

CKD in 2023



Kim Zuber, PAC

Executive Director

American Academy of Nephrology PAs
(AANPA)



Disclosures

I have no relevant relationships with ineligible companies to disclose within the past 24 months



Objectives

- 1) Review the updated definition of CKD with removal of race modifiers for staging CKD 1-5
- 2) Discuss the causes, complications, and comorbidities of CKD
- 3) Demonstrate peer reviewed, proven methods to prevent progression of CKD



Kidney Disease Facts

30 million Americans have CKD
15% of the population
Most don't know it

**Every 5 minutes
someone's kidneys fail**

**Between 2000-2019, there
was a 41.8% increase in
ESKD cases**

**More than 113,000
people are waiting for
a kidney transplant**

**A program to increase
testing/management for Am
Indian population between
2000-2019, led to a less cases;
saving Medicare \$520 million**



Kidney Disease Facts

In 2019, the cost of CKD Stage 1-5 was more than \$114 BILLION

Or 44% of the entire Medicare budget

This is larger than the budget of the NIH + NASA + Homeland Security all added together

saving Medicare \$520 million

And it is growing.....

- CKD is the fastest growing chronic disease
- The rate of growth is highest in the 20-54 y/o!
- The incidence of CKD grew by 89%
- Death from CKD grew by 98%
- Disability from CKD grew 62%



We are adapting and joining other societies

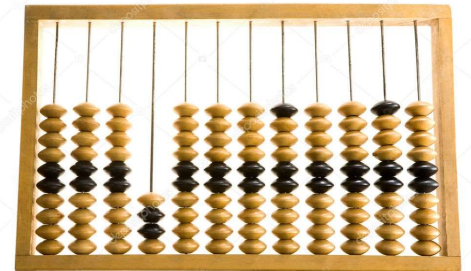
- In August 2020, the American Society of Nephrology and the NKF institute a Task Force to look into race-based issues in eGFR
- Along with the FDA, US weights and measures, the pathology society, researchers, patients and the transplant community, a new eGFR formula is released in Nov 2021
- In October 2022, ***Diabetes Management in CKD*** is published; ADA + KDIGO
- In February 2021, ***Hypertension Management in CKD*** is published
- In Oct 2021, NKF/ASN introduces a race-free ***eGFR calculator***
- By the end of 2022, the new eGFR calculator adopted by medical community
- KDIGO announces new CKD update to be published in 2023

KDIGO Management of Diabetes in CKD 2020, KDIGO Management of HTN in CKD2021, ASN/NKF Race Task Force 2021, Consensus statement ADA/KDIGO DM in CKD 2022



eGFR Calculators for Kidney Function

- **1976 Cockcroft-Gault formula**
 - Compared 249 White hospitalized males with inulin vs calculator
 - Requires age, gender, SCr, weight
 - 15% less in females (never confirmed)
 - Reports as CrCl, often in FDA package inserts
- **1999 Modification of Diet in Renal Disease (MDRD) formula**
 - Compared 1585 CKD patients with iothalamate vs calculator
 - Requires age, gender, SCr, BUN, Albumin, race (*Black 1.2 modifier*)
 - Adjusted to age, gender, SCr, race in 2000 (*Black 1.2 modifier*)
- **2012 CKD-EPI formula (on your present lab forms)**
 - Developed with input from large data bases at NIH (NHANES, AASK)
 - Contains 'correction' for race (*Black 1.16x modifier*)



A Unifying Approach for GFR Estimation: Recommendations of the N... Race in

New eGFR calculator CKD-EPI 2021



consequences that do not



Recommend nat...
timely use of cys...
decision-making



Encourage and...
endogenous filt...
racial and ethnic



The Task Force...
carefully review

National Kidney Foundation eGFR CALCULATORS

MOBILE APP



ONLINE



individuals.

increased, routine, and
firm eGFR in clinical

information with new
interventions to eliminate

se stakeholders and
these recommendations

Cynthia Delgado, Mukta Baweja, Deidra C. Crews, et al.
Approach for GFR Estimation: Recommendations of the Task Force on Reassessing the Inclusion of Race in Diagnosis
AJKD DOI: 10.1053/j.ajkd.2021.08.003, JASN DOI: 10.1053/j.jasn.2021.08.003

Visual Graphic by Edgar Lerma, MD, FASN



What Changed in the Calculator?

Old formula: CKD-EPI eGFRcr (CKD-EPI) (age, sex, race)

$eGFR = 141 \times \min(Scr/k, 1)^\alpha \times \max(Scr/k, 1)^{-1.209} \times 0.993^{Age} \times 1.018$ [if female] $\times 1.159$ [if black]

Where Scr is serum creatinine, k is 0.7 for females and 0.9 for males, α is **-0.329** for females and **-0.411** for males, min indicates the minimum of Scr/ k or 1, and max indicates the maximum of Scr/ k or 1

New formula: eGFRcr (CKD-EPI) refit without race variable

$eGFR = 142 \times \min(Scr/k, 1)^\alpha \times \max(Scr/k, 1)^{-1.200} \times 0.9938^{Age} \times 1.012$ [if female]

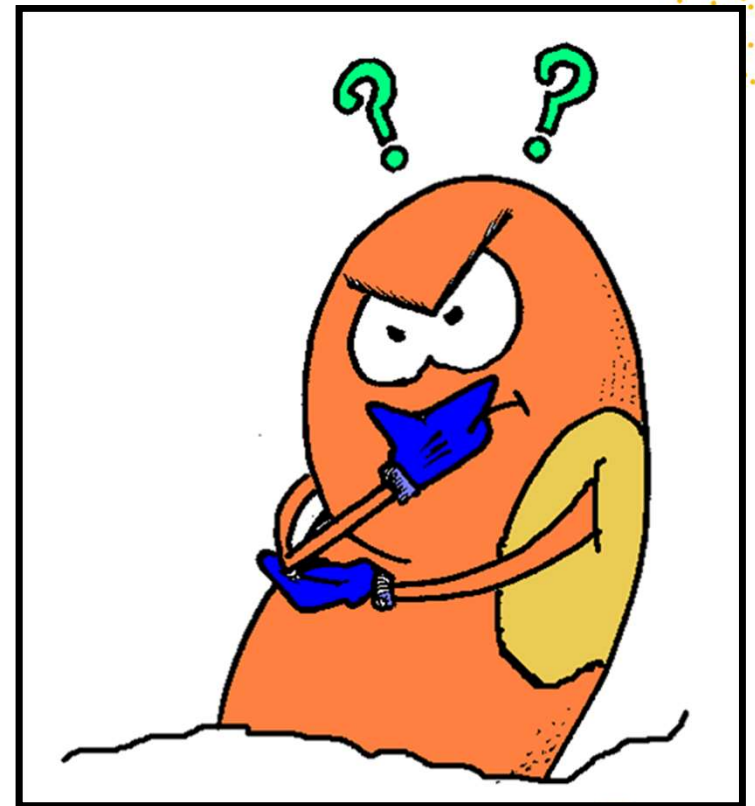
where Scr is serum creatinine, k is 0.7 for females and 0.9 males, α is **-0.241** for females and **-0.302** for males, min indicates the minimum of Scr/ k or 1, max indicates the maximum of Scr/ k or 1

Introduction of New Calculator

- February 28, 2022 All LabCorp moves to new calculator
 - Approx 51 million tests
- April 1, 2022 All VA labs move to new calculator
 - Largest integrated health system in the US
- July 11, 2022 All Quest labs move to new calculator
 - Approx 60 million tests
- July 2022 All transplant will be listed using the new calculator
- August 2022 All large universities changed (Mayo, Stanford, Univ of AL, Harvard, Yale, etc)
- **By the end of 2022, 80% of all labs were using the new race neutral calculator**



So....who and how
do we screen?
And why??



How do I find CKD?

