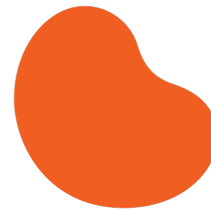


Chronic Kidney Disease What does the Health care team need to know?

Dr.Chitra Bhosekar, MD.

Nephrologist ,Emplify Health @ Bellin.

National Kidney Foundation Board Member.
Vice Chair -WCHQ-CKD committee.



NATIONAL KIDNEY
FOUNDATION®

of Wisconsin

Definition & Classification

Chronic disease – Present for > 3 months

Reduced ability of the kidney to filter – GFR (Glomerular filtration rate)

Leaky Glomerular Basement Membrane (presence of albumin in the urine – ACR (Albumin Creatinine Ratio)

5 Stages I-V

ESRD (End Stage Renal disease) (needs dialysis to survive)

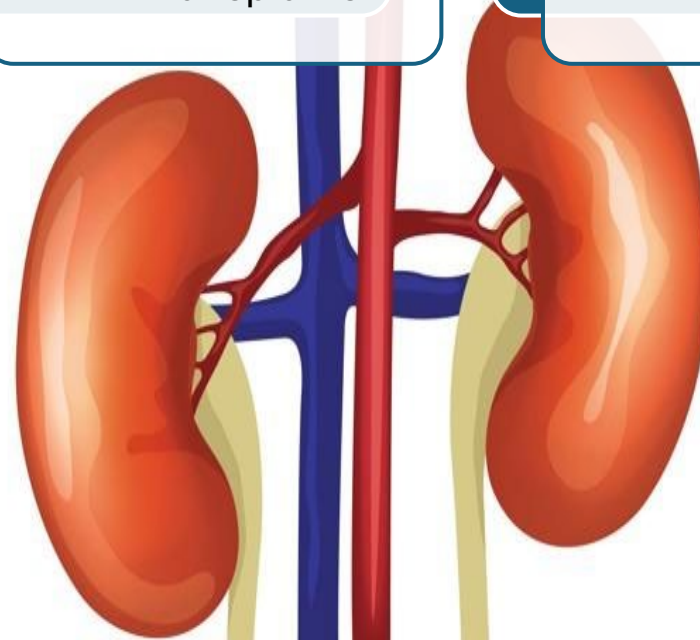
Chronic Kidney Disease – US Healthcare Statistics

14% U.S. population

Over age 65 years-
50% probability of
developing chronic
kidney disease

@ 600,000 people in
U.S. with kidney
failure including those
with transplants

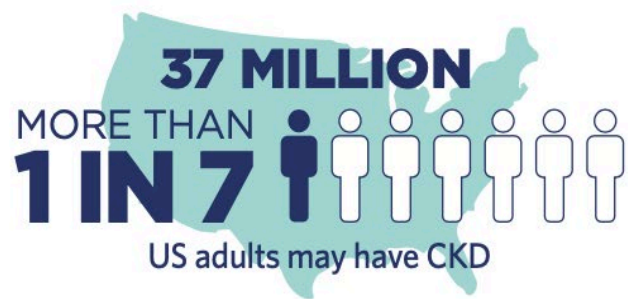
~ 130 billion dollars/yr



CHRONIC KIDNEY DISEASE

COMMON • SERIOUS • COSTLY

Chronic kidney disease (CKD) causes loss of kidney function over time and may lead to kidney failure or end-stage kidney disease (ESKD).



Think of CKD as a "Disease Accelerator"



RISK FACTORS

- Diabetes
- High blood pressure
- Heart disease
- Obesity
- Family history of CKD
- Older age



*Lifetime risk of
CKD-3 is 50%
in the US!*

TREATMENT LOWERS RISK FOR ESKD

COMMON · SERIOUS · COSTLY

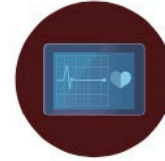
CKD INCREASES RISK FOR:



Heart disease
and heart failure




Stroke



Early
death

MEDICARE COSTS

CKD = 
MORE THAN
\$81 BILLION

ESKD = 
MORE THAN
\$36 BILLION

REDUCE COSTS BY PREVENTING:

- CKD in people at risk
- CKD progressing to ESKD
- Other chronic conditions, including type 2 diabetes and heart disease

2022 MSSP Medicare Avg Expense:

ESRD/ESKD: \$89,975/yr

All MSSP patients: \$12,325/yr

		• GFR (G)		• Albuminuria (A)		
				<30 mg/g <3 mg/mmol	30–299 mg/g 3–29 mg/mmol	≥300 mg/g ≥30 mg/mmol
GFR categories (mL/min/1.73 m ²) Description and range	G1	Normal or high	≥90	Screen 1	Treat 1	Treat and refer 3
	G2	Mildly decreased	60–89	Screen 1	Treat 1	Treat and refer 3
	G3a	Mildly to moderately decreased	45–59	Treat 1	Treat 2	Treat and refer 3
	G3b	Moderately to severely decreased	30–44	Treat 2	Treat and refer 3	Treat and refer 3
	G4	Severely decreased	15–29	Treat and refer* 3	Treat and refer* 3	Treat and refer 4+
	G5	Kidney failure	<15	Treat and refer 4+	Treat and refer 4+	Treat and refer 4+

 Low risk (if no other markers of kidney disease, no CKD)

 High risk

 Moderately increased risk

 Very high risk

What Makes this disease a big problem?

What's the Fuss about this disease?

