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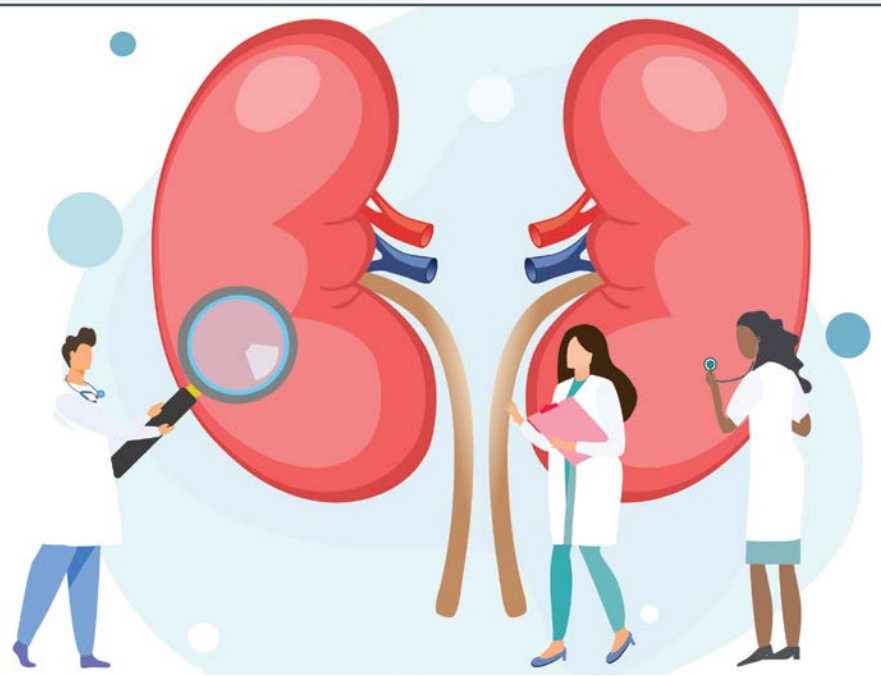
Provided by Clinical Care Options, LLC

# Early Identification and Management of Chronic Kidney Disease: A Call to Action for Primary Care Providers

**November 11, 2023**
**Alpharetta, GA**



This activity is supported by an independent educational grant from Boehringer Ingelheim Pharmaceuticals, Inc. and Eli Lilly and Company.

# Faculty Chairs

**Chuck Vega, MD, FAAFP**
Clinical Professor
UC Irvine Department of Family Medicine
Assistant Dean for Culture and Community Education
Director, Program in Medical Education for the Latino Community (PRIME-LC)
UC Irvine School of Medicine
Orange, California

**Rajeev Raghavan, MD, M.Ed, FASN, FACP**
Program Director, HCA Kingwood Internal Medicine
Clinical Professor, University of Houston Fertitta Family College of Medicine
Associate Designated Institution Official, HCA Gulf Coast Division
HCA Houston Healthcare
Kingwood, Texas

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## Goal

The goal of this program is to improve the knowledge and competence of PCPs in the early screening, identification, and management of CKD

## Target Audience

The target audience for this educational program is primary care physicians, nurse practitioners and physician assistants/associates who care for patients with or who are at risk for CKD

## Learning Objectives

At the conclusion of this activity, learners should be able to:

- Construct a CKD screening and follow-up plan to facilitate early identification and management of kidney disease
- Design a medication therapy plan for cardiorenal protection in a patient with CKD, integrating guideline recommendations with expanding evidence-based treatment options and patient specific clinical characteristics
- Employ best practices in referral and multidisciplinary management of patients with CKD

# Accreditation Information

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## Physician Continuing Medical Education

CCO designates this live activity for a maximum of 1.0 *AMA PRA Category 1 Credit™*. Physicians should claim only the credit commensurate with the extent of their participation in the activity.

## Nursing Continuing Professional Development

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# ARS Interactive Questions

- **How to Vote**
- You will find a small card style remote located at your seat
  - The buttons are numbered 1 through 9 and 0
  - When the presenter asks you to vote on a question, please press the button that corresponds with your answer
  - If you change your mind or press an incorrect key, just press the correct button – the last button pressed will be accepted as your answer
  - At the end of the session, please leave the remote at the seat where you found it

# Outcomes Analysis: What Did You Learn?

- Some questions in this activity will be presented twice: once before the content and then again later in the activity

- Discussion of the correct answers and a summary of your responses will appear only after the postactivity questions
- All responses will be measured only in aggregate (ie, your individual responses will not be identified)
- Thank you for helping us assess the impact of this educational activity

# Poll: How many patients do you screen for CKD in a typical week?

A. 1-4

B. 5-9

C. 10-15

D. >15

# Presurvey 1: For which of the following patients would you want to ensure early screening for CKD?

A. Patient with complicated pregnancy
B. Patient with family history of heart failure
C. Patient with hyperlipidemia
D. Patient with hypothyroidism

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**Presurvey 2: JM is a 50-year-old male with CKD stage 3a and A2 albuminuria. Which dual drug regimen may result in 7 additional years free of kidney failure and death?**

A. Finerenone + ertugliflozin

B. Losartan + semaglutide

C. Olmesartan + quinapril

D. Ramipril + empagliflozin

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**Presurvey 3: JK is a 65-year-old female with an eGFR of 45 mL/min/1.73 $m^2$. She is currently receiving lisinopril, amlodipine, and HCTZ. Her average blood pressure is 150/90 mm Hg. What should your next step be in JK's care to help decrease mortality?**

A. Add sitagliptin
B. Continue to monitor her for 3 months
C. Refer her to a nephrologist
D. Switch HCTZ to furosemide

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# Overview of CKD Screening, Diagnosis, and Progression Risk

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# Background

- 14.8% of US adults have CKD
  - Diabetes mellitus and hypertension are implicated in ~67% of cases
- CKD
  - Silent disease that requires laboratory testing for diagnosis
  - Higher prevalence among people with lower income and education level
  - Responsible for more deaths annually than breast and prostate cancer

**Early detection in at-risk patients is critical to slow progression**

kidney.org/atoz/content/gout/patient-facts. kidneyfund.org/all-about-kidneys/quick-kidney-disease-facts-and-stats.
Vart. JAMA Netw Open. 2020;3:e207932.

Slide credit: clinicaloptions.com

# Who Has CKD?

- Dipstick urinalysis
- Urine albumin-to-creatinine ratio
- Serum creatinine/eGFR
- Serum cystatin/eGFR
- Ultrasonography

niddk.nih.gov/health-information/kidney-disease/chronic-kidney-disease-ckd/tests-diagnosis.
Qiu. Oncotarget. 2017;8:72985. Ahmed. Cureus. 2019;11:e4241.

Slide credit: clinicaloptions.com

# Think About Your Patients Who Are at Risk for CKD

- Obesity
- Diabetes mellitus
- Hypertension
- Premature birth
- Complicated pregnancy
- Comorbid organ disease
- Family history of kidney disease

kidneyfund.org/all-about-kidneys/risk-factors#risk-factors-for-kidney-disease. Crump. BMJ. 2019;365:I1346.
Gouveia. J Bras Befrol. 2021;43:88. MacRae. Cr J Gen Pract. 2021;71:e243.

Slide credit: clinicaloptions.com

# Speaking a Uniform Language

- Blood test to measure kidney function: **creatinine and cystatin C**
- Creatinine (or cystatin C) + age + gender → **eGFR**
- **Urine dipstick** qualitatively indicates presence of blood or protein
- **UACR** is quantitative, spot, 1-time measurement of albuminuria
- 24-hr urine measurements for protein or creatinine are rarely necessary

**Creatinine <1.2 mg/dL and eGFR >60 mL/min/1.73 $m^2$ are *typically* considered normal**

Qiu. Oncotarget. 2017;8:72985. kidney.org/sites/default/files/11-10-1815_HBE_PatBro_Urinalysis_v6.pdf. health.usnews.com/health-care/patient-advice/articles/creatininelevels.