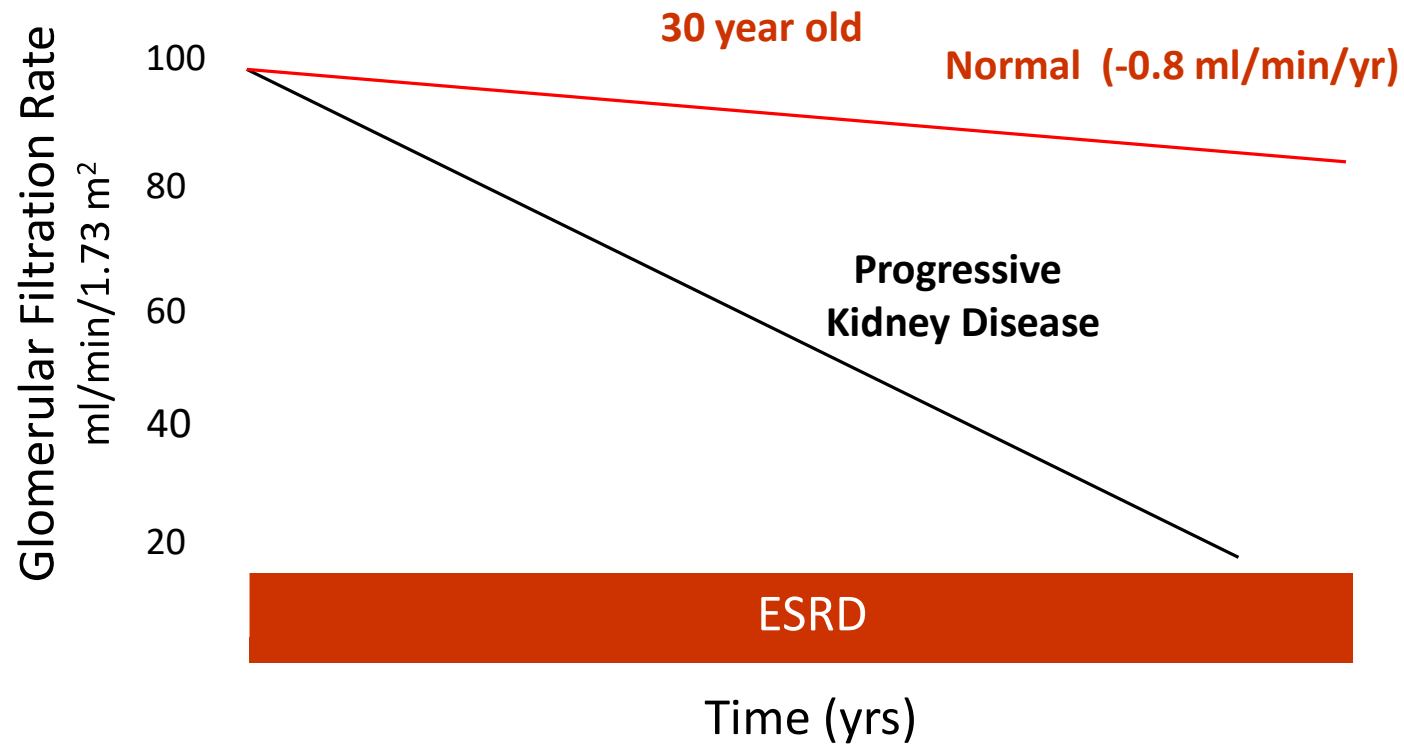
• Go for the obvious!

- Elderly (60!!!!)
- Minority
- Hypertension/CVD
- Diabetes
- Family history
- Female
 - *Although less likely to go to ESRD!*
- On their medical history!

Go for the less obvious!

Previous AKI
Lupus, sarcoid, amyloid, gout, auto-immune...
Previous donor/Previous transplant
History of stones
History of cancer
History of oophorectomy
History of gout
Smoker (any type)
Soda drinkers
Moms who drank with pregnancy
NACL bingers
Almost any medical condition

Normal Age Progression of Kidney Function





Stages of CKD

| Composite ranking for relative risks by GFR and albuminuria (KDIGO 2009) | | | | Albuminuria stages, description and range (mg/g) | | | | |
|--|----------------|------------------|-------------|--|-------------|-------------|-------------------------|-------------|
| | | | | A1 | | A2 | A3 | |
| | | | | Optimal and high-normal | | High | Very high and nephrotic | |
| | | | | <10 | 10–29 | 30–299 | 300–1999 | ≥2000 |
| GFR stages, description and range (ml/min per 1.73 m ²) | G1 | High and optimal | >105 | Green | Green | Yellow | Orange | Red hatched |
| | | | 90–104 | Green | Green | Yellow | Orange | Red hatched |
| | G2 | Mild | 75–89 | Green | Green | Yellow | Orange | Red hatched |
| | | | 60–74 | Green | Green | Yellow | Orange | Red hatched |
| | G3a | Mild-moderate | 45–59 | Yellow | Yellow | Orange | Red | Red hatched |
| | G3b | Moderate-severe | 30–44 | Orange | Orange | Red | Red | Red hatched |
| | G4 | Severe | 15–29 | Red | Red | Red | Red | Red hatched |
| G5 | Kidney failure | <15 | Red hatched | Red hatched | Red hatched | Red hatched | Red hatched | |



Sadie

*She reports she is 85 y/o,
female, and she has diabetes*

Labs: eGFR 45ml/min

If you lose 1%/yr above the age of 30,
85-30 means 55 years of GFR loss

Or

***100 (average perfect kidney function)-55 (years)
or expected eGFR is 45ml/min***

She is age appropriate but, will she progress?



Albuminuria As Risk Factor

The relationship between magnitude of proteinuria reduction and the risk of ESRD: Results of the AASK study of kidney disease and hypertension
Ach Intern Med **2001**



The Progression of CKD: A 10-year population-based study of the effects of gender and age. KI
2006



Combining GFR and albuminuria to classify CKD improves prediction of ESRD, JASN **2009**



Changes in Albuminuria and the Risk of Major Clinical Outcomes in Diabetes: Results From ADVANCE-ON



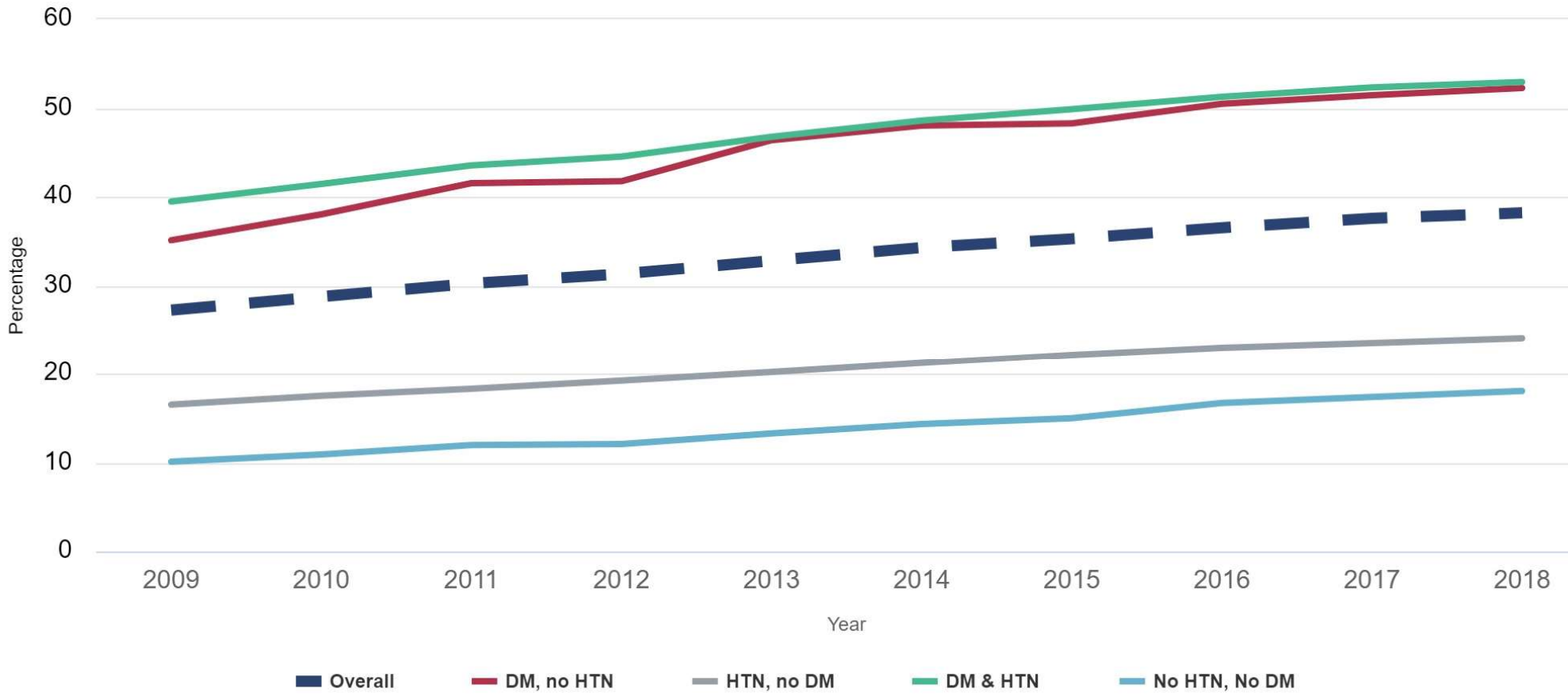
Changes in Albuminuria and subsequent risk of incident kidney disease, JASN **2017**



Alberta Kidney Disease Network:
Relation between kidney function, proteinuria,
and adverse outcomes, JAMA **2010**