Mortality

Morbidity

Hospital Admissions

Readmissions

ER visits

SILENT disease

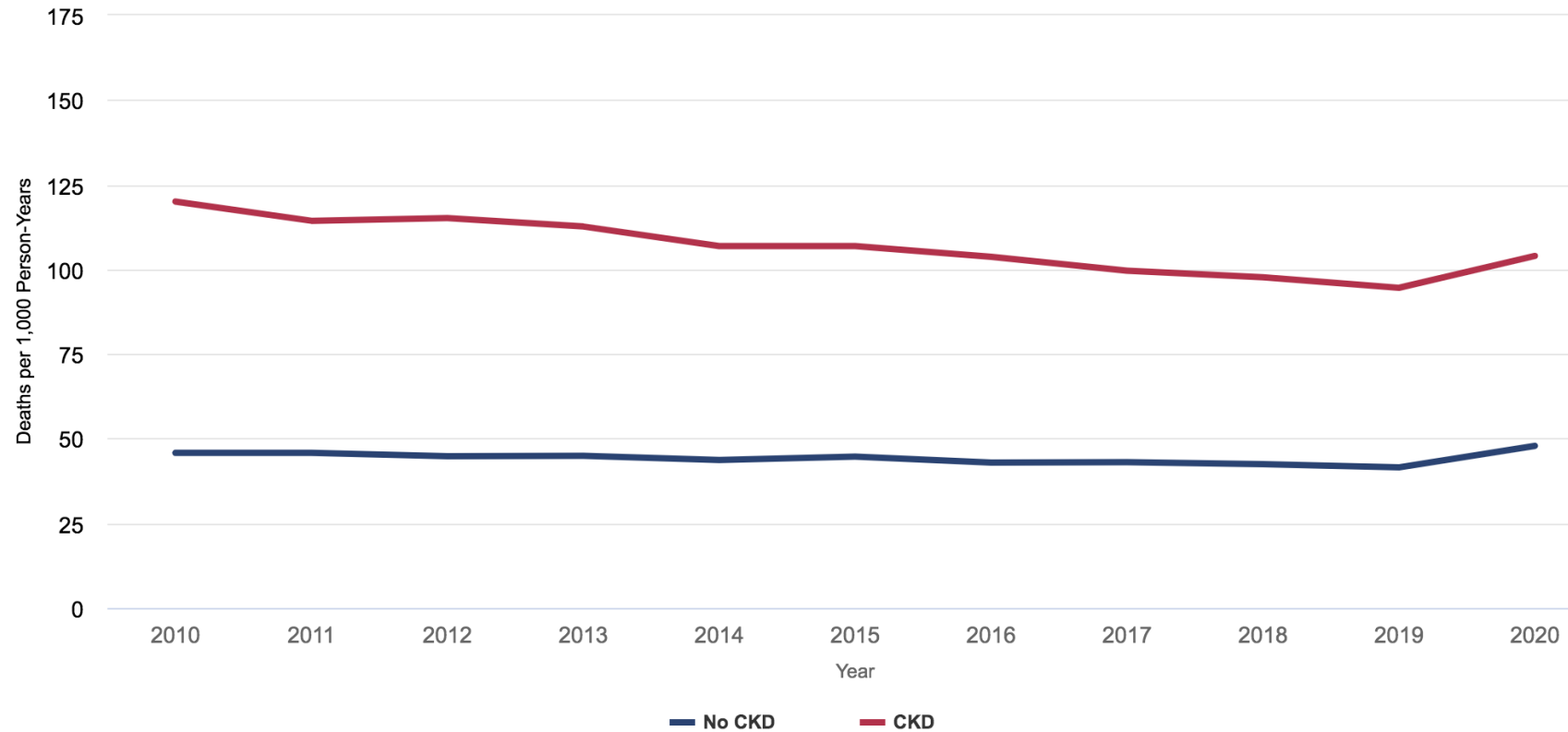
What are the risk Factors?

- **Diabetes**
- **Hypertension**
- Obesity
- Smoking
- African American Ancestry
- Apo L1 gene mutation
- FH kidney disease
- Use of NSAIDS
- Heart Disease