Slide credit: clinicaloptions.com

# *Think* in Stages, but *Talk* in Percentages

| | eGFR (mL/min/1.73 m²) | Normal to Mild Albuminuria (A1) (<30 mg/g) | Moderate Albuminuria (A2) (30-299 mg/g) | Severe Albuminuria (A3) (≥300 mg/g) |
|---|---|---|---|---|
| 1 | Normal or high ≥90 | Low risk | Moderately increased risk | High risk |
| 2 | Mildly decreased 60-89 | Low risk | Moderately increased risk | High risk |
| 3a | Mildly to moderately decreased 45-59 | Moderately increased risk | High risk | Very high risk |
| 3b | Moderately to severely decreased 30-44 | High risk | Very high risk | Very high risk |
| 4 | Severely decreased 15-29 | Very high risk | Very high risk | Very high risk |
| 5 | Kidney failure ≤15 | Very high risk | Very high risk | Very high risk |

*Staging is for research or coding and guiding management*

*Patients are more comfortable with eGFR*

eGFR is akin to a percentage

33 mL/min = 33%)

kidney.org/kidneydisease/siemens_hcp_quickreference.

Slide credit: clinicaloptions.com

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# Screening Recommendations: USPSTF

- USPSTF was against recommending routine screening in asymptomatic adults in 2012

**BUT…**

- Reevaluation in progress (July 2023)
  - Increased prevalence of obesity and diabetes mellitus
  - Importance of early detection
  - Advances in medical therapies
- Key questions to answer:
  - In asymptomatic adults without CKD diagnosis, what impact does screening have on clinical outcomes? What are the harms? Among those with stage 1-3 CKD, what impact does treatment have on clinical outcomes?

Moyer. Ann Intern Med. 2012;157:567.
uspreventiveservicestaskforce.org/uspstf/document/draft-research-plan/chronic-kidney-disease-screening.
cdc.gov/obesity/data/adult.html. cdc.gov/diabetes/library/reports/reportcard/national-state-diabetes-trends.html.

Slide credit: clinicaloptions.com

# Screening Recommendations: Specialty Societies

- KDIGO and International Society of Nephrology recommend screening groups with at-risk factors
  - Hypertension, diabetes, cardiovascular disease, older age, family history of CKD, or race/ethnicity
- American Diabetes Association and KDIGO recommend:
  - UACR and eGFR for patients with T1D (starting at 5 yr) and T2D (at diagnosis) annually or more if at high risk
    - Of 1.8 million people with T2D, 85% had ≥1 serum creatinine test in 1 yr, but only 44% had UACR ordered (based on claims data)

kdigo.org/wp-content/uploads/2019/01/ISN_KDIGO_EarlyScreeningBooklet_WEB.pdf.
diabetesjournals.org/care/article/45/12/3075/147614/Diabetes-Management-in-Chronic-Kidney-Disease-A.
Folkerts. Mayo Clin Proc. 2021;96:975.

Slide credit: clinicaloptions.com

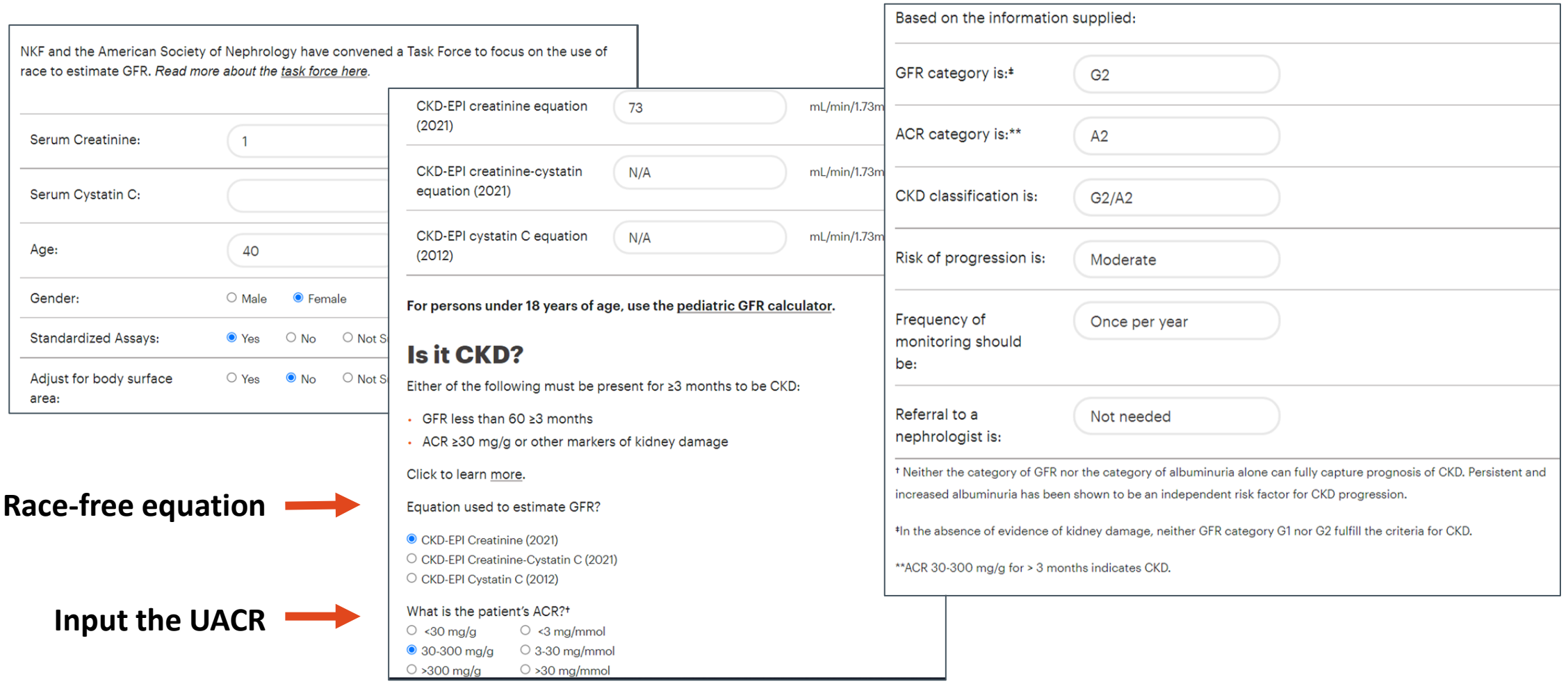
# Improving Equity in CKD Screening

- Start using eGFR equations that do not require race identification
  - 2021 CKD-EPI creatinine formula[1]
- Adopt use of cystatin C instead of or along with creatinine to measure eGFR
- Consider doing genetic testing early
  - ~25% of patients with CKD report family history[2]
  - APOL1 mutation associated with CKD in those from western and central Africa[3]

1. kidney.org/professionals/kdoqi/gfr_calculator/formula. 2. Groopman. NEJM. 2019;380:142.
3. kidneyfund.org/all-about-kidneys/other-kidney-diseases/apol1-mediated-kidney-disease.

Slide credit: clinicaloptions.com

# Using an Online Calculator Is Simple and Beneficial




**Race-free equation** →

**Input the UACR** →

kidney.org/professionals/kdoqi/gfr_calculator.

Slide credit: clinicaloptions.com

# Tools to Enhance Screening

- **Informatics:** auto alerts within electronic health record to identify acute kidney injury and/or reminders to monitor UACR
- **Provider:** handheld ultrasonography and nephrologist-led education via quarterly lectures, patient-facing booklet, clinic champion
- **Laboratory:** adoption of cystatin C, in addition to creatinine, to measure eGFR

Lamprea-Montealegre. BMC Nephrol. 2022;23:331.