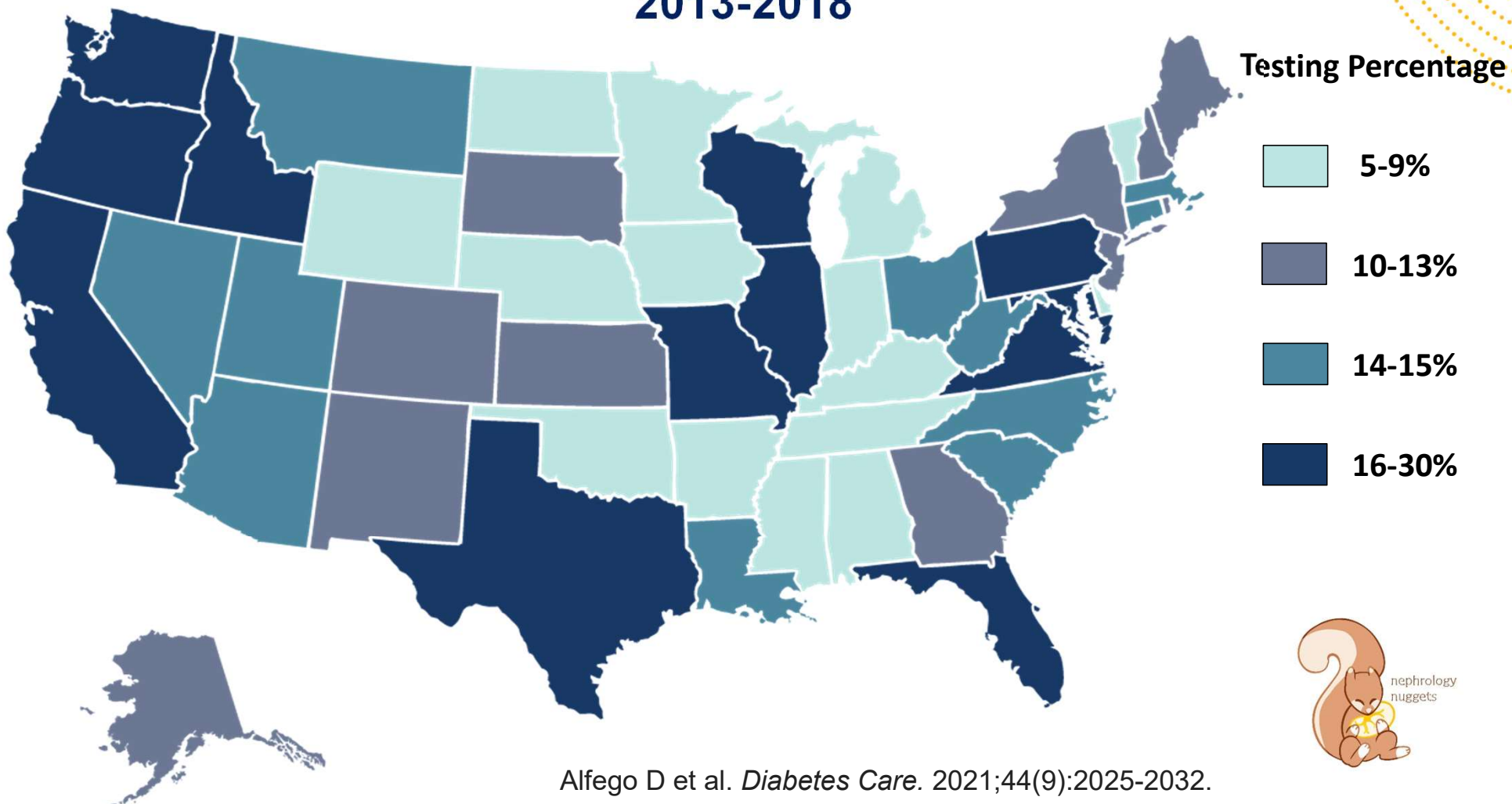
Probability of urine albumin testing in at-risk Medicare patients



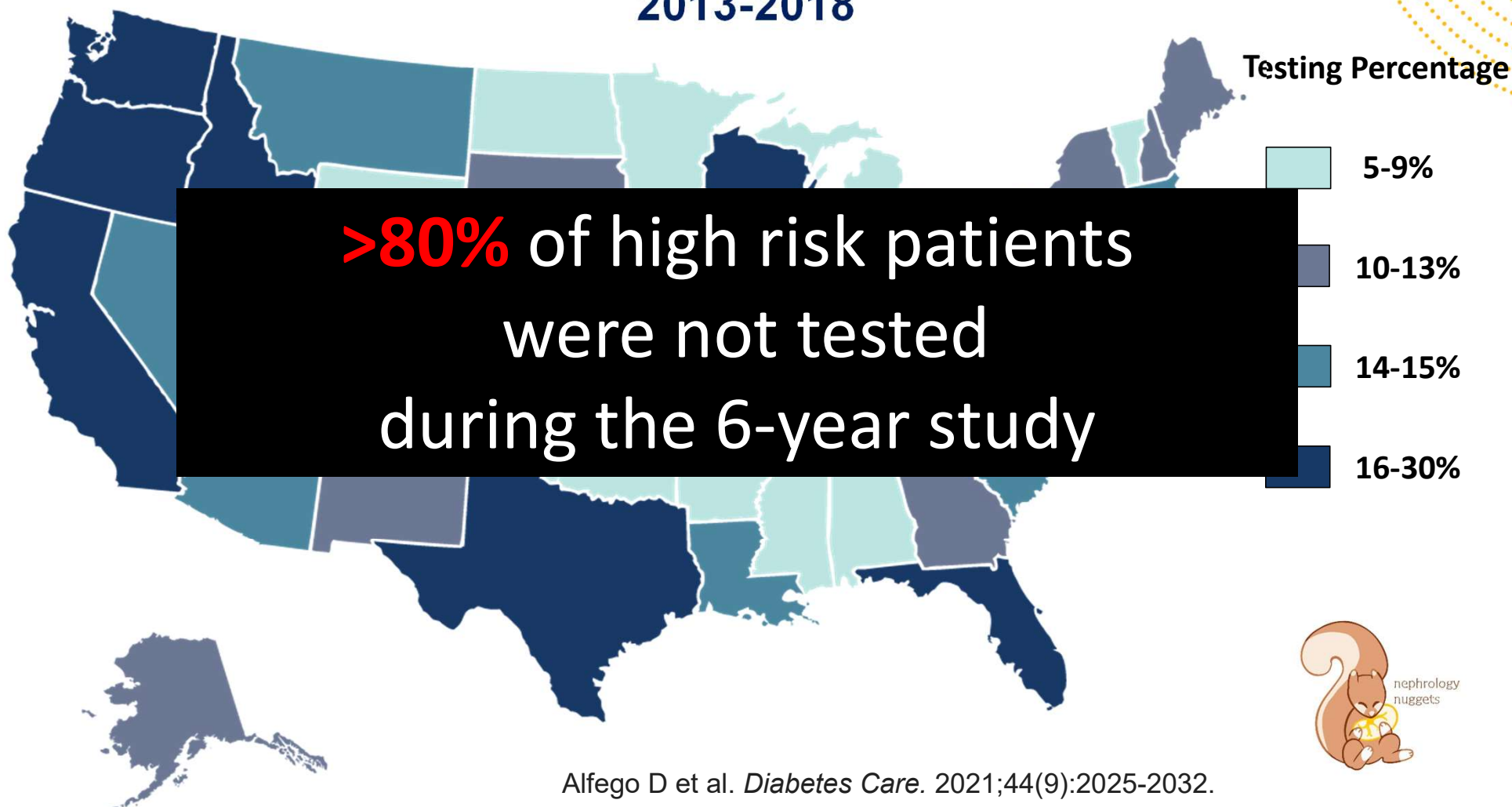
USRDS 2020



LabCorp: Testing Rates of Patients at Risk for CKD Across U.S. 2013-2018



LabCorp: Testing Rates of Patients at Risk for CKD Across U.S. 2013-2018



REVEAL Trial: eGFR decline before and after a CKD Diagnosis

S

Median annual decline in eGFR
(mL/min/1.73 m²) **significantly
decreased** following a CKD
diagnosis ^a

