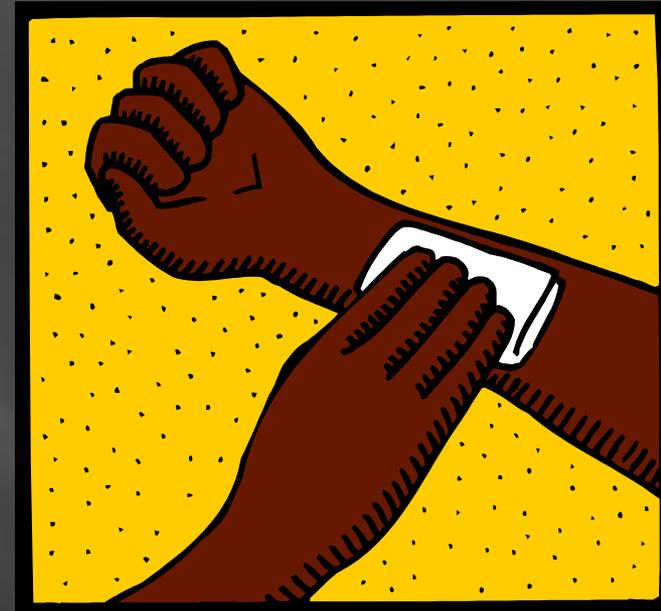
# We Check for Bone Disease

- ▣ We √  $\text{Ca}^{++}$ ;  $\text{PO}_4^-$ ; and PTH and 25 OH Vit D levels
- ▣  $\text{Ca}^{++}$  is 9.8 (nl)
- ▣  $\text{PO}_4^-$  is 3.1 (nl)
- ▣ PTH is 60 (nl)
- ▣ Vit D is 7 (low)
- ▣ We start her Vit D 50,000 units once per month or 1,000-2,000 units daily
- ▣ We follow these labs yearly and refer if  $\text{PTH} > 100$  or  $\text{PO}_4^-$  rises above 4.5



# We Preserve her Blood Vessels

- ▣ We remember “Fistulas first and Catheters Kill”
- ▣ We tell her to use the back of her hand for blood draws
- ▣ We refuse to allow any PICC lines to be put in when GFR < 45.
- ▣ We refer her to nephrology when GFR < 30
- ▣ If the GFR < 20; we refer for transplant evaluation even before she needs dialysis



# Our Patient Does Well

- ▣ She does not have a heart attack
- ▣ She lost 30 pounds
- ▣ Her kidney disease stabilizes
- ▣ She feels better and has more energy
- ▣ We delay the need for dialysis
- ▣ She does not get a hip fracture
- ▣ If she does progress, she will be referred early



# Most Important Points

## Evidence Based

- ▣ Use GFR, Urine Microalbumin to diagnose CKD
- ▣ If GFR < 60 or Microalbumin/creat > 30 start ACE (If cough on ACE, start ARB)
- ▣ Avoid NSAIDS
- ▣ Refer to Nephrology for GFR < 30
- ▣ Refer for Transplant evaluation for GFR < 20
- ▣ Promote smoking cessation
- ▣ Keep BP < 140/90
- ▣ Keep HbA1C < 7.0
- ▣ Keep LDL < 100
- ▣ Avoid PICC lines for GFR < 45

# Other Important Points

## Strong Consensus based

- ▣ Check Calcium, Phosphorous, PTH, and Vit D yearly
- ▣ Check Hemoglobin yearly
- ▣ If iron is normal, start erythropoietin if Hb < 10 or refer to Nephrology
- ▣ Refer to Nephrology for Phosphorous > 4.5 or PTH > 100

# Referral Guidelines

- ▣  $\text{GFR} < 30$
- ▣ Rapidly deteriorating kidney function
- ▣ Marked proteinuria
- ▣ Difficult-to-control hypertension
- ▣  $\text{PTH} > 100$  or Phosphate  $> 4.5$
- ▣  $\text{GFR} < 20$ ; Refer for Transplant evaluation

# Understanding eGFR

<u>eGFR</u>	<u>What to do</u>
>60 and microalbumin < 30	<ul style="list-style-type: none"><li>• Yearly surveillance with GFR (for hypertensive patients) and both GFR and microalbumin (for diabetic patients)</li></ul>
>60 and microalbumin > 30	<ul style="list-style-type: none"><li>• ACE or ARB</li></ul>
>45 and < 60*	<ul style="list-style-type: none"><li>• ACE or ARB</li><li>• Discontinue NSAIDS</li><li>• ? off Metformin**</li><li>• Check hemoglobin</li><li>• Check Calcium, Phosphorous, PTH and Vitamin D yearly</li></ul>
>30 and < 45	<ul style="list-style-type: none"><li>• The above plus</li><li>• Stop metformin**</li><li>• No PICC lines</li><li>• All blood draws from dominant arm (Save an Arm)</li></ul>
< 30	<ul style="list-style-type: none"><li>• Refer to Nephrologist</li></ul>
< 20	<ul style="list-style-type: none"><li>• <b><i>Refer for transplant evaluation</i></b></li></ul>

# Notes on eGFR table

- ▣ \* Need 2 consecutive GFR  $<60$  at least 3 months apart to diagnose CKD. If the patient does not have risk factors of hypertension, diabetes, family history or coronary disease, this might be a false positive test.
- ▣ \*Treat hypertension, diabetes, and hyperlipidemia the same way you would treat a diabetic patient.
- ▣ \*\*Metformin does not cause progression of CKD, but it increases the risk of lactic acidosis.

# Questions??



# The End!