Slide credit: clinicaloptions.com

# Preventing CKD Progression and Adverse Health-Related Outcomes

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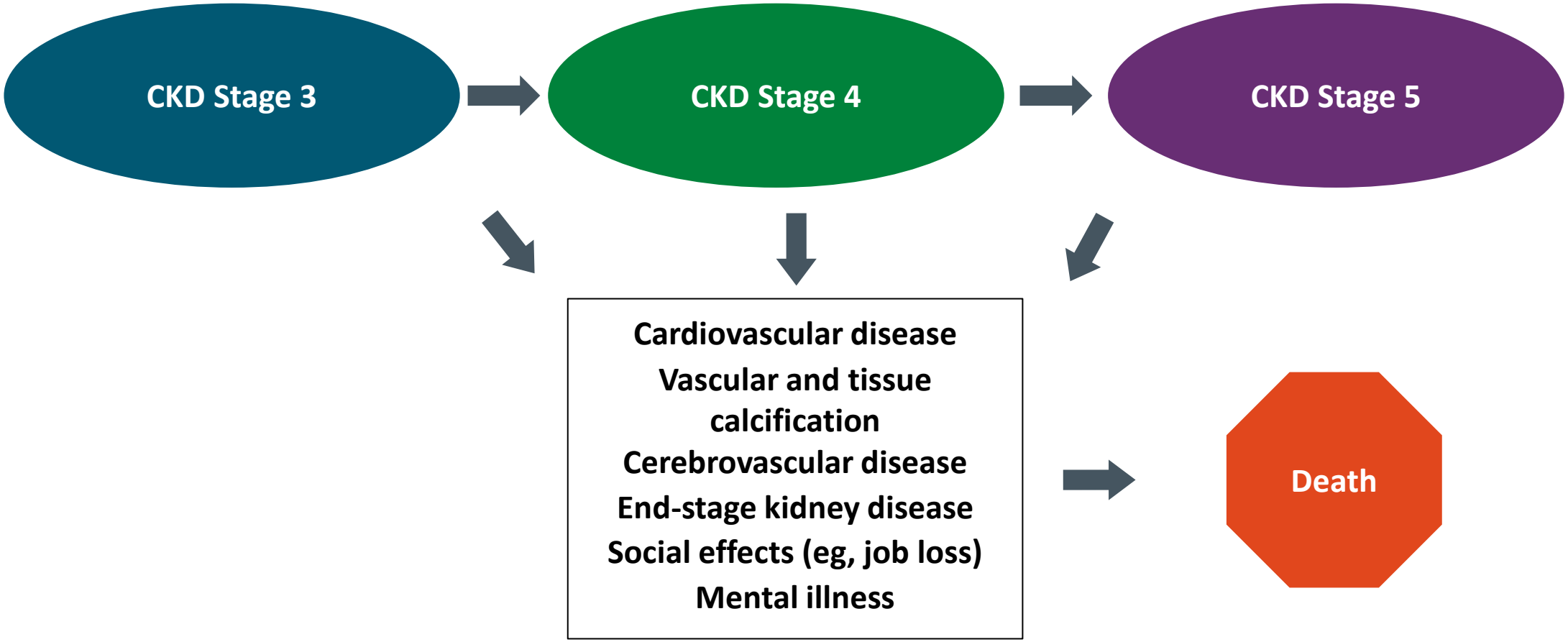
# Health-Related Risks in CKD




Slide credit: clinicaloptions.com

# Guideline-Recommended Management in CKD: When eGFR Is <45 mL/min/1.73 $m^2$

- Metabolic acidosis
  - Bicarbonate therapy to target $HCO_3$
  - Fruits and vegetables, sodium bicarbonate
- Hyperkalemia
  - Late manifestation of CKD
  - Potassium binders
- Volume overload
  - Sodium restriction
  - Chlorthalidone is effective diuretic in advanced CKD

kidney.org/sites/default/files/02-10-8119_cbj_kls_profed_bulletin_metabolicacidosis_slim.pdf. Morales. Front Med (Lausanne). 2021;8:653634. Vaidya. ncbi.nlm.nih.gov/books/NBK535404. Ali. Curr Opin Nephrol Hypertens. 2022;31:406.

Slide credit: clinicaloptions.com

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# Guideline-Recommended Management in CKD: When eGFR Is <45 mL/min/1.73 m$^2$

- Mineral and bone disorder
  - Phosphate binders with each meal
  - Start inactive vitamin D early
  - Active vitamin D to treat secondary hyperparathyroidism
- Anemia of CKD
  - Monthly iron panel with supplementation if TSAT <20%
  - Target hemoglobin 11-11.5 g/dL

kidney.org/atoz/content/MineralBoneDisorder. https://www.ajkd.org/action/showPdf?pii=S0272-6386%2813%2900978-5. Krikorian. US Pharm. 2013;8:22.

Slide credit: clinicaloptions.com

# Blood Pressure Management

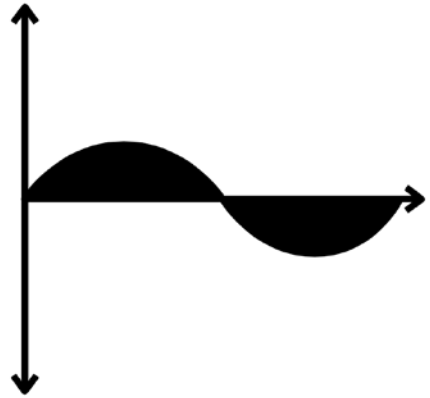
- Recommend starting RASi for people with high blood pressure, CKD, and severely increased albuminuria
  - Albuminuria A3 *without* diabetes and albuminuria A2-A3 with diabetes
  - Avoid combinations of ACEi, ARB, and RASi medications
- KDIGO guidelines target: 130/80 mm Hg in CKD ***and*** diabetes mellitus
- Less-intensive blood pressure–lowering therapy in patients with very limited life expectancy or symptomatic postural hypotension

Jung. Electrolyte Blood Pres. 2021;19:19. kdigo.org/wp-content/uploads/2016/10/KDIGO-2021-BP-GL.pdf.

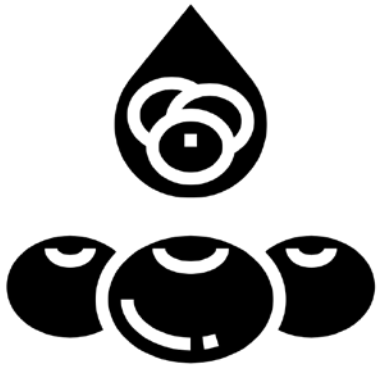
Slide credit: clinicaloptions.com

# Pitfalls With A1C Measurement in CKD

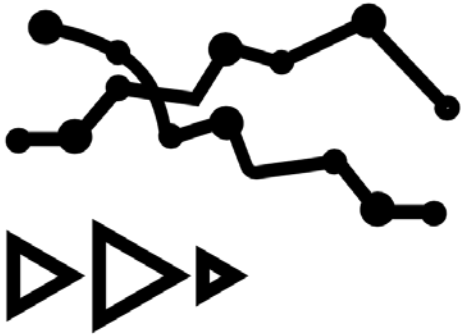
A1C: 3-mo average glucose



Beware of $^{high}$ highs, $_{low}$ lows!



Affected by red blood cell turnover



Variability of 0.5%: SAME patient, SAME day!

kdigo.org/wp-content/uploads/2022/10/KDIGO-2022-Clinical-Practice-Guideline-for-Diabetes-Management-in-CKD.pdf.
Zhou. J Clin Med. 2022;11:6692.