Before

-3.20

95% CI: -3.38, -3.00

After

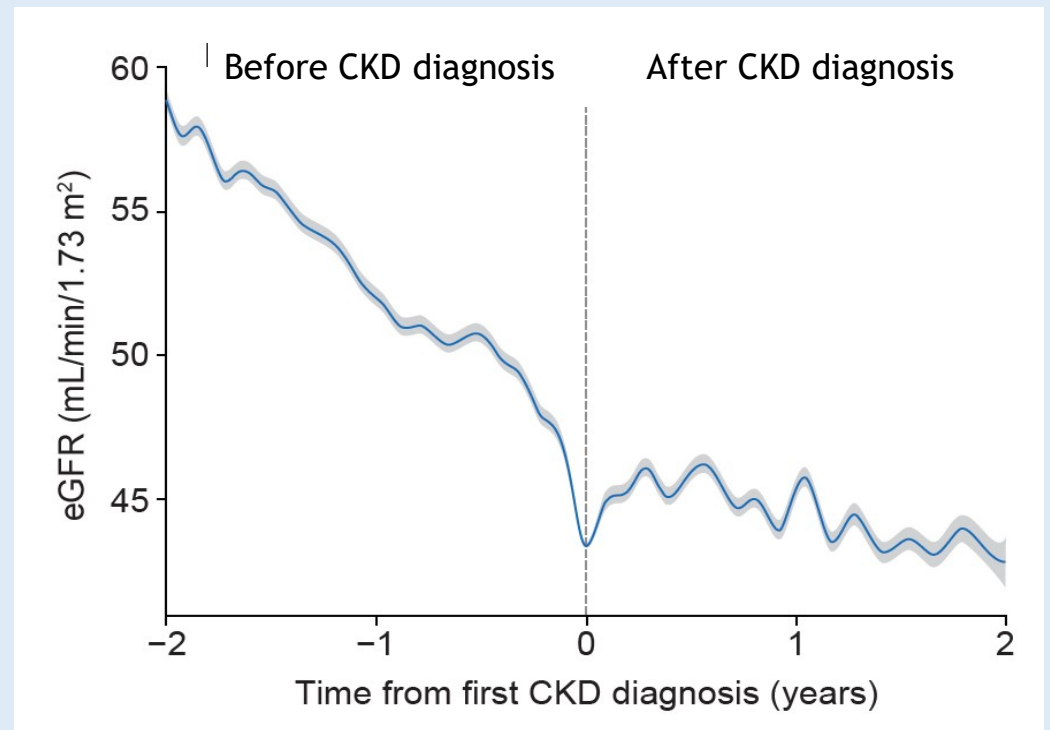
-0.74

95% CI: -0.96, -0.53



*Springer Health presented ASN Nov 2022,
Tangri N, et al. Adv Ther, Jan 2023

eGFR trajectories before and after a CKD diagnosis



Shaded area represents 95% CIs

**Gold Standard:
Urine albumin to creatinine ratio
(UACR)**

Urinary protein



Urine protein to creatinine ratio

**Special Thanks to Scott and White of Temple TX for
use of their kidney comic**



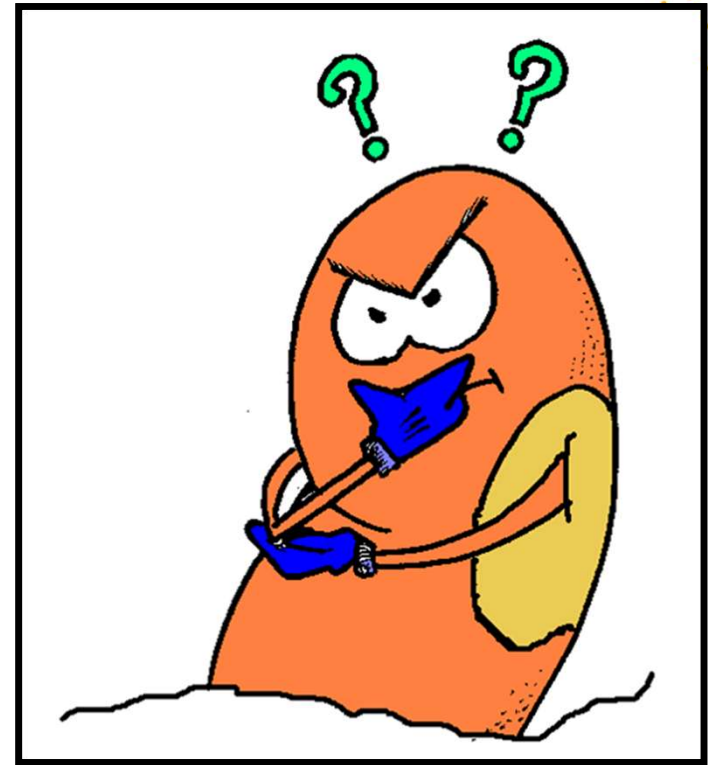
Urine Pearls

- **UACR will be positive BEFORE eGFR drops**
- Some labs (Quest, LabCorp) refer to a UACR as 'microalbuminuria'
- NKF has joined with Quest (*Code: 39165, CPT: 82043; 82565; 82570*) and LabCorp (*Code: 140301, CPT: 82043; 82565; 82570*) to roll out a 'Kidney Profile' that incorporates both the SCr + the UACR
- **Order a UACR at least 1x/yr to monitor kidney function**
 - **For all patients with hypertension**
 - **For all patients with diabetes**
 - **For all patients with risk factors**
 - **Age >60 y/o is a risk factor**



So we know who
has CKD
And we tested
their urine

Now...how do we
manage CKD in
2023?



The Big 5

- 1) Hypertension
- 2) Diabetes
- 3) Obesity
- 4) Cardiovascular Disease
- 5) This and That (kind of defies categorization)



Hypertension



The most common comorbidity in CKD is HTN

If HTN doesn't cause your CKD, your CKD will cause HTN

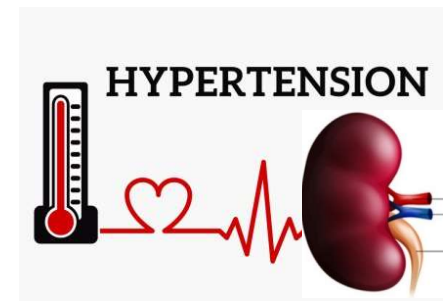
So what is the GOAL?

KDIGO 2021 HTN Management in CKD GUIDELINES:

Target **SBP 120mm** Hg

Use an automatic office cuff measurement

No DBP goal



Effectiveness of Lifestyle Changes

| Modification | Example | Approx Reduction |
|--------------------------|--|----------------------------------|
| Physical activity | Aerobic (brisk walking?) >30/day, most days | 4-9mmHg |
| DASH eating plan | Low fat diet rich in fruits, vegetables | 8-14mmHg |
| NACL restriction | Decrease to 2.4gm/day | 2-8mm Hg |
| Moderate ETOH | 1 drink/women, 2 drinks/men | 2-4mmHg |
| Weight loss | BMI 18.5-25 | 5-20mmHg/10kg weight loss |
| Stress reduction | Practice modality | 5mmHg |
| Quit smoking | Any which way | 2-4mmHg after 1 week |

NACL Restriction

Stage of Kidney Disease
= NACL clearance

Most effective in
patients of color

Tricks:

Pork holidays

No cooking w/NACL

'B' cooking



First Choice: ACEi/ARB

ACEi OR ARB:

First choice in Diabetes and/or CKD

Even in the AA population

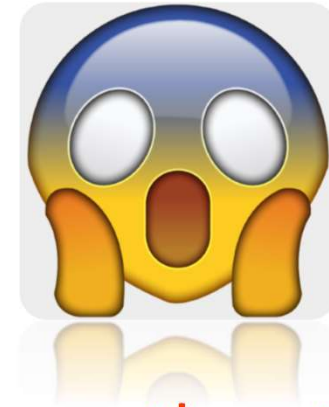
Will decrease albuminuria....

Use it even if there is no albuminuria

It doesn't matter ACEi vs ARB

Only 1 or the other due to:

- inc risk of hyperkalemia
- Hypotension
- AKI/failure
- no decrease in mortality



**One or the other
NOT BOTH!**



Rose



74 y/o routine visit

PMH: PVD, HL, HTN

Meds: metoprolol, HCTZ, amlodipine, ASA, atorvastatin

PE: 168/98, home 150-160s

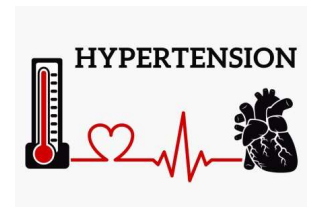
Labs: SCr 1.2mg/dL, UACR 30mg/dL, eGFR 56mm/min

Add lisinopril for BP/UACR control

F/U labs 2 weeks later, **SCr 1.5mg/dL with K 5.2mEq/L**

What is an acceptable rise in SCr when starting an ACEi/ARB?

**Acceptable rise in SCr
is 20-30%**



When do I stop an ACEi/ARB?

- If hyperkalemia cannot be **controlled**
 - Diet, education, medication

What do the present studies say? *All observational trials*

Continued use of ACEi/ARB with a GFR<30mm/min protected the heart WITHOUT an increase in ESRD*

Stopping ACEi/ARB increased mortality and MACE endpoints by 11.9-13.6% with a <8% increase in ESRD in Stage 5 patients**

Inc death rate due to CVD in those who had ACE/ARB stopped for hyperkalemia***



* Ass Between Renin-Angiotensin System Blockade Discontinuation and All-Cause Mortality Among Persons With Low Estimated Glomerular Filtration Rate, *JAMA Intern Med*, 2020

** Stopping Renin-Angiotensin System Inhibitors in Patients with Advanced CKD and Risk of Adverse Outcomes: A Nationwide Study, *JASN* Feb 2021

*** Hyperkalemia-Related Discontinuation of Renin-Angiotensin-Aldosterone System Inhibitors and Clinical Outcomes in CKD: A Population-Based Cohort Study, *AJKD* 2022

When do I stop an ACEi/ARB?

The STOP-ACEi trial

Multicenter UK randomized controlled trial of ACEi/ARB withdrawal in advanced kidney disease

Enrollment completed **June 2018, published Nov 2022**

Trial time line 3 years

Do patients who stop ACEi/ARB have more cardiac events or more GFR loss??