Mortality in CKD

Figure 3.1 All-cause mortality rate in older adults, 2010-2020

Overall, adjusted for demographics

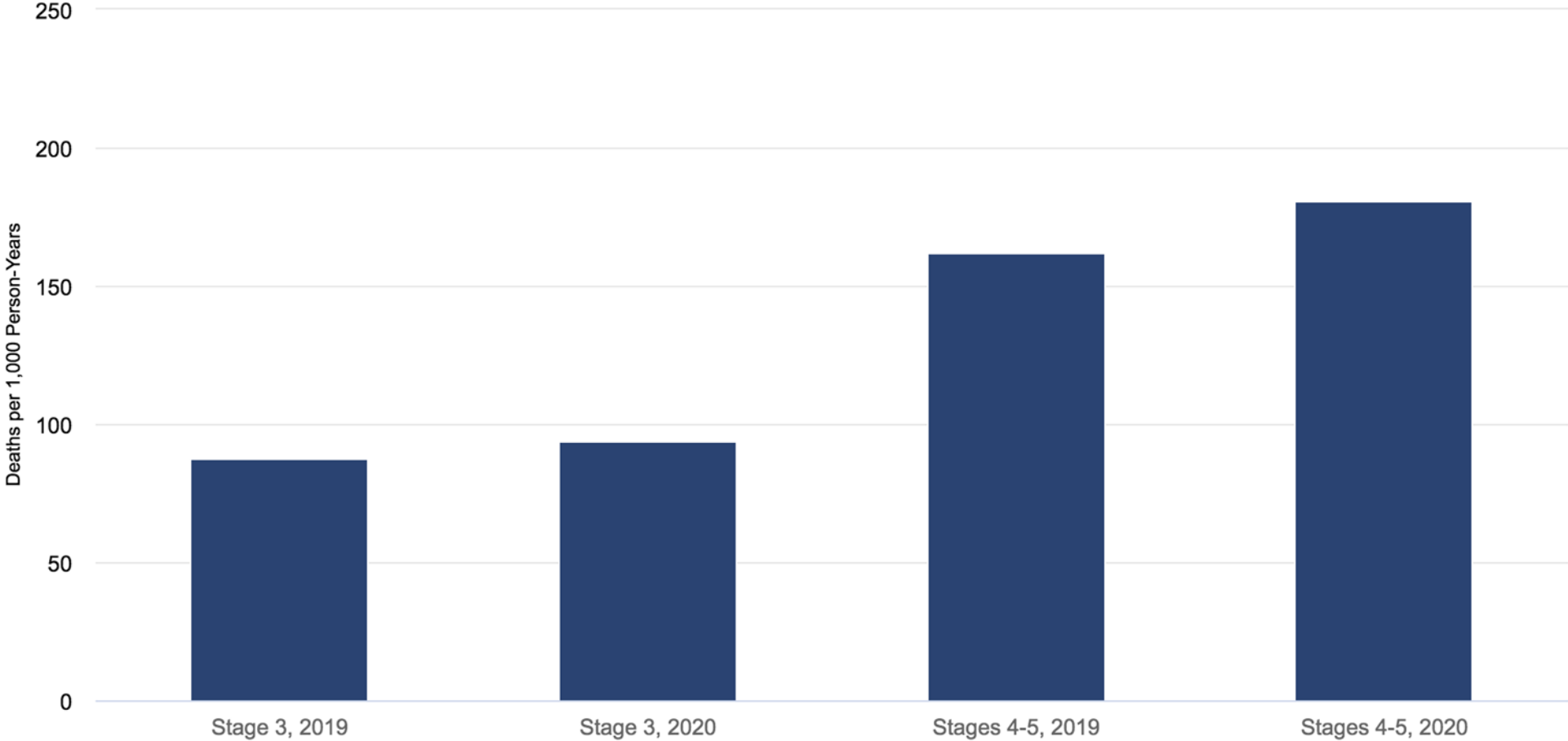


Data Source: 2022 United States Renal Data System Annual Data Report

All cause Mortality and Stage

Figure 3.2b All-cause mortality rate in older adults, by CKD stage and demographics, 2019 and 2020