Slide credit: clinicaloptions.com

# Lifestyle Changes Are First Line to Slow Progression of CKD

## When eGFR Is <45%:

- Protein restriction at **0.55-0.8 g/kg/day**
- **4+ servings** of fruits and vegetables per day
- Target **BMI <30 kg/m$^2$** *with* daily exercise
- Restrict sodium to **<2.3 g/Na/day**
- Avoid, avoid, avoid **processed** foods

Joshi. Curr Opin Nephrol Hypertens. 2020;29:16.
Du. Am J Kid Dis. 2022;80:589.

Slide credit: clinicaloptions.com

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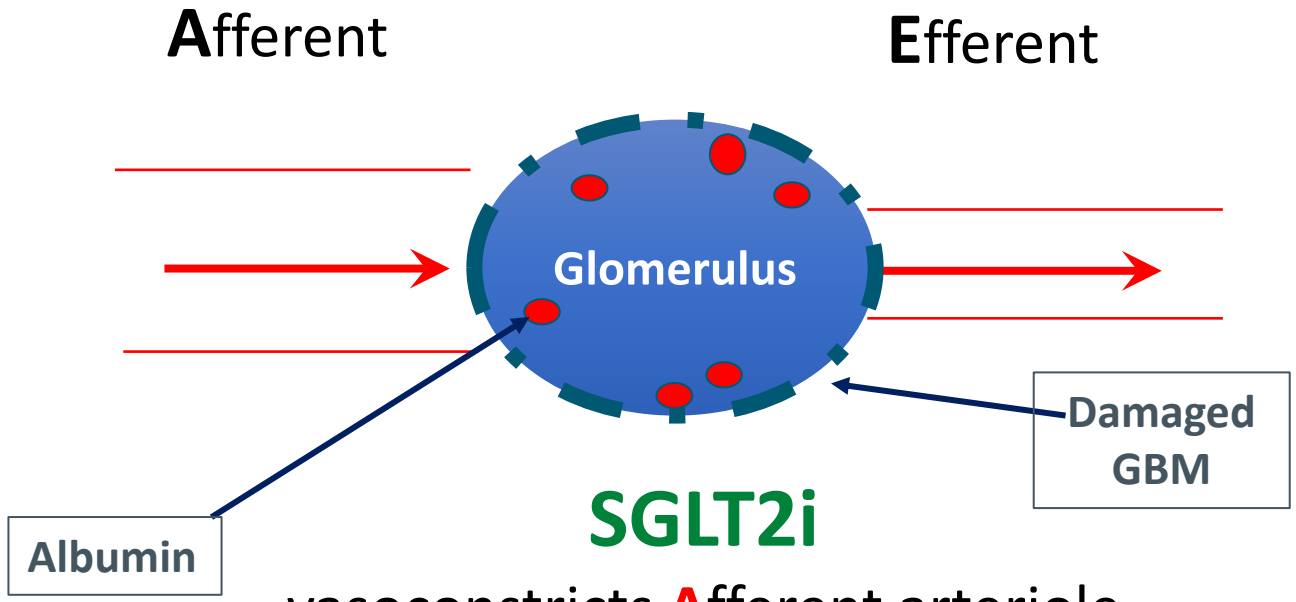
# Reducing Albuminuria Improves Outcomes

- Persistent albuminuria results in fibrosis and scarring within tubules → disease progression
- Treatment goal
  - A3 (≥300 mg/g) → A2 → A1 (<30 mg/g)

**RASi**

limit **E**fferent arteriole vasoconstriction



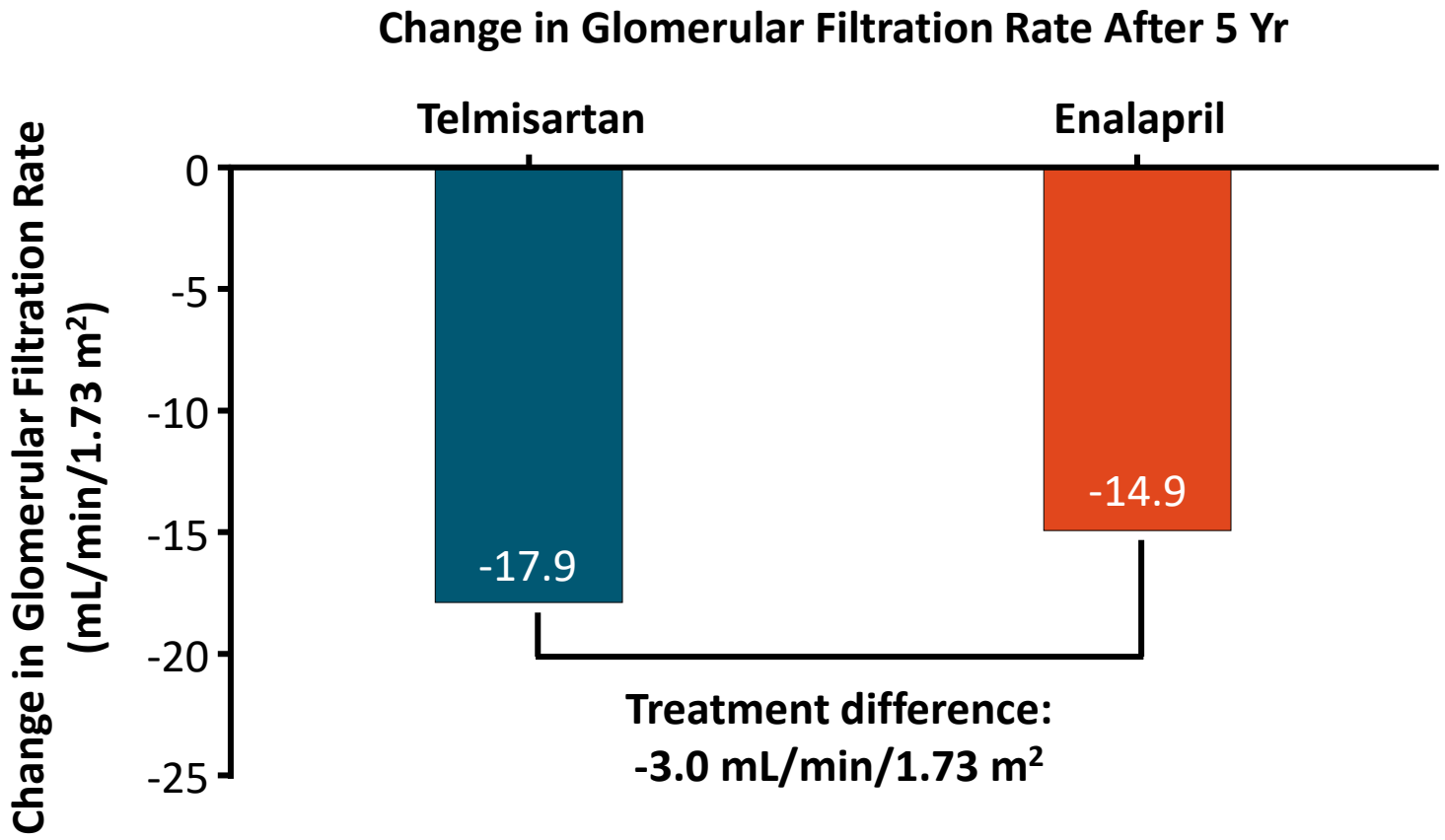

**SGLT2i**

vasoconstricts **A**fferent arteriole

Lambers Heerspink. Clin J Am Soc Nephrol. 2015;10:1079. kidney.org/kidneydisease/siemens_hcp_quickreference.

Slide credit: clinicaloptions.com

# ACEi vs ARB: No Difference in Glomerular Filtration Rate Decline




**Telmisartan is noninferior to enalapril for long-term renoprotection in persons with T2D**

Barnett. NEJM. 2004;351:1952.