**Higher death rate from
kidney AND cardiac endpoints
If you stop the ACEi/ARB**

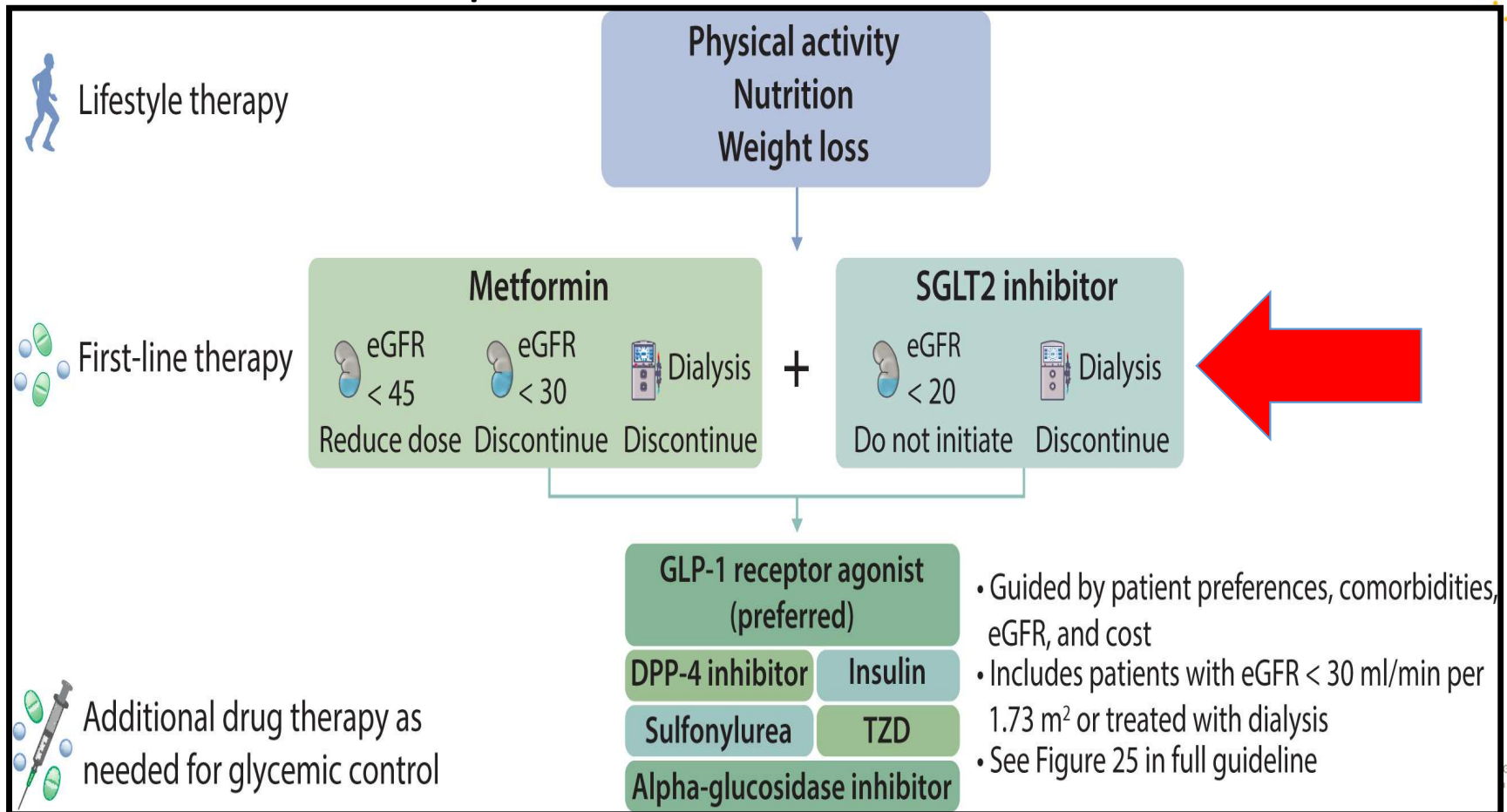


Hypertension Pearls

- NACL restriction is just as effective as a medication
- Always tell a patient that it will take 3-4 meds for control;
If it takes fewer, they think you are brilliant
- Start with ACEi/ARB, then diuretic (if possible)
- Consider an SGLT2i early in the process; It is a diuretic
- Calcium channel blockers work **VERY** well in the AA population
- With cardiovascular disease...ACE/CCB>ACE/diuretic
- Thiazide diuretics do **NOT** work if the GFR<30ml/min
- **NOTHING works if you cannot afford it**



2022 KDIGO: Update for Diabetes Treatment in CKD



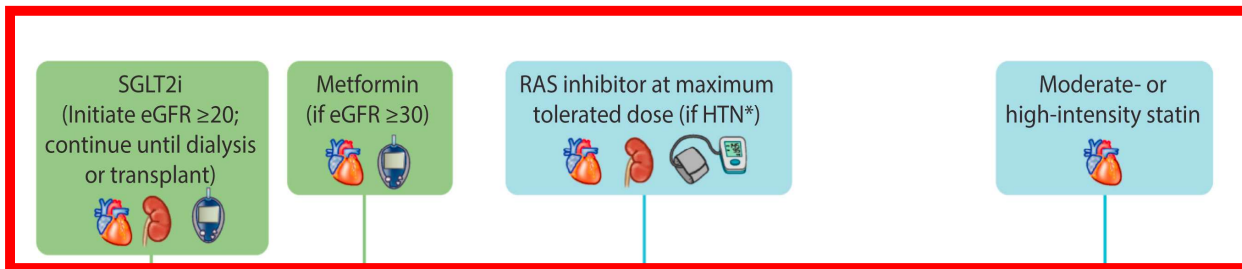
NOTE: Lower eGFR of 20 for starting SGLT2i

Lifestyle



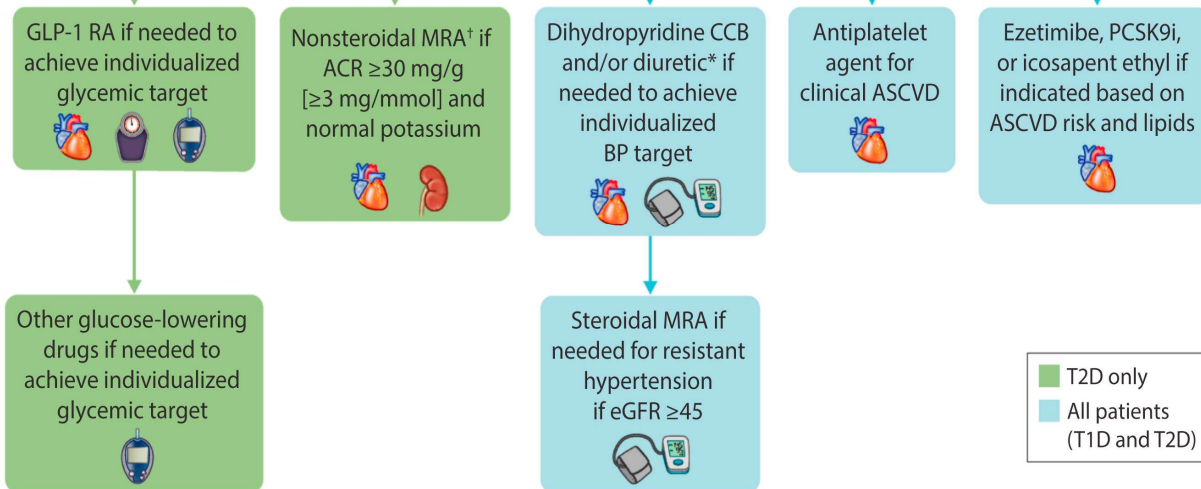
Regular risk factor reassessment (every 3–6 months)

First-line drug therapy



Regular reassessment of glycemia, albuminuria, BP, CVD risk, and lipids

Additional risk-based therapy

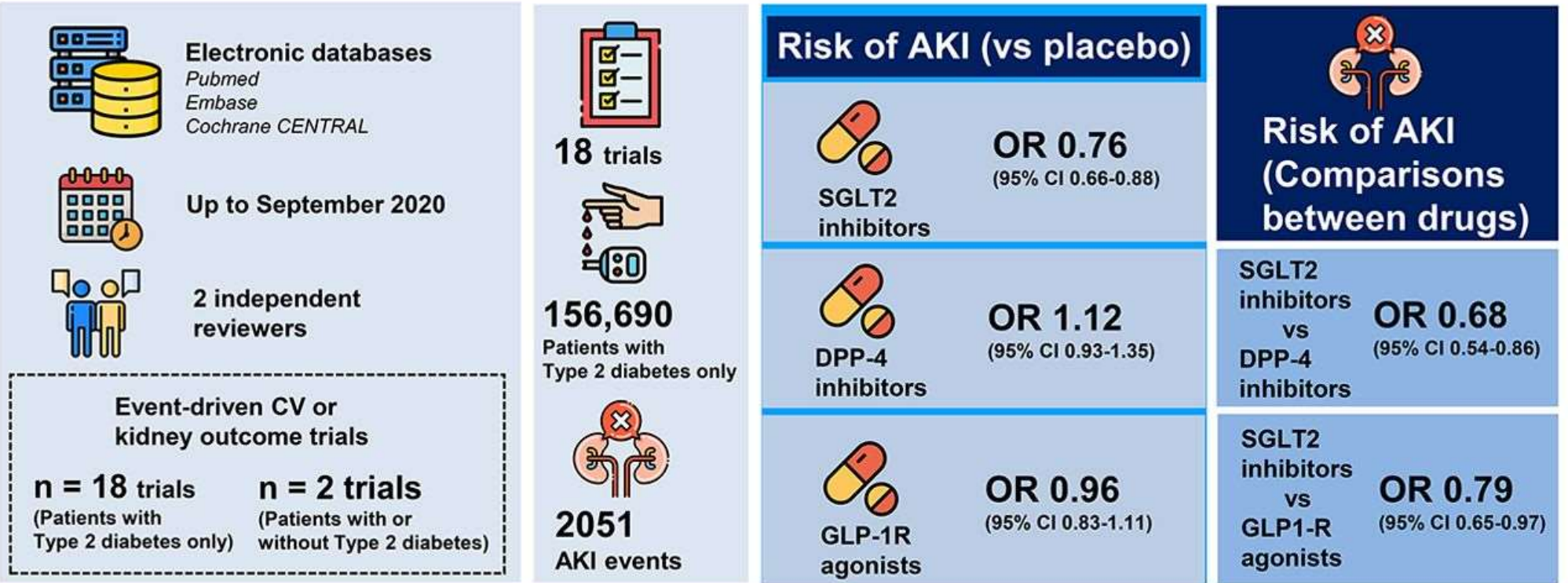


■ T2D only
■ All patients (T1D and T2D)

KDIGO+ADA
Oct 2022
CKD and DM



Comparison of the effects of three novel classes of glucose-lowering drugs on AKI risk in patients with or without type 2 diabetes



Conclusion Current evidence indicates that SGLT2 inhibitors have a lower risk of AKI than both DPP-4 inhibitors and GLP-1RAs.