Overall, adjusted

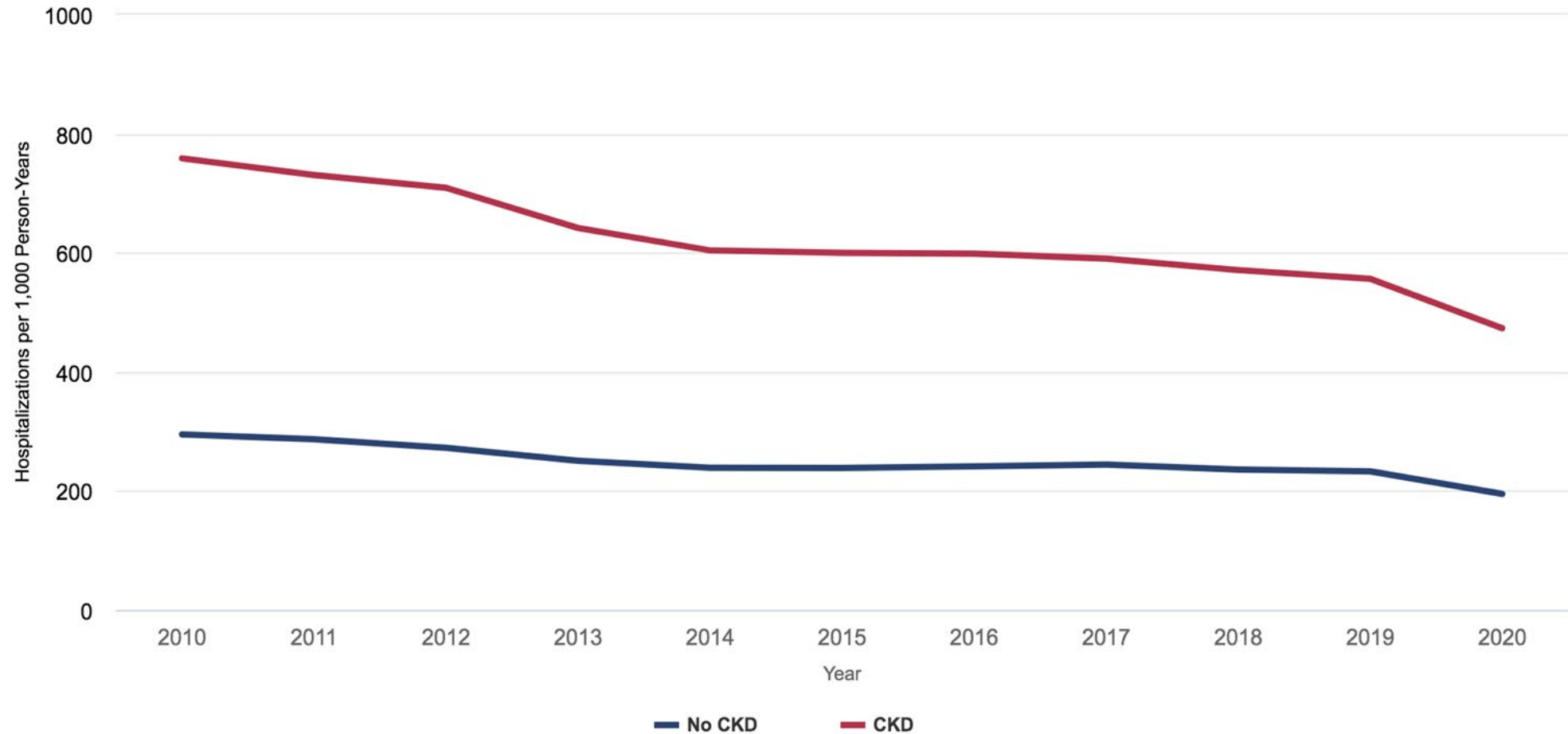


Data Source: 2022 United States Renal Data System Annual Data Report

Hospitalizations

Figure 3.4 All-cause hospitalization rates in older adults, 2010-2020

By CKD status, adjusted for demographics

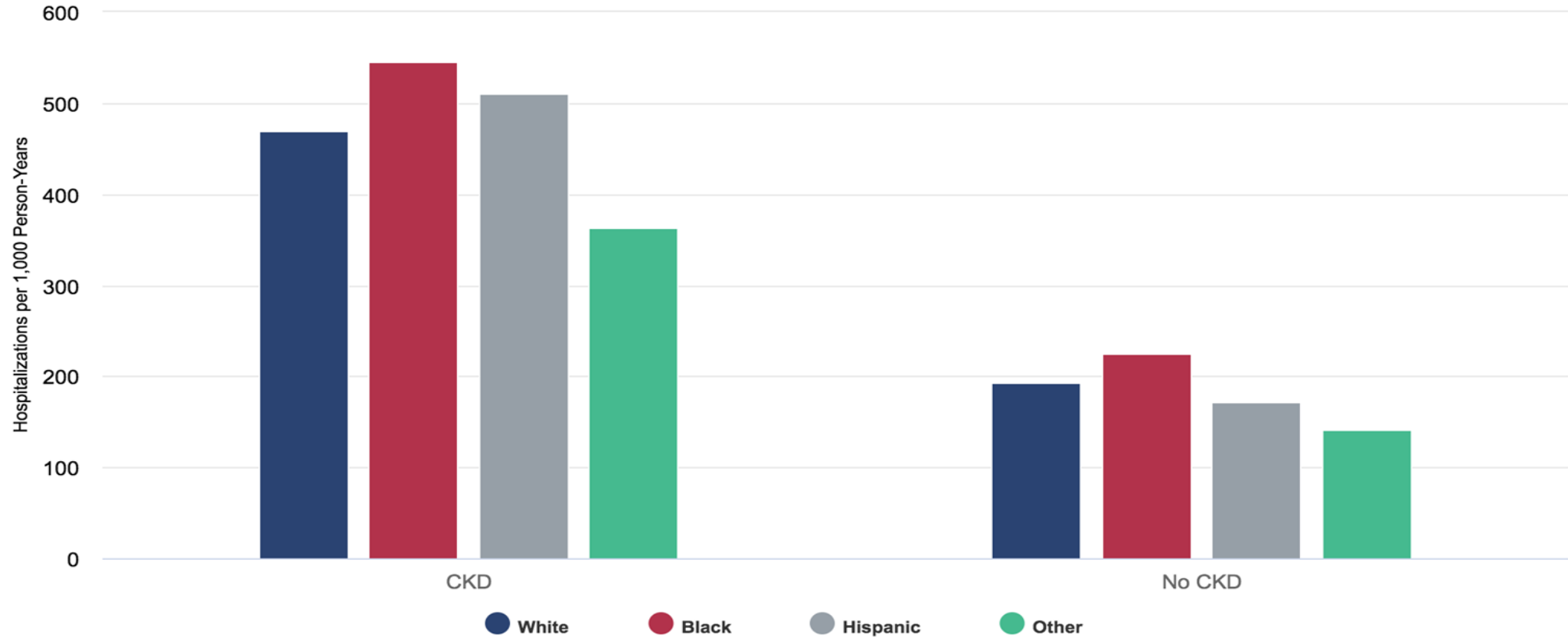


Data Source: 2022 United States Renal Data System Annual Data Report

Hospitalization

Figure 3.5b Adjusted all-cause hospitalization rates in older adults, by demographics, 2020