Slide credit: clinicaloptions.com

# FDA-Approved SGLT2 Inhibitors

| | Bexagliflozin | Canagliflozin | Dapagliflozin | Empagliflozin | Ertugliflozin |
|---|---|---|---|---|---|
| **Dosage forms** | 20 mg | 100 mg<br>300 mg | 5 mg<br>10 mg | 10 mg<br>25 mg | 5 mg<br>15 mg |
| **Dosing** | 20 mg in morning independent of meals | 100-300 mg prior to first meal of day | 5-10 mg independent of meals | 10-25 mg in morning independent of meals | 5-15 mg in morning independent of meals |
| **Renal indication** | None | To reduce risk of ESKD, doubling of serum creatinine, CV death, and hospitalization for heart failure in adults with T2D and diabetic nephropathy with albuminuria | To reduce risk of sustained eGFR decline, ESKD, CV death, and hospitalization for heart failure in adults with chronic kidney disease at risk of progression | To reduce risk of sustained decline in eGFR, ESKD, CV death, and hospitalization in adults with chronic kidney disease at risk of progression | None |

Bexagliflozin PI. Canagliflozin PI. Dapagliflozin PI. Empagliflozin PI. Ertugliflozin PI.

Slide credit: clinicaloptions.com

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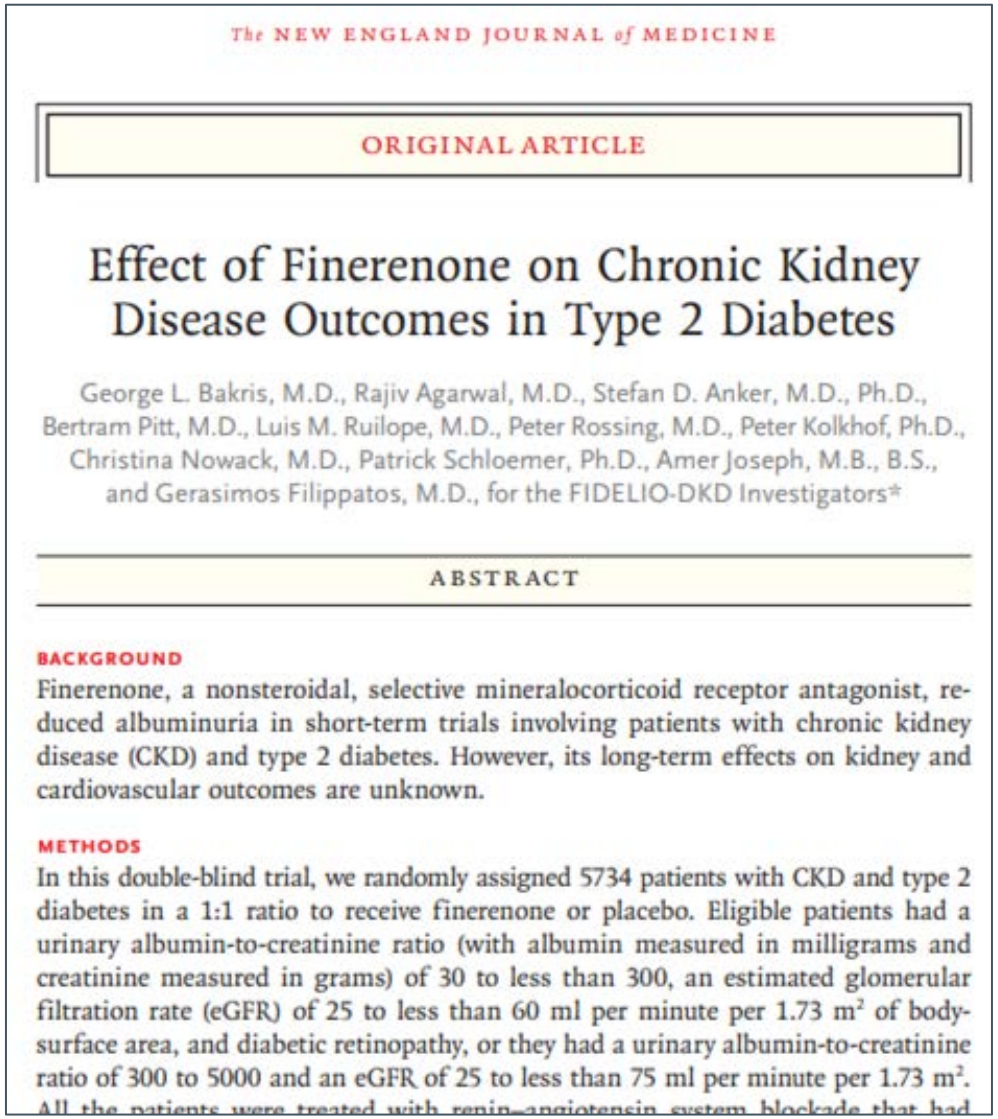
# Nonsteroidal, Selective Mineralocorticoid Receptor Antagonist

- Among patients with CKD and T2D, finerenone treatment lowered risk of CKD progression (NNT = 29) and cardiovascular events (NNT = 42) compared with placebo



The NEW ENGLAND JOURNAL of MEDICINE

ORIGINAL ARTICLE

## Effect of Finerenone on Chronic Kidney Disease Outcomes in Type 2 Diabetes

George L. Bakris, M.D., Rajiv Agarwal, M.D., Stefan D. Anker, M.D., Ph.D., Bertram Pitt, M.D., Luis M. Ruilope, M.D., Peter Rossing, M.D., Peter Kolkhof, Ph.D., Christina Nowack, M.D., Patrick Schloemer, Ph.D., Amer Joseph, M.B., B.S., and Gerasimos Filippatos, M.D., for the FIDELIO-DKD Investigators*

ABSTRACT

BACKGROUND

Finerenone, a nonsteroidal, selective mineralocorticoid receptor antagonist, reduced albuminuria in short-term trials involving patients with chronic kidney disease (CKD) and type 2 diabetes. However, its long-term effects on kidney and cardiovascular outcomes are unknown.

METHODS

In this double-blind trial, we randomly assigned 5734 patients with CKD and type 2 diabetes in a 1:1 ratio to receive finerenone or placebo. Eligible patients had a urinary albumin-to-creatinine ratio (with albumin measured in milligrams and creatinine measured in grams) of 30 to less than 300, an estimated glomerular filtration rate (eGFR) of 25 to less than 60 ml per minute per 1.73 $m^2$ of body-surface area, and diabetic retinopathy, or they had a urinary albumin-to-creatinine ratio of 300 to 5000 and an eGFR of 25 to less than 75 ml per minute per 1.73 $m^2$. All the patients were treated with renin–angiotensin system blockade that had

Bakris. NEJM. 2020;383:2219.

Slide credit: clinicaloptions.com

# 2023 ADA Standards of Care: Pharmacologic Approaches to Glycemic Treatment

**Goal: cardiorenal risk reduction in high-risk patients with T2D (plus comprehensive CV risk management)**

## ASCVD or indicators of high risk

GLP-1 RA with proven CVD benefit

**Either or**

SGLT2i with proven CVD benefit

If A1C above target

- For patients receiving GLP-1 RA, consider adding SGLT2i with proven CVD benefit or vice versa
- TZD

## Heart failure (HFrEF or HFpEF)

SGLT2i with proven HF benefit in this population

## CKD (on max tolerated ACEi/ARB)

**Preferably** SGLT2i with primary evidence of reducing CKD progression; use SGLT2i in people with eGFR >20 mL/min/1.73 $m^2$; continue until initiation of dialysis or transplantation

**Or** GLP-1 RA with proven CVD benefit if SGLT2i not tolerated or contraindicated

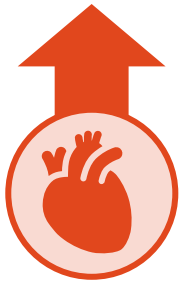
If A1C above target, for patients receiving SGLT2i, consider incorporating a GLP-1 RA or vice versa

El Sayed. Diabetes Care. 2023;46(suppl 1):5140.