Min Zhao, Shusen Sun, Zhenguang Huang, et al. *Network Meta-Analysis of Novel Glucose-Lowering Drugs on Risk of Acute Kidney Injury*. CJASN doi: 10.2215/CJN.11220720. Visual Abstract by Edgar Lerma, MD, FASN

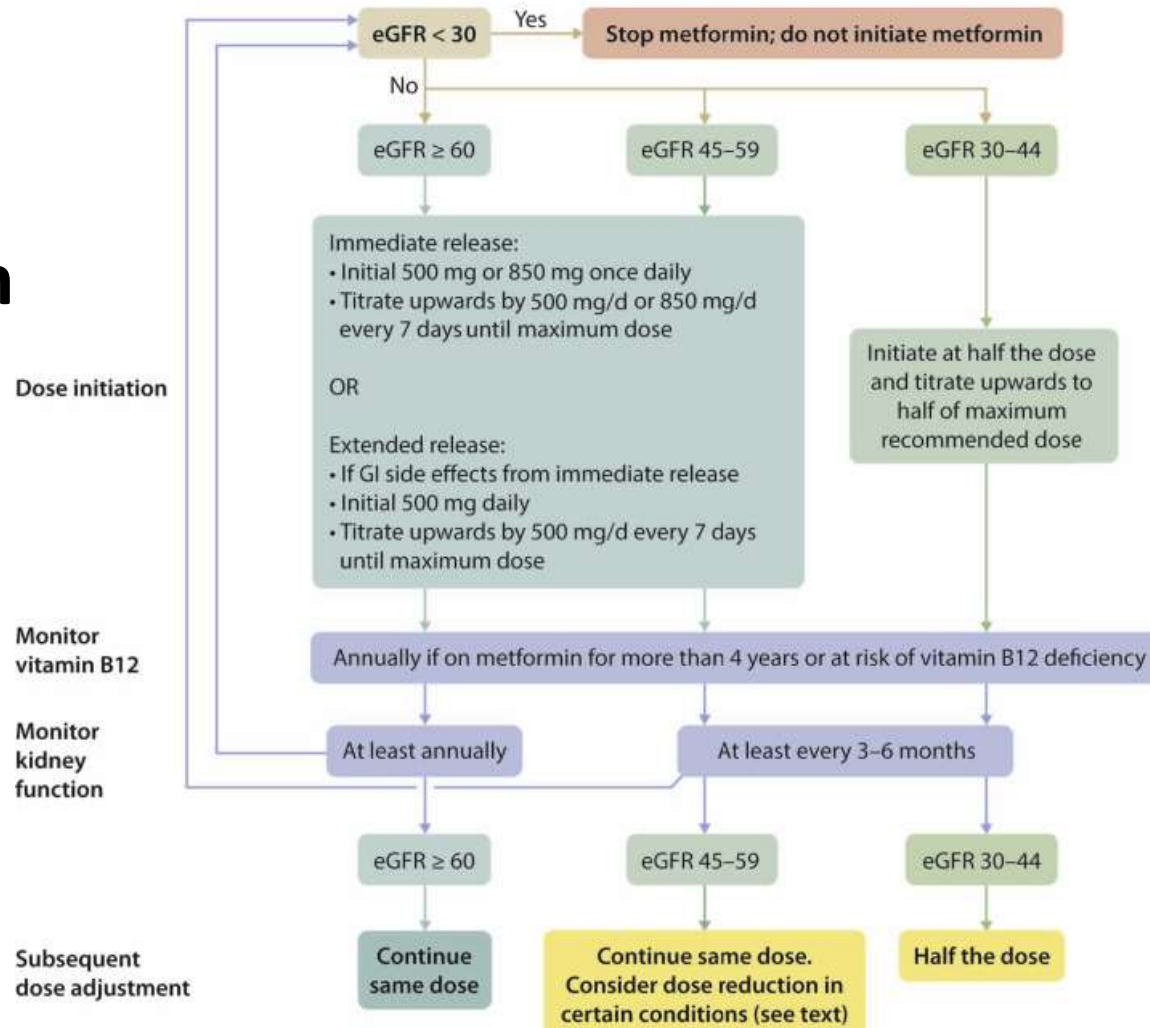
Kidney Specific Family Details: Metformin

- This should be the first medication for any DM patient
- Metformin is underutilized in DKD
- It is an older medication and therefore cheap
- **No renal dosing needed**
- Dosing is dependent of side effects (usually GI)
- Decreases CV risks which cause 70% of all CKD deaths
- Often will decrease cholesterol, triglycerides and weight



Therapeutic Considerations for Antihyperglycemic Agents in DKD CJASN May 2017

Metformin Dosing in CKD: Algorithm Format



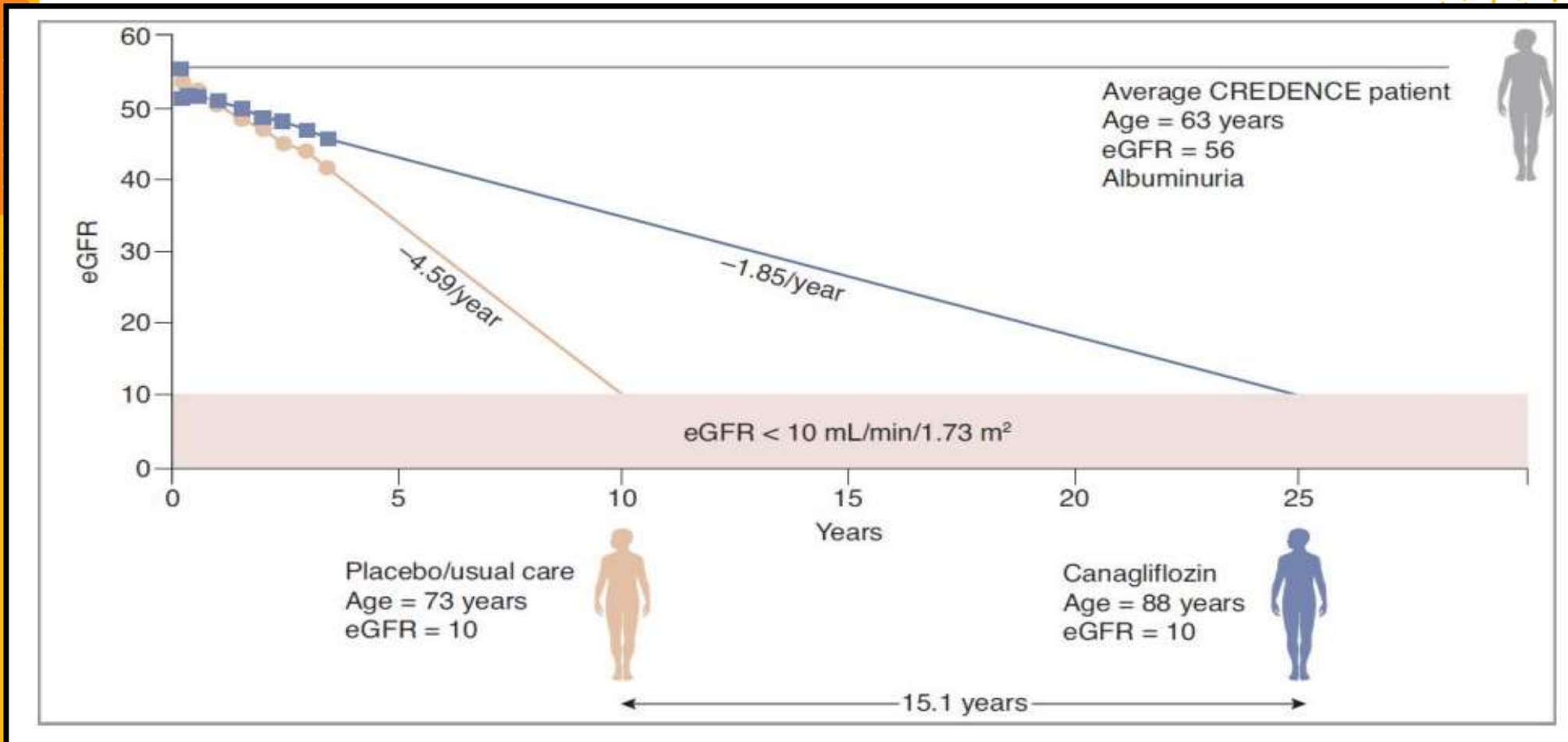
MACE Endpoints for SGLT2i Trials

- 1st trial **EMPA-REG** with kidney as secondary outcome
Protected against Nephropathy! 44% DECREASE in kidney endpoints
Lowered albuminuria, slowed eGFR loss, lowered kidney/CV death
- **CREDESCENCE** enrolled DKD patients for a primary endpoint trial
All had UACR>300mg/dL; Stopped early
Lowered albuminuria, slowed eGFR loss, lowered kidney/CV death 43%
- **DAPA CKD** enrolled CKD patients for primary endpoint trial
All had albuminuria but ½ did NOT have diabetes
Lowered albuminuria, slowed eGFR loss, lowered kidney/CV death 41%
- **EMPA-KIDNEY** enrolled CKD patients with and without albuminuria
Trial stopped early but all patients did better with SGLT2i
Those with more albuminuria showed best results



Wanner C, et al. *NEJM* 2019, Perkovic V, et al. *NEJM* 2019, Heerspink HJL, et al. *NEJM* 2020, The EMPA-KIDNEY Collaborative Group, *NEJM* Nov 2022