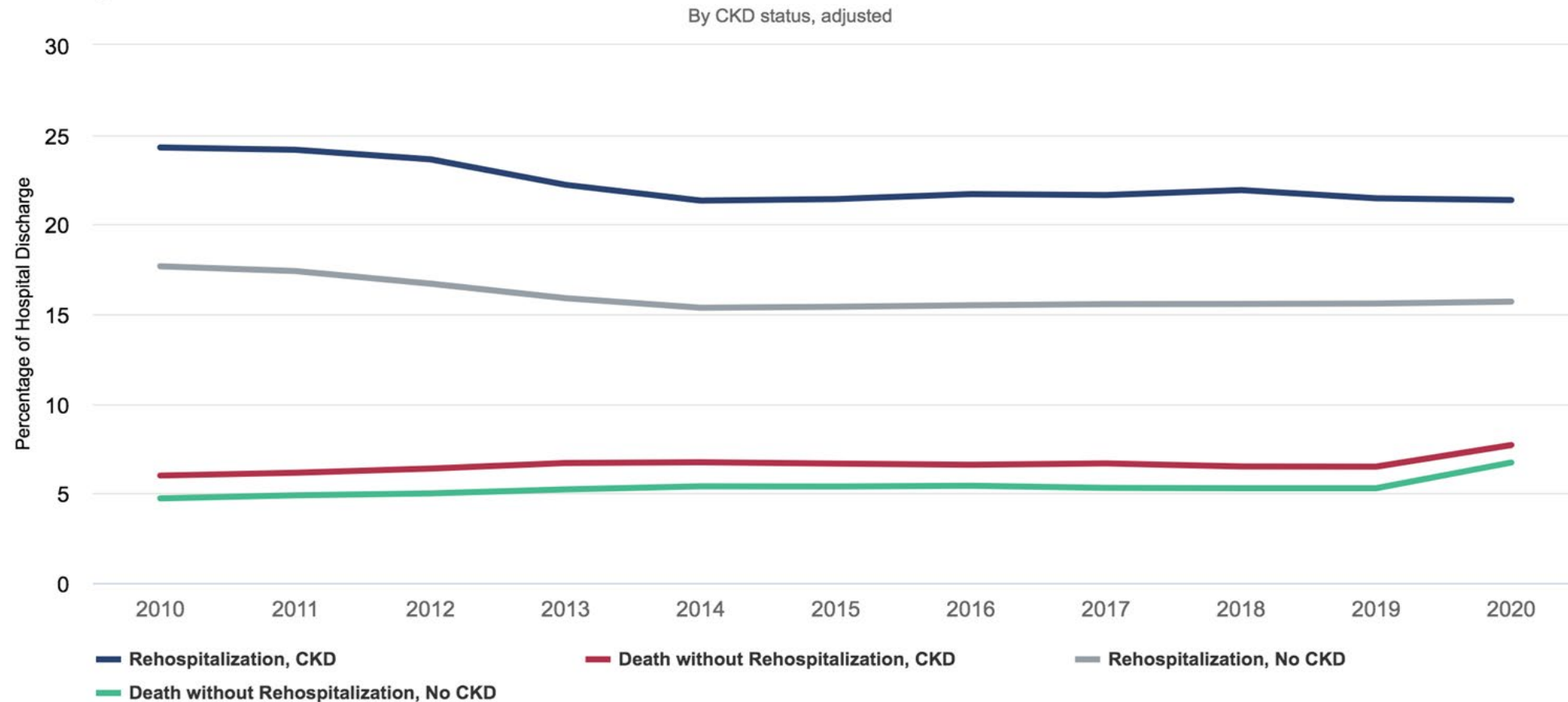
Medicare FFS, by race/ethnicity and CKD status



Data Source: 2022 United States Renal Data System Annual Data Report

Rehospitalizations

Figure 3.13 Percentage of all-cause hospitalizations resulting in rehospitalization or death within 30 days of discharge in older adults, 2010-2020