Slide credit: clinicaloptions.com

# Cardiovascular Protection

## Cardiovascular Disease Is Leading Cause of Death in Patients With T2D



2-4x rate of CV disease

2x rate of heart failure

Life span in adults ≥50 yr of age
**MEN:** 7.5 yr
**WOMEN:** 8.2 yr

Risk of stroke (RR: 1.8-6)

50% higher rate of CV death

Go. Circulation. 2014;129:e28. Franco. Arch Intern Med. 2007;167:1145.
McAllister. Circulation. 2018;138:2774. Malmberg. Circulation. 2000;102:1014.

Slide credit: clinicaloptions.com

# ASCVD Risk Factors and Risk Enhancers

- Family history of premature ASCVD
- Primary hypercholesterolemia
- Metabolic syndrome
- CKD with or without albuminuria
- Chronic inflammatory conditions
- History of premature menopause
- History of preeclampsia
- Persistently elevated primary hypertriglyceridemia
- Elevated high-sensitivity C-reactive protein
- Elevated Lp(a)
- Elevated apo B
- ABI >0.9
- Long duration of T2D (≥10 yr)
- High-risk race/ethnicity populations

Arnett. J Am Coll Cardiol. 2019;74:1376.

Slide credit: clinicaloptions.com

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# Cardiovascular Outcomes With SGLT2 Inhibitors

| Trial, Agent | Study Population |
|---|---|
| **EMPA-REG** Empagliflozin | T2D and established CVD |
| **CANVAS** Canagliflozin | T2D and high CV risk |
| **DECLARE-TIMI 58** Dapagliflozin | T2D and CV risk (60%) or CVD (40%) |
| **DAPA-HF** Dapagliflozin | HFrEF ± T2D |
| **VERTIS CV** Ertugliflozin | T2D and established CVD |

Zinman. NEJM. 2015;373;2117. Neal. NEJM. 2017;377:644. Wiviott. NEJM. 2019;380:347.
Perkovic. NEJM. 2019;380:2295. Cannon. Am Heart J. 2018;206:11.

Slide credit: clinicaloptions.com

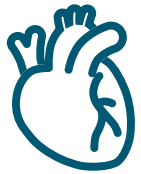
# SGLT2i CVOTs: Patient Populations and Trial Design

| Trial/Drug Tested | EMPA-REG OUTCOME[1] (N = 7020) Empagliflozin | CANVAS Program[2] (N = 10,142) Canagliflozin | DECLARE-TIMI 58[3] (N = 17,160) Dapagliflozin | CREDENCE[4] (N = 4401) Canagliflozin | VERTIS CV[5] (N = 8246) Ertugliflozin |
|---|---|---|---|---|---|
| Duration of follow-up, median, yr | 3.1 | 2.4 | 4.2 | 2.6 | 3.0 |
| Age, mean, yr | 63.1 | 63.3 | 63.9 | 63.0 | 64.4 |
| Gender, % female | 28.5 | 35.8 | 37.4 | 33.9 | 30.0 |
| DM duration, mean, yr | NA | 13.5 | 11.8 | 15.8 | 13.0 |
| Established CVD, % | 100 | 65.6 | 40.6 | 50.4 | 100 |
| History of HF, % | 10.1 | 14.4 | 10.0 | 14.8 | 23.7 |
| Mean A1C, % | 8.1 | 8.2 | 8.3 | 8.3 | 8.2 |
| Reduced renal function (eGFR <60 mL/min/1.73 $m^2$), % | 25.9 | 20.1 | 7.4 | 59.8 | 21.9 |

1. Zinman. NEJM. 2015;373;2117. 2. Neal. NEJM. 2017;377:2097. 3. Wiviott. NEJM. 2019;80;347.
4. Perkovic. NEJM. 2019;380;2295. 5. Cannon. Evaluation of Ertugliflozin Efficacy and Safety Cardiovascular Outcomes Trial – VERTIS CV. ADA Scientific Sessions. 2020.

Slide credit: clinicaloptions.com

# SGLT2 Inhibitors Reduce CV Risk in T2D



| | Empagliflozin EMPA-REG[1] | Canagliflozin CANVAS[2] | Dapagliflozin* DECLARE-TIMI 58[3] | Ertugliflozin VERTIS CV[4] |
|---|---|---|---|---|
| **MACE** | ↓ 14% | ↓ 14% | ↔ Noninferior | ↔ Noninferior |
| **CV death** | ↓ 38% | ↓ 13% | ↓ 17% | ↓ NS |
| **HF hospitalization** | ↓ 35% | ↓ 33% | Composite CV death/HF hospitalization | ↓ 30% |

*60% of participants were in primary prevention population.

1. Zinman. NEJM. 2015;373;2117. 2. Neal. NEJM. 2017;377:2097. 3. Wiviott. NEJM. 2019;380:347.
4. Cannon. Evaluation of Ertugliflozin Efficacy and Safety Cardiovascular Outcomes Trial – VERTIS CV. ADA Scientific Sessions. 2020.

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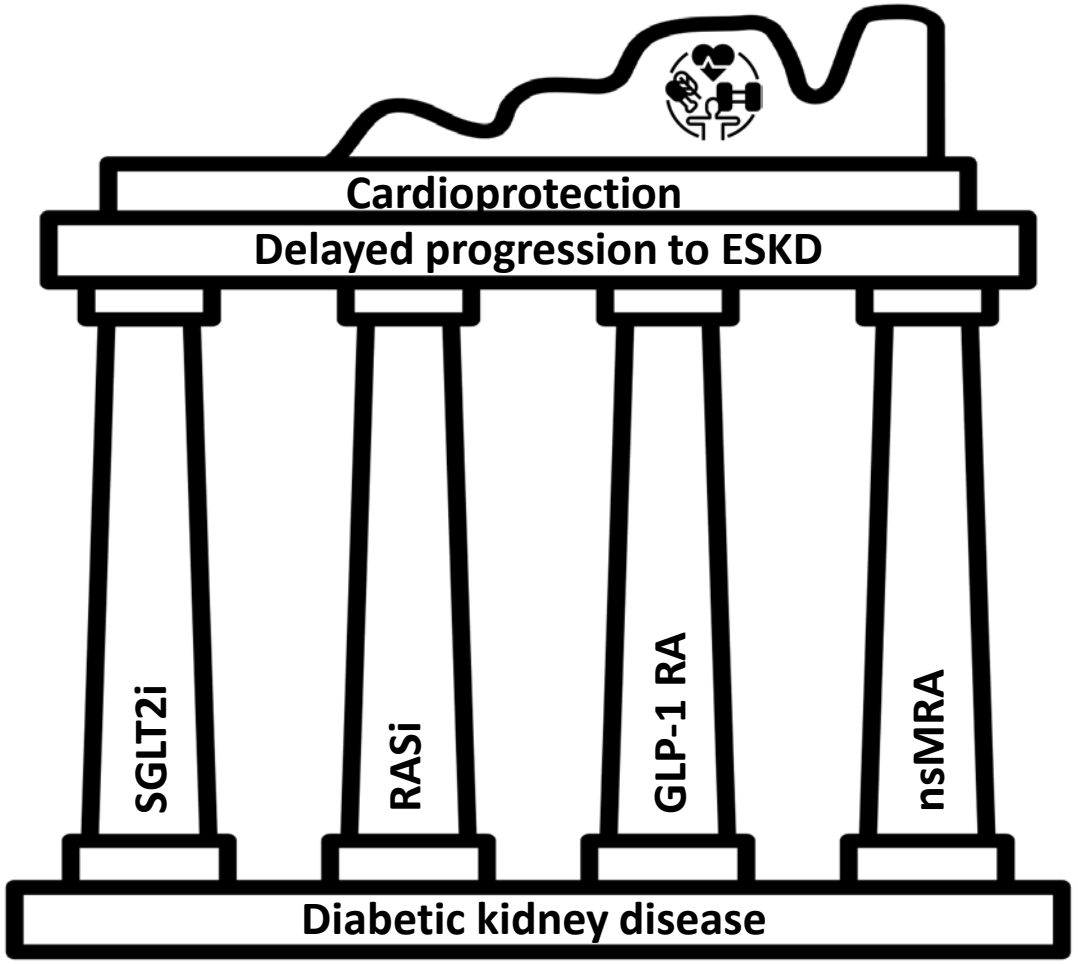
# Pillars of Treating Patients With CKD