CREDESCENCE: Using Canagliflozin postpones Dialysis



Perkovic V, et al. *N Engl J Med.* 2019;380:2295-2306

Tricks to Using SGLT2 inhibitors in CKD

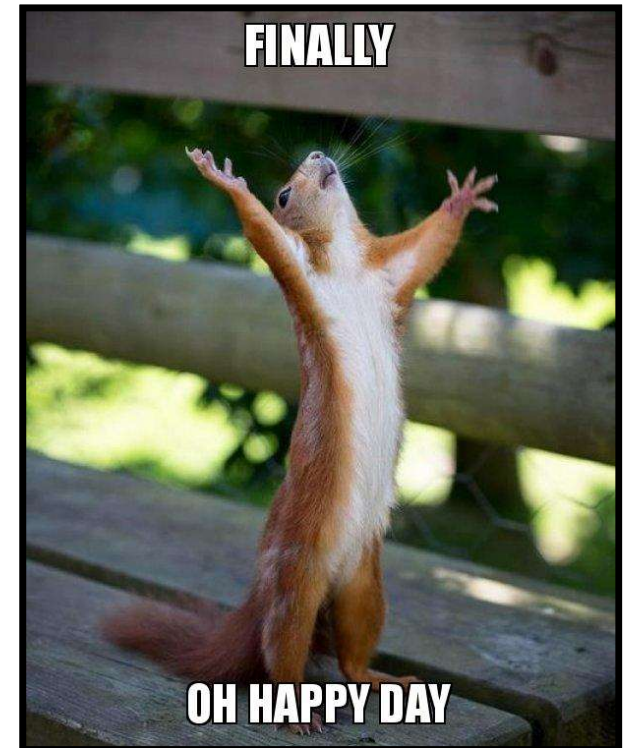
- Initially treat with maximum dose of ACEi/ARB before adding SGLT2i
SGLT2i can be used up to Stage 4 (20ml/min)
- If patient on loop diuretic, ½ the dose....
(in trials, researcher choice: ½ number of daily doses or ½ each dose)
- Tell patient to increase fluid (*water*)
- Monitor blood pressure; all SGLT2i are diuretics too!
- There will be a drop in eGFR (inc in SCr) but take a deep breath, step away from EHR and ignore
- The A1C may not decline by much as CKD progresses, however, reno/cardio protection occurs
- SCr bump from RAAS is 4-6w but from SGLT2i is 4-6mo

Even those with a bump in eGFR had better kidney outcomes



Benefits of SGLT2i

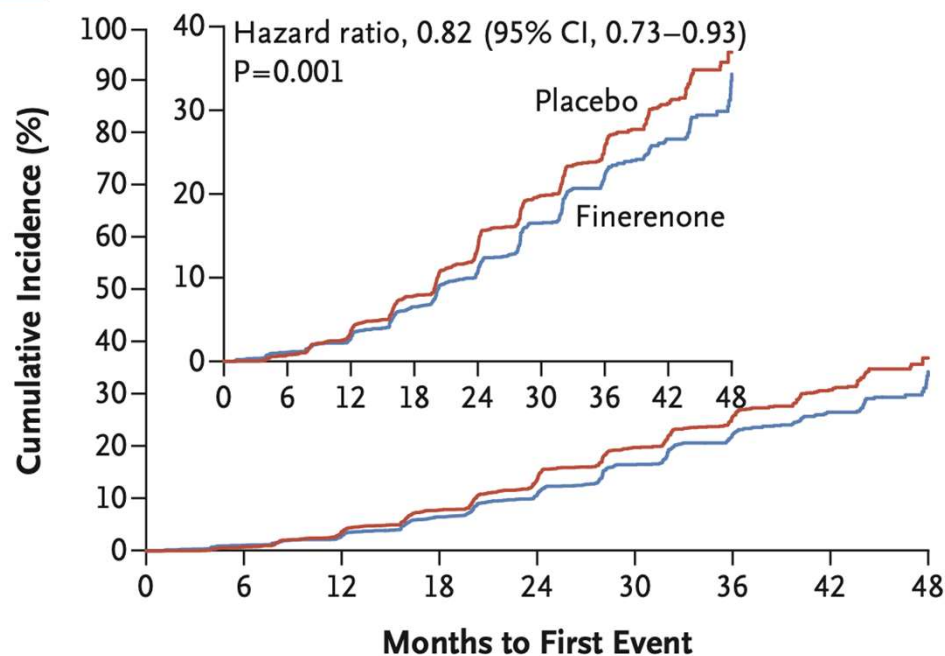
- **Slows progression of CKD**
 - CREDESCENCE: if eGFR 56ml/min, UACR 927mg/dL-slow progression by 2.74ml/min/year
 - DAPA-CKD: if eGFR 44ml/min, UACR 930mg/dL-slow progression by 1.8ml/min/year
- **Reduces albuminuria**
 - 30-40% and this is on top of ACE/ARB
- **SBP reduction**
 - 4mm Hg
- **Weight reduction**
 - 5-6lb (if eGFR>45ml/min)
- **Reduce A1C**
 - 0.5-0.8% (if eGFR>45ml/min)
- **Lower uric acid by 10%**
 - A 50% lower risk of nephrolithiasis



Kristensen KB, et al. Diabetologia 2021

New Kid on the Block- Non-steroidal MRA Finerenone (Kerendia®)

Primary Composite Outcome



Mechanism of Action

Induces conformational change within the mineralocorticoid receptor

Works to decrease inflammation?

FDA 7/9/21:

- 1) Reduce the risk of loss of kidney function
- 2) Reduce incidence of kidney failure
- 3) Reduce cardiovascular death
- 4) Reduce non-fatal heart attacks
- 5) Reduce hospitalization for heart failure in adults with CKD and T2DM

MRA-Mineralocorticoid Receptor Antagonists

Bakris GL, et al. *N Engl J Med.* 2020;383(23):2219-2229

Bariatric Surgery

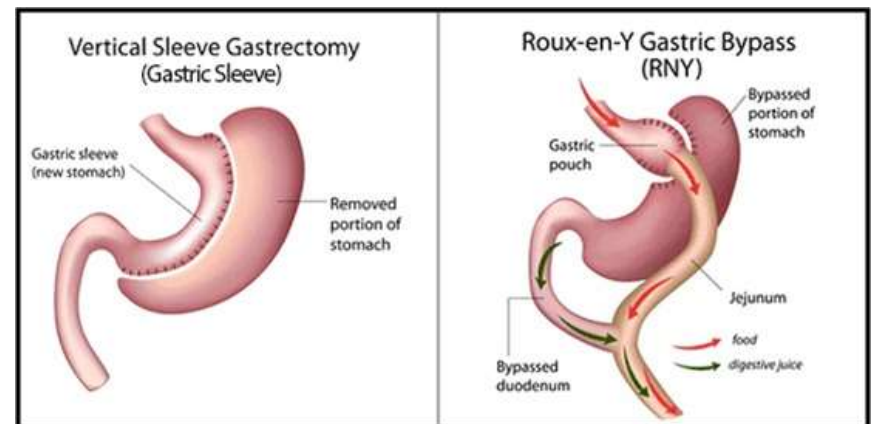
Large Kaiser group (714) over 3 years
44% minority, 77% female, 66% w/DM, 91% w/HTN
Surgical patients had nearly 10mL/min better
eGFRs at 3 years than non-surgical

Large Kaiser group (802) matched with those
without gastric bypass surgery
79% females, BMI>40, +DM, HTN
Surgical patients had a 79% lower 5-year risk of
mortality

Bariatric surgery protects
kidney function + lowers death rate



ANNALS
OF
SURGERY



Bariatric Surgery and Risk of Death in Persons With CKD, Ann Surg. 2022.
eGFR Before/After Bariatric Surgery in CKD. Am J Kidney Dis. 2017

Diabetes and Obesity Pearls

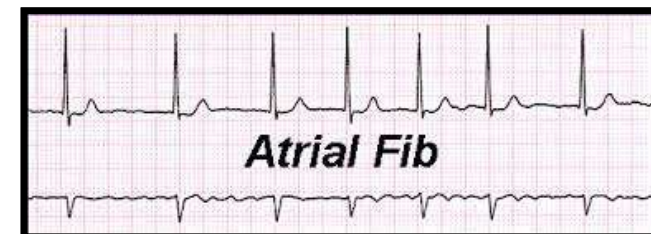
- Losing weight saves your kidneys
 - Studies show >7 year protection after bypass surgery (*JASN 2018, 2144 patients*)
- CKD diagnosis helps for Medicare coverage for Bariatric Surgery
- Some diabetic medications promote weight loss...Use them!
- If you actually followed the diabetic, kidney, hypertensive, cardiovascular diet, you would only be allowed to eat cardboard
- Mediterranean diet is best, plant protein>animal protein
- High fruit and vegetables can cause hyperkalemia
 - Monitor K with any new diet changes (*and in Jan*)
- **NACL holidays help with HTN and weight loss**



Cardiovascular Disease (CVD)



- More than 70% of kidney patients die of CVD
- Statins are underutilized in CKD
- CKD patients are **2-3X** more likely to have atrial fibrillation
 - Take the time to listen with that stethoscope
 - Warfarin vs DOACs is still debated but KDIGO states to use NOACs
- Smoking is an issue
 - Including vaping, marijuana and cigarette
 - *Oral marijuana is safe in CKD*
 - No studies on chewing tobacco