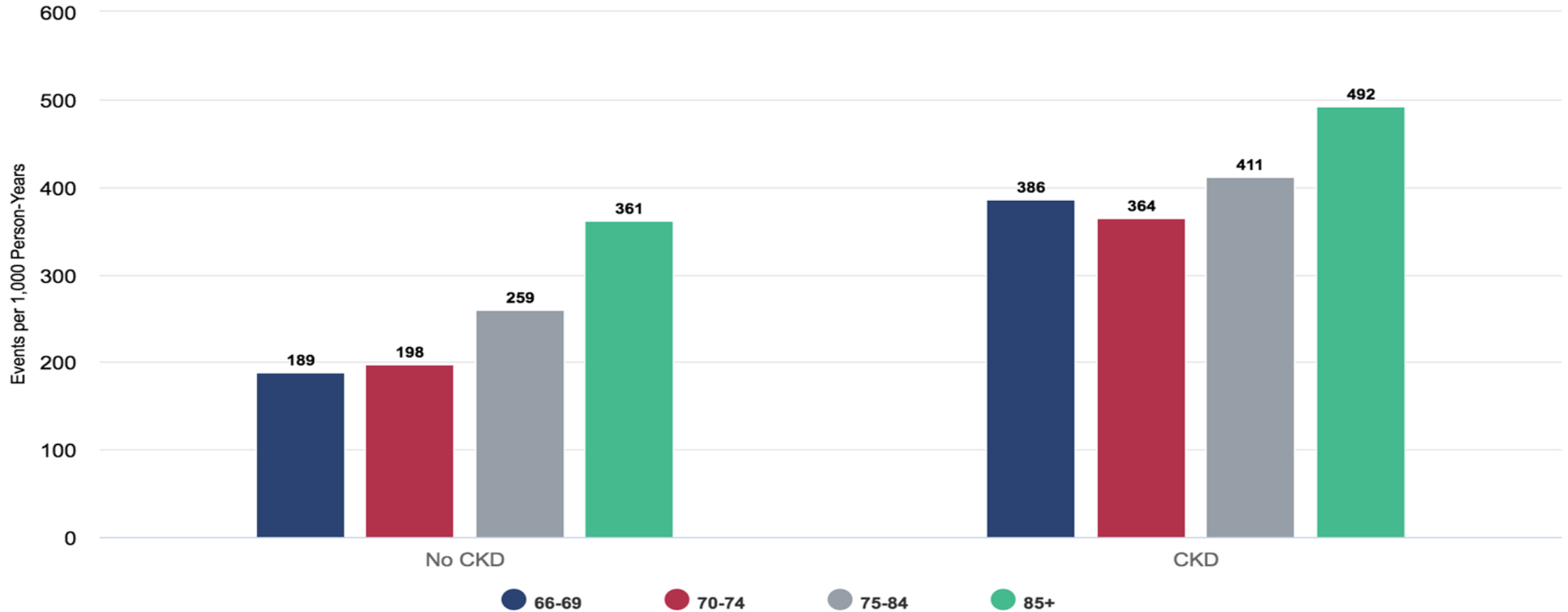


Data Source: 2022 United States Renal Data System Annual Data Report

ED Encounters

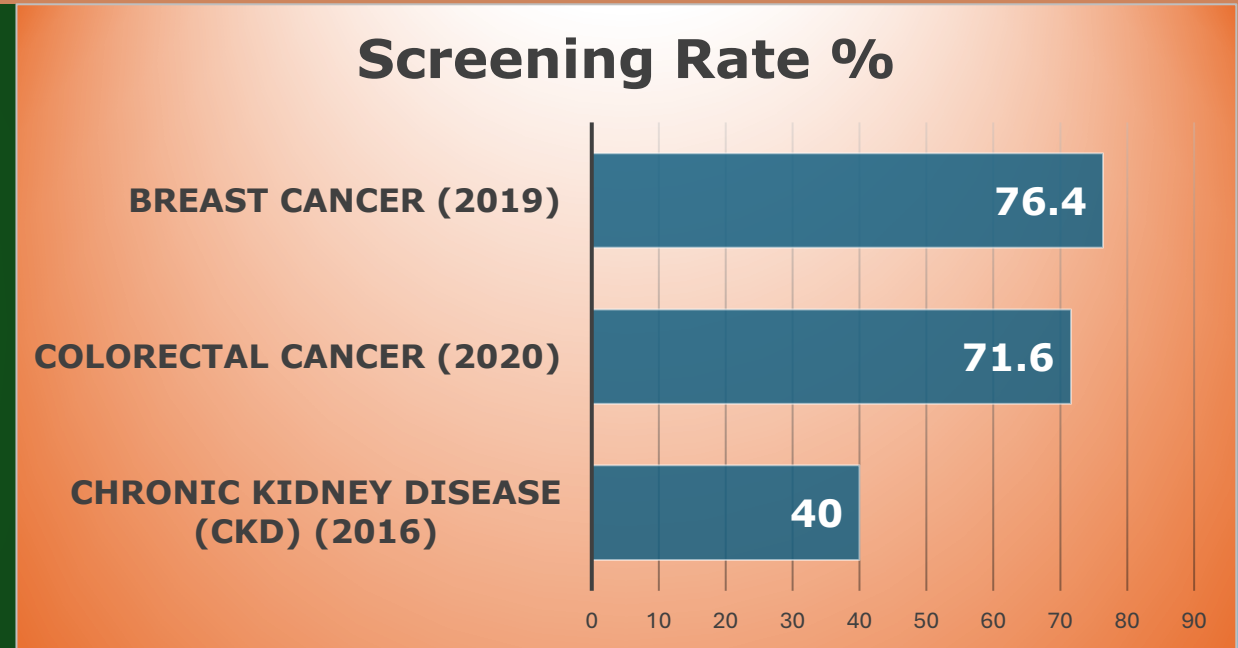
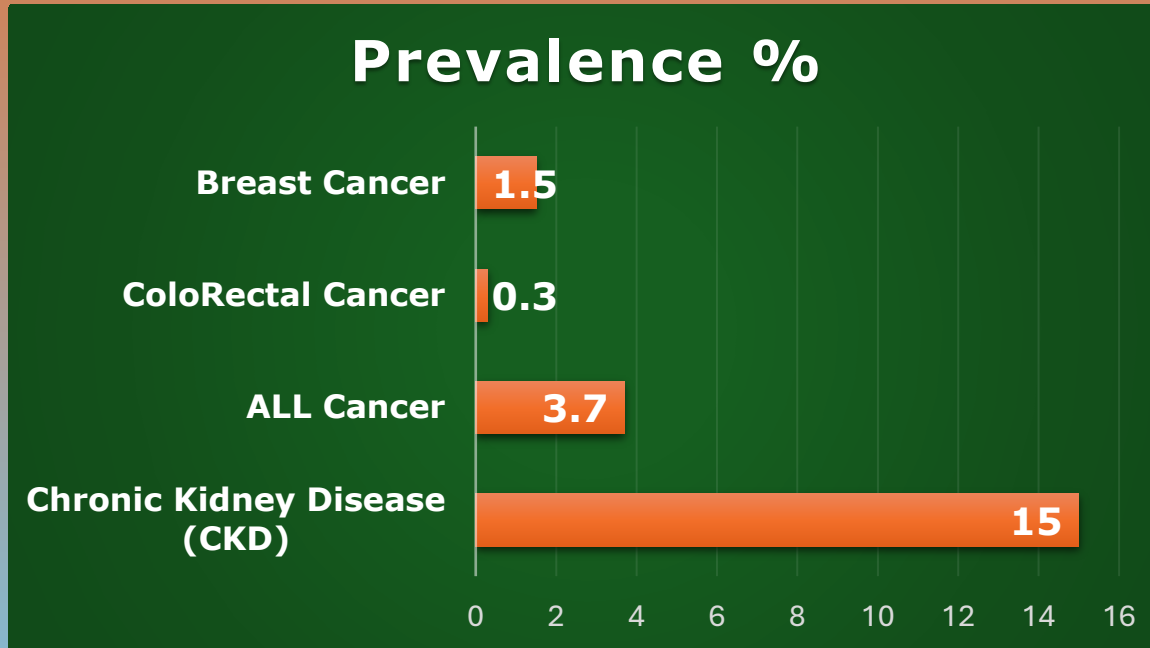
Figure 3.15b Adjusted emergency department encounter rates in older adults, by demographics, 2020

Medicare FFS, by age and CKD status



Data Source: 2022 United States Renal Data System Annual Data Report

Putting Things into Perspective: How common is CKD? Don't we already screen for it?