- "A patient of age 50 years with albuminuric ***CKD without diabetes***, when treated with a **combination of ACE inhibitors/ARBs and SGLT2 inhibitors,** may experience about **7 additional years** free of kidney failure and death compared with a person not treated with these agents"




Vart. Clin J Am Soc Nephrol. 2022;17:1754.

Slide credit: clinicaloptions.com

# Medication Therapy Compliance

- "Drugs don't work in patients who don't take them"
  - C. Everett Koop, MD, US Surgeon General (1985)
- For every 100 prescriptions written:
  - 25%-30% are taken properly
  - On average, 15%-20% are refilled as prescribed

Lindenfeld. Eur J Heart Fail. 2017;19:1412.
blog.telepharm.com/the-answer-to-the-adherence-problem-at-community-health-centers.

Slide credit: clinicaloptions.com

# Monitoring Adverse Events of New Medications

- Rise in sCr <30% is expected and beneficial with RASi (eGFR reduction)
- Patients may lose 5-10 lb when starting SGLT2i (hypovolemia)
- Potassium may rise after 2-4 wk of initiation or increase in dose of RASi or nsMRA (hyperkalemia)

Slide credit: clinicaloptions.com

# Tolerability of SGLT2 Inhibitors: Advise Before Starting!

- Polyuria
  - Usually mild
  - Improves after several doses
  - Caution with:
    - Diuretics: consider discontinuing or lower dose
    - LUTS, especially detrusor instability
  - Start at low dose and then increase

Yau. Kidney Int Rep. 2022;7:1463. Ansary. Int J Mol Sci. 2019;20:629.
Padda. https://www.ncbi.nlm.nih.gov/books/NBK576405/.

Slide credit: clinicaloptions.com

# Safety of SGLT2 Inhibitors: Advise Before Starting!

- Infections
  - Mycosis >> UTI
- "Normoglycemic" DKA
  - Hold drug in severe illness or dehydration
    - Similar to metformin
- Lower-extremity ulcers
  - Controversial, best to avoid in cases of active ulcers

Yau. Kidney Int Rep. 2022;7:1463. Padda. https://www.ncbi.nlm.nih.gov/books/NBK576405/.

Slide credit: clinicaloptions.com

# Renal Dosing of SGLT2 Inhibitors

## Dapagliflozin

- eGFR ≥45: No dose adjustment required
- eGFR 25 to <45: Not recommended for T2D; no dose adjustment required for HF or CKD
- eGFR <25:
  - Do not recommend initiation
  - May continue 10 mg/day for patients with HF or CKD to reduce eGFR risk of decline, ESKD, CV death, and hospitalization for HF

## Empagliflozin

**Diabetes mellitus:**

- eGFR 30-90: No dose adjustment required
- eGFR <30 without risk factors for CV: Not recommended

**Heart failure:**

- eGFR ≥20: No dose adjustment required
- eGFR <20: Insufficient data; no dosing recommendations are currently available
- eGFR <30 without CV disease or risk: Not recommended

**Efficacy reduced with eGFR, but less of a safety issue in CKD**

Dapagliflozin PI. Empagliflozin PI.

Slide credit: clinicaloptions.com

# Renal Dosing of SGLT2 Inhibitors

## Bexagliflozin

**Renal impairment:**

- eGFR <30: Not recommended

## Canagliflozin

**Renal impairment:**

- eGFR ≥60: No dose adjustment necessary
- eGFR 30 to <60: 100 mg daily
- eGFR <30 and albuminuria >300 mg/day: 100 mg daily to reduce ESKD risk, doubling of serum creatinine, CV death, and HF-related hospitalization
- eGFR <30: Not recommended

## Ertugliflozin

**Renal impairment:**

- eGFR ≥45: No dose adjustment necessary
- eGFR <45: Not recommended

**Efficacy reduced with eGFR, but less of a safety issue in CKD**

Bexagliflozin PI. Canagliflozin PI. Ertugliflozin PI.

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# Team-Based Care for Patients With CKD

# Who Is on the Team?

- Nephrologist
- Advanced practice clinician (nephrology based)
- Nephrology nurse
- Nephrology social worker
- Renal nutritionist
- Dialysis technician
- Secretary/clerk
- Billing and coding team
- *And?*

Slide credit: clinicaloptions.com

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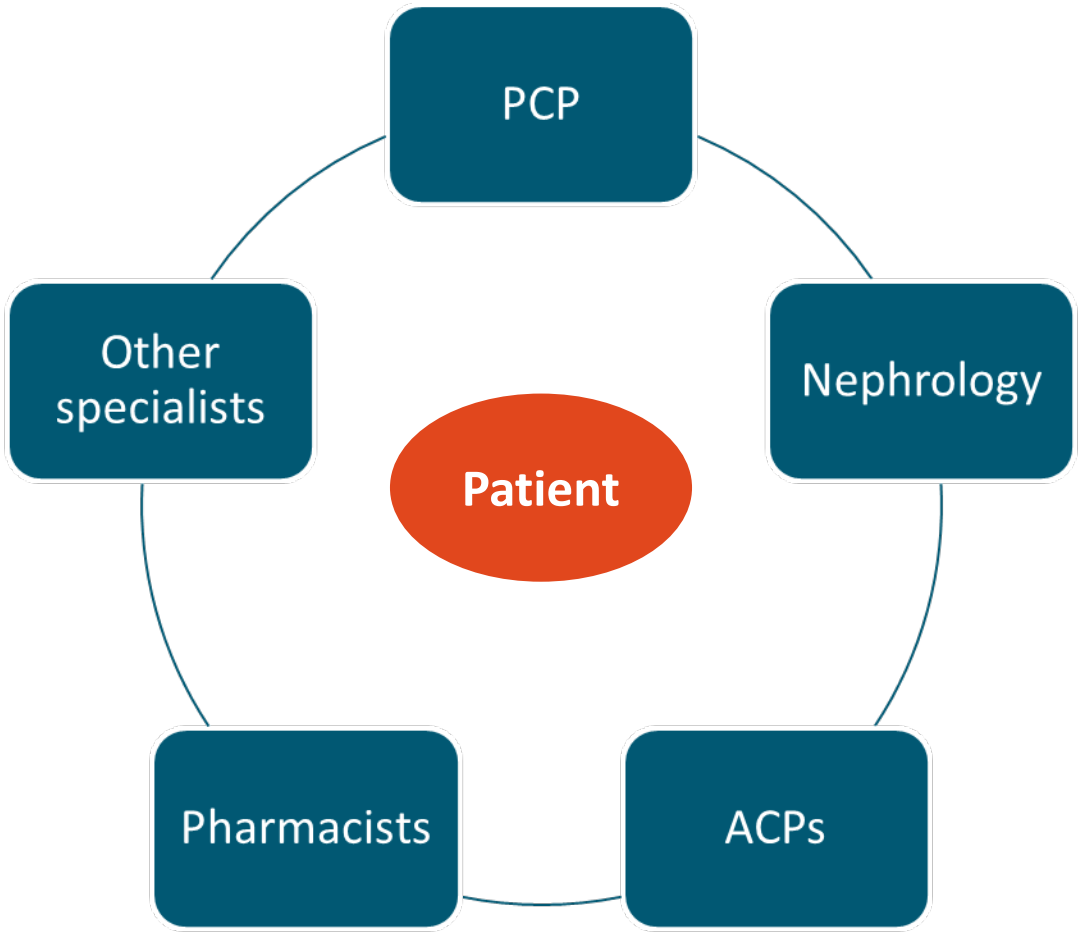
Slide credit: clinicaloptions.com