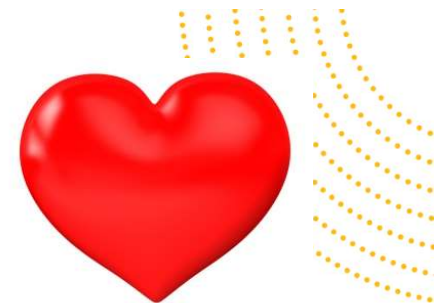


KDIGO Guidelines for dosing in A Fib

| CrCl (ml/min) | Apixaban* (Eliquis®) | Dabigatran (Pradaxa®) | Edoxaban** (Savaysa®, Lixiana®) | Rivaroxaban (Xarelto®) |
|------------------------|---------------------------------------|----------------------------|------------------------------------|--------------------------------|
| >95 | 5mg bid | 150mg bid | 60mg qd^^ | 20mg qd |
| 51-95 | 5mg bid | 150mg bid | 60mg qd | 20mg qd |
| 31-50 | 5mg bid (CrCl cut off 25ml/min) | 150mg bid or 110mg bid^ | 30mg qd | 15mg qd |
| 15-30 | 2.5mg bid | Unknown | 30mg qd could be considered | 15mg qd could be considered |
| <15 not on dialysis | Unknown | Not recommended | Not recommended | Unknown |
| <15 on dialysis | Unknown | Not recommended | Not recommended | Unknown |

Hyperlipidemia

CKD = Heart Disease



SHARP Trial: Statins or statins + ezetimibe

Fibrates are not recommended in CKD by KDIGO

Debatable is effective in Stage 5/5D CKD

Uremia affects LDL levels making them unreliable

When you put a CKD patient on a Statin

FIRE AND FORGET

<http://kdigo.org/home/guidelines/lipids/>

SHARP: The effects of lowering LDL cholesterol with simvastatin plus ezetimibe in patients with CKD (Study of Heart and Renal Protection): a randomised placebo-controlled trial, Lancet 2011



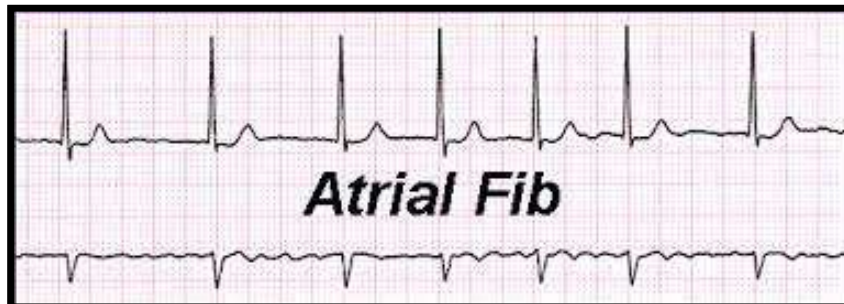
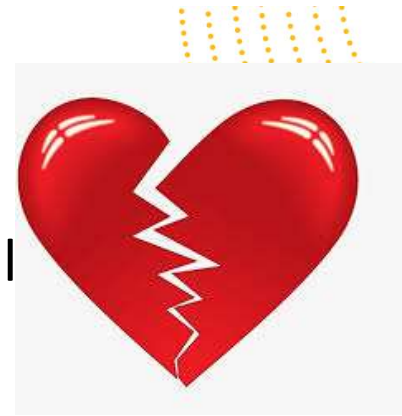
Hyperlipidemia: KDIGO Guidelines

Recommended doses (mg/d) of statins in adults with CKD

| Statin | eGFR G1-G2 | eGFR G3a-G5, including patients on dialysis or with a kidney transplant |
|------------------------------------|---------------------|---|
| Lovastatin | GP (General public) | nd (not determined) |
| Fluvastatin | GP | 80 ¹ |
| Atorvastatin | GP | 20 ² |
| Rosuvastatin (Increased hematuria) | GP | 10 ³ |
| Simvastatin/Ezetmibe | GP | 20/10 ⁴ |
| Pravastatin | GP | 40 |
| Simvastatin | GP | 40 |
| Pitavastatin | GP | 2 |

CVD Pearls

- A CKD patient is more likely to die of CVD than via kidney fail
- All CKD and DM patients should be on a statin
 - Add Vit D if leg cramps
 - **REAL** rhabdo from statins is <5%
- CKD patients are 2X more likely to have cardiac arrhythmias
 - Mainly a fib
- **All patients with CKD have heart disease**



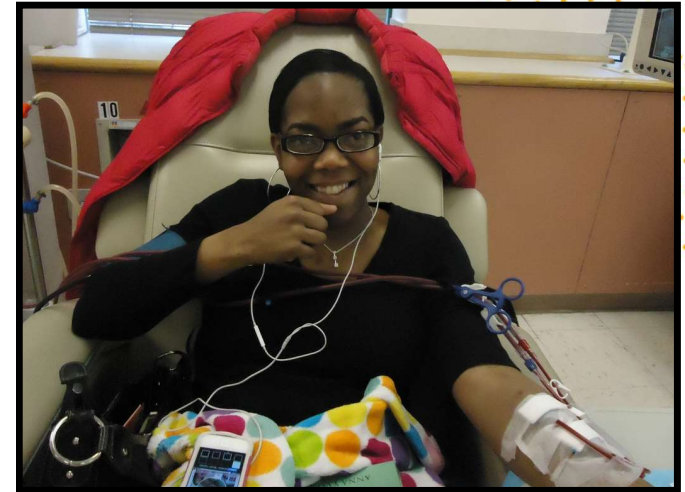
This and That

- Drinking soda after exercise hurts the kidney
- Sleep (7h/night) is reno-protective
- Bilateral oophorectomy increases CKD risk
 - Increase 7.5% if premenopausal
- Increasing H₂O does not help the kidneys
- Marijuana (oral) does not hurt the kidney and may be helpful in pain
- **ETOH is reno-protective**
- PPIs **do** cause CKD but very small risk
- As you lose kidney function, you are more likely to have a serious fall
- Untreated Hepatitis C will cause loss of GFR
- Gut and Dental disease are predictive of CKD



The CKD Patient

- 1) Stage by eGFR + UACR
- 2) Monitor UACR; it is predictive of progression
- 3) All CKD patients are cardiac patients
- 4) All patients should be on statins
- 5) All patients should be on RAAS...studies have shown best at higher doses but any dose is important
- 6) All patients should be considered for SGLT2i
- 7) Any patient with albuminuria should be on RAAS + SGLT2i
- 8) Labs 2x/yr for CKD 3a, quarterly for CKD 3b and q6wk for CKD 4, we follow CKD 5 monthly and CKD 5D weekly
- 9) Check for a fib, anemia, MBD, acidosis, consider birth control
- 10) Discuss concept of 'normal kidney eating' rather than 'diet'



When to Refer

I always hear that your nephrology consultants complain about referrals...

We *are* overwhelmed but...

Start your referral with:

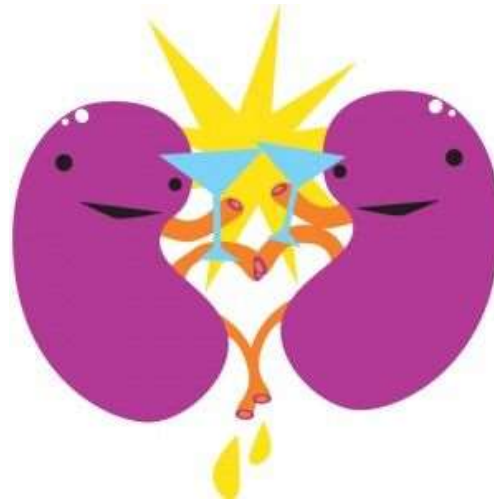
'Per KDIGO Guidelines,

I am referring this patient due to...'

- 1) Uncontrolled HTN
- 2) Stage 4 CKD (*some places taking Stage 3a!*)
- 3) eGFR dropped 25% in 6 months *or*
- 4) SCr increased 25% in 6 months
- 5) Patient request



Thank you for helping us care for our
CKD patients!
We could not do it without you....



Kim Zuber, PAC aanpa1@yahoo.com



References

- 1) Kidney Disease: Improving Global Outcomes (KDIGO) Diabetes Work Group. KDIGO 2020 Clinical Practice Guideline for Diabetes Management in Chronic Kidney Disease. *Kidney Int.* 2020;98(4S):S1–S115.
- 2) Centers for Disease Control and Prevention, Chronic Kidney Disease (CKD) Surveillance System 2021, <https://www.cdc.gov/kidneydisease/pdf/Chronic-Kidney-Disease-in-the-US-2021-h.pdf>
- 3) Kidney Disease: Improving Global Outcomes (KDIGO) Blood Pressure Work Group. KDIGO 2021 Clinical Practice Guideline for the Management of Blood Pressure in Chronic Kidney Disease. *Kidney Int.* 2021;99(3S):S1–S87.
- 4) United States Renal Data System. 2020USRDS Annual Data Report: Epidemiology of kidney disease in the United States. National Institutes of Health, National Institute of Diabetes and Digestive and Kidney Diseases, Bethesda, MD, 2020.
- 5) Center for Disease Control and Prevention, Chronic Kidney Disease in the United States 2021, <https://www.cdc.gov/kidneydisease/publications-resources/ckd-national-facts.html>
- 6) Bhandari S, Mehta S, Khwaja A, Cleland JGF, et al for STOP ACEi Trial Investigators. Renin-Angiotensin System Inhibition in Advanced Chronic Kidney Disease. *N Engl J Med.* 2022 Dec 1;387(22):2021-2032.
- 7) The EMPA-KIDNEY Collaborative Group, Empagliflozin in Patients with Chronic Kidney Disease. *N Engl J Med.* 2023.