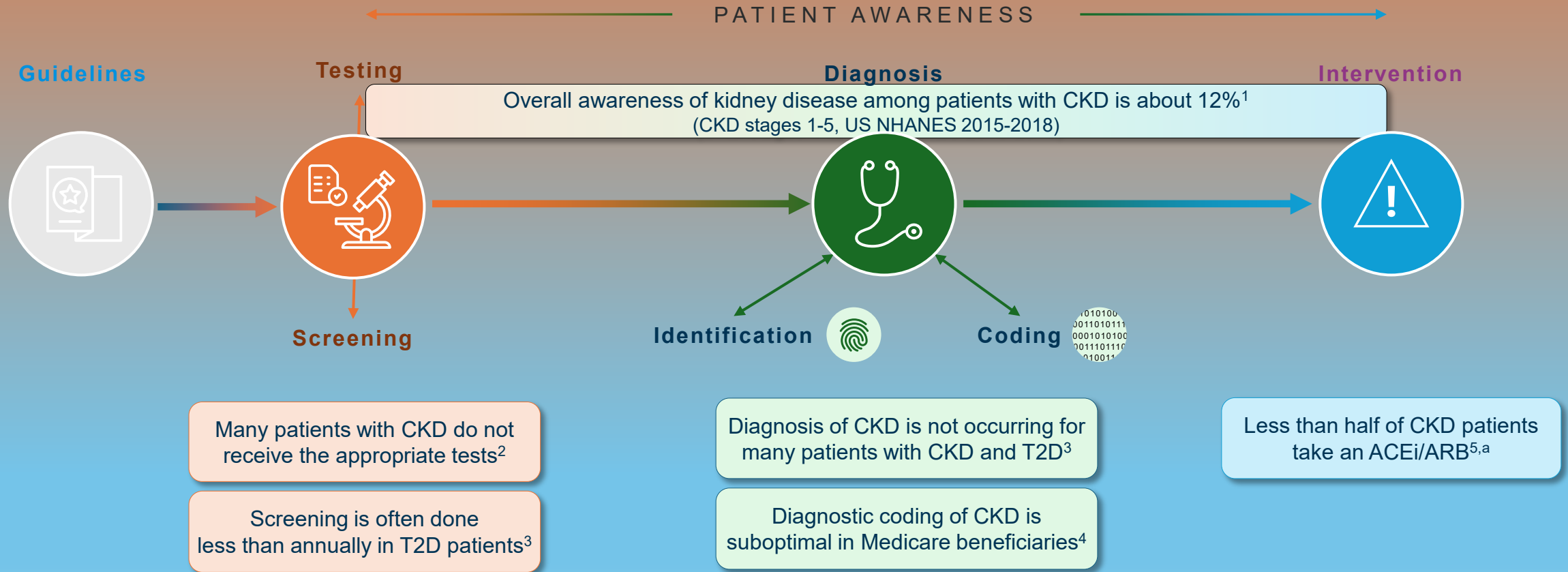


- Per the National Kidney Foundation, **CKD is 10th leading cause of death** in the US.
 - **In older populations (> 65yo), the risk for CVD & all-cause mortality often exceeds risk of ESRD.**
- Given how common this is and the low rate of progression to kidney failure (3%), **primary care is ideally positioned to care for these patients.**
- *40% screening for CKD is a **best-case scenario** – this only accounts for screening patients with diabetes. If we include screening all patients with DM + HTN, the screening rate is closer to **20%**



**Number
one cause
of kidney
failure in
U.S.**

There Are Several Gaps Along the Pathway Between Recognizing CKD Associated With T2D and Taking Action



^aStudy examined ACEi/ARB utilization in 38,885 participants aged ≥20 years old who had serum creatinine and UACR measurements surveyed through NHANES (1999-2014). CKD defined as eGFR <60 mL/min/1.73 m² or UACR ≥30 mg/g. Of 7085 participants with CKD, 34.9% used an ACEi/ARB over the study period, and 40.1% between 2011-2014.⁵

ACEi, angiotensin-converting enzyme inhibitor; ARB, angiotensin II receptor blocker; CKD, chronic kidney disease; NHANES, National Health and Nutritional Examination Survey; T2D, type 2 diabetes.

1. USRDS Annual Data Report Chapter 1, 2020. 2. USRDS Annual Data Report Chapter 2, 2020. 3. Szczech LA, et al. *PLoS One*. 2014;9:e110535. 16

4. USRDS Annual Data Report Chapter 2, 2021. 5. Murphy DP, et al. *J Am Soc Nephrol*. 2019;30:1314-1321.

Both UACR and eGFR Are Recommended by Guidelines for Identification of CKD Progression in Patients With T2D¹



eGFR

measures kidney function²



UACR

measures kidney damage²



ADA, KDIGO, and KDOQI Guidelines:

- ✓ Recommend using both eGFR and UACR to monitor kidney health in patients with diabetes¹⁻³
- ✓ Suggest routine testing in patients with diabetes can help detect CKD earlier¹⁻³

When used **together**, eGFR and UACR are predictive of CKD progression in patients with CKD¹



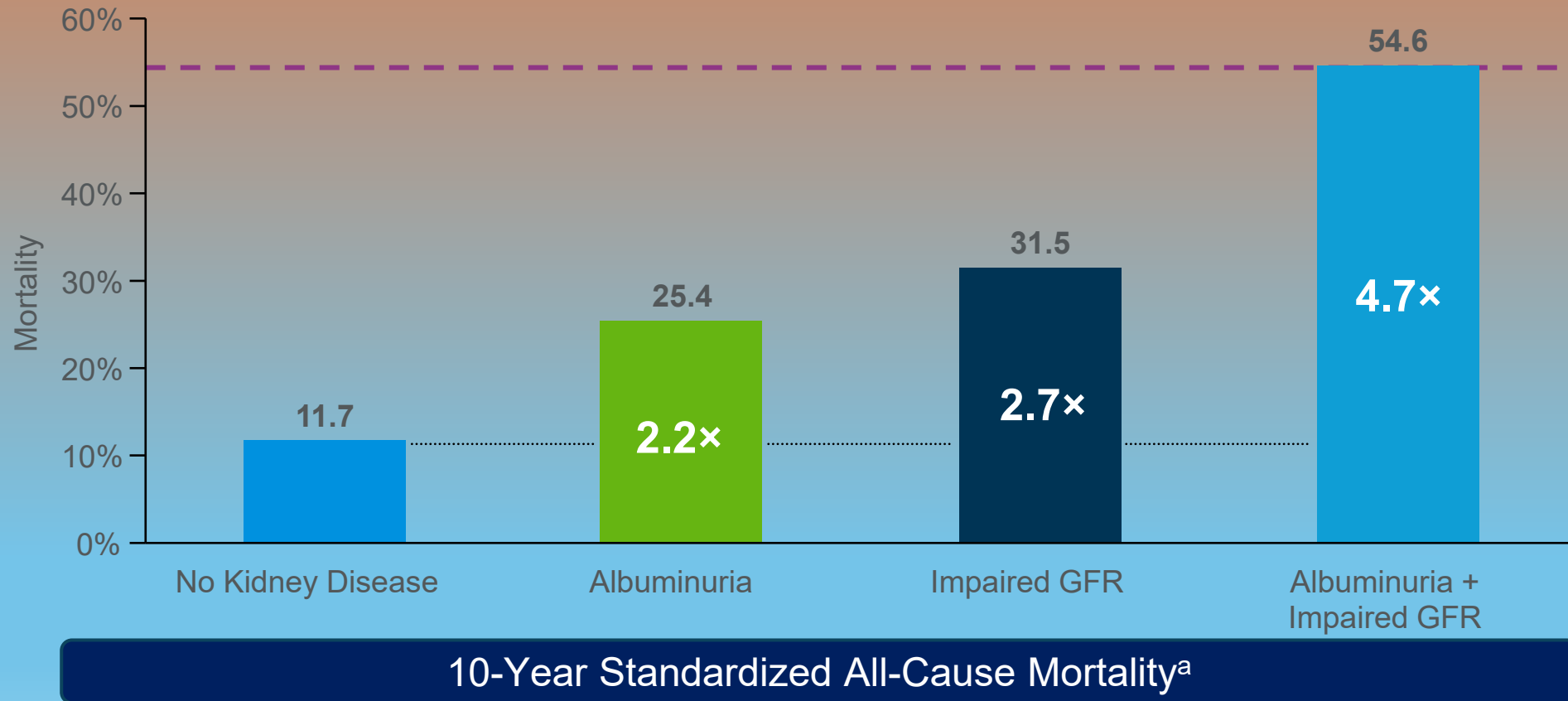
Limitations exist when using other methods for detection of CKD in patients with T2D, such as **urine dipstick tests (less sensitive)** and **timed ACR collection (burdensome)**^{1,2}

ACR, albumin-to-creatinine ratio; ADA, American Diabetes Association; CKD, chronic kidney disease; eGFR, estimated glomerular filtration rate; KDIGO, Kidney Disease Improving Global Outcomes; KDOQI, Kidney Disease Outcomes Quality Initiative; T2D, type 2 diabetes; UACR, urine albumin-to-creatinine ratio.

1. American Diabetes Association. Section 11. *Diabetes Care*. 2022;45(Suppl. 1):S175-S184. 2. Kidney Disease Improving Global Outcomes. *Kidney Int Suppl*. 2013;3:1-150.

3. National Kidney Foundation Kidney Disease Outcomes Quality Initiative. *Am J Kidney Dis*. 2007;49(Suppl. 2):S1-S180.

Albuminuria and Impaired GFR –Association with All-Cause Mortality in Patients With T2D



^aN=1430 T2D patients in NHANES III; all-cause mortality was standardized to age, gender, and race/ethnicity distribution of the study population.^{1,2}

GFR, glomerular filtration rate; NHANES III, Third National Health and Nutrition Examination Survey; T2D, type 2 diabetes.

1. Afkarian M, et al. *J Am Soc Nephrol.* 2013;24:302-308. 2. Afkarian M, et al. Supplementary Material. *J Am Soc Nephrol.* 2013;24.

T2D & All-Cause Mortality Across KDIGO Risk Categories