# Who Is in Charge?




Slide credit: clinicaloptions.com

# Nephrologists Sound Off on Team-Based Care

- 221 Canadian nephrologists responded to survey
- Preferred referral from PCP: eGFR >30 mL/min/1.73 $m^2$
- Usual referral from PCP: eGFR 20-29 mL/min/1.73 $m^2$
- Ideal time for referral: >12 mo prior to ESKD
- 57% felt eGFR 20-20 mL/min/1.73 $m^2$ was best time to discuss dialysis
  - 38% felt that optimal preparation time was >3 mo

Mendelssohn. Am J Kidney Dis. 2006;47:277.

Slide credit: clinicaloptions.com

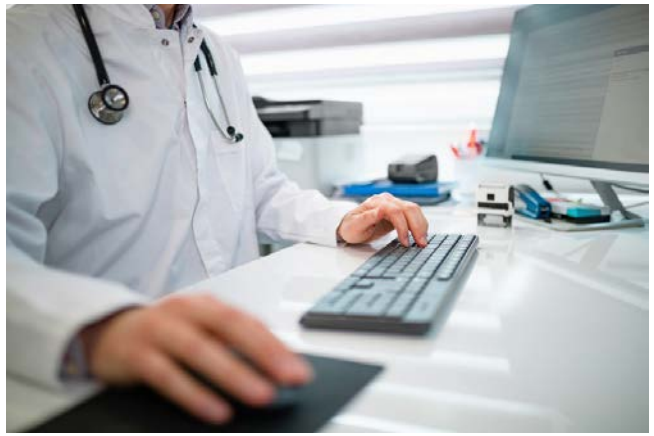
# PCPs Can Encourage Lifestyle Changes to Address CKD

## Lifestyle Changes

Joshi. Curr Opin Nephrol Hypertens. 2020;29:16.
niddk.nih.gov/health-information/kidney-disease/chronic-kidney-disease-ckd/prevention.

Slide credit: clinicaloptions.com

# When to Refer to Nephrology



Generally, patients with eGFR <30 mL/min/1.73 $m^2$ should be comanaged with a nephrologist

- Associated with decreased mortality and lessened need for emergent dialysis

Refer patient to nephrology earlier for:

- Rapid decrease in eGFR (rapid progression)
- Nephrotic syndrome
- Metabolic complications
- Unidentifiable cause for CKD
- Difficult-to-control hypertension
- Genetic kidney disease

Kinchen. Ann Intern Med. 2002;137:479.

Slide credit: clinicaloptions.com

# Benefits of Timely Referral to Outpatient Nephrology

- Mortality
- Treatment costs
- Progression of disease
- Hospitalization

Lonnemann. Kidney Int Rep. 2016;2:142.

Slide credit: clinicaloptions.com

# Potential Consequences of Late Referrals

- Must wait to see specialist, especially in more rural areas
- Potential to progress to end-stage kidney disease before diagnosis is made
- Less time to discuss management options (home dialysis, transplant potential)
- Unlikely to treat with newer therapies
- Less opportunity to enroll on clinical trials

Baer. NDT Plus. 2010;3:17.

Slide credit: clinicaloptions.com

# What Will the Nephrologist Appreciate from the PCP?

## Pertinent labs

- eGFR
- Creatinine
- Electrolytes
- UACR
- CBC

## Pertinent history

- Recent symptoms
- Medical history
- Family history
- Accurate medication list and what has been tried
- Previous labs

## Imaging

- Renal ultrasound

## Starting Medications

- SGLT2i
- ACEi or ARBs

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# Discussion Point

How can PCPs work best with nephrology in the diagnosis and management of CKD?

## Assessment 1: For which of the following patients would you want to ensure early screening for CKD?

A. Patient with complicated pregnancy
B. Patient with family history of heart failure
C. Patient with hyperlipidemia
D. Patient with hypothyroidism

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**RATIONALE**

Risks for CKD are:

- Obesity
- Diabetes
- Hypertension
- Premature birth
- Complicated pregnancy
- Comorbid organ disease
- Family history of kidney disease

**Assessment 2: JM is a 50-year-old male with CKD stage 3a and A2 albuminuria. Which dual drug regimen may result in 7 additional years free of kidney failure and death?**

A. Finerenone + ertugliflozin

B. Losartan + semaglutide

C. Olmesartan + quinapril

D. Ramipril + empagliflozin

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**Assessment 3: JK is a 65-year-old female with an eGFR of 45 mL/min/1.73 $m^2$. She is currently receiving lisinopril, amlodipine, and HCTZ. Her average blood pressure is 150/90 mm Hg. What should your next step be in JK's care to help decrease mortality?**

A. Add sitagliptin
B. Continue to monitor her for 3 months
C. Refer her to a nephrologist
D. Switch HCTZ to furosemide

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**RATIONALE**

Generally, patients with eGFR <30 mL/min/1.73 $m^2$ should be comanaged with a nephrologist, but patients should be referred earlier for the following:

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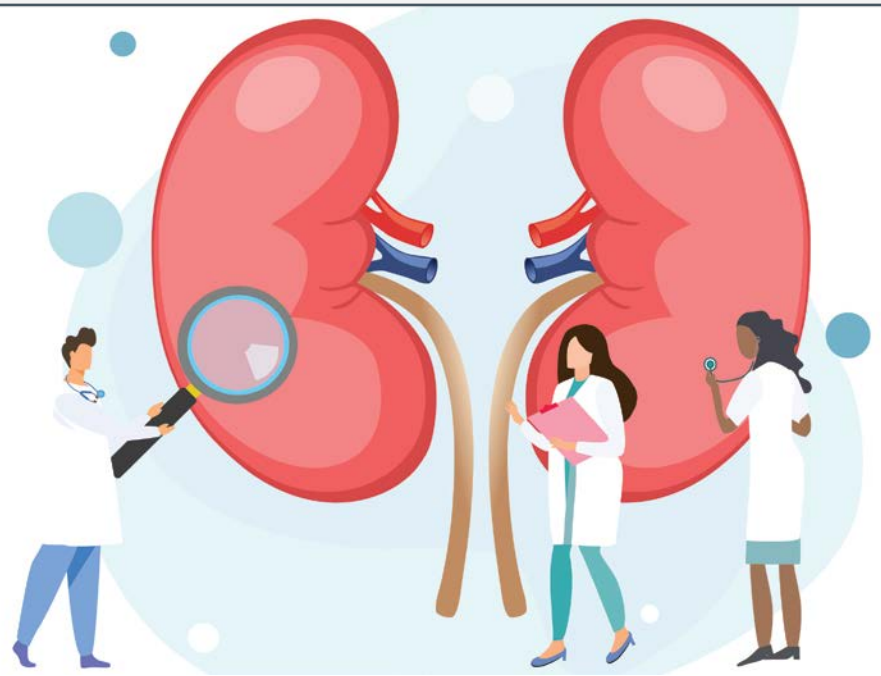
- Difficult-to-control hypertension
- Genetic kidney disease

# Question and Answer Session



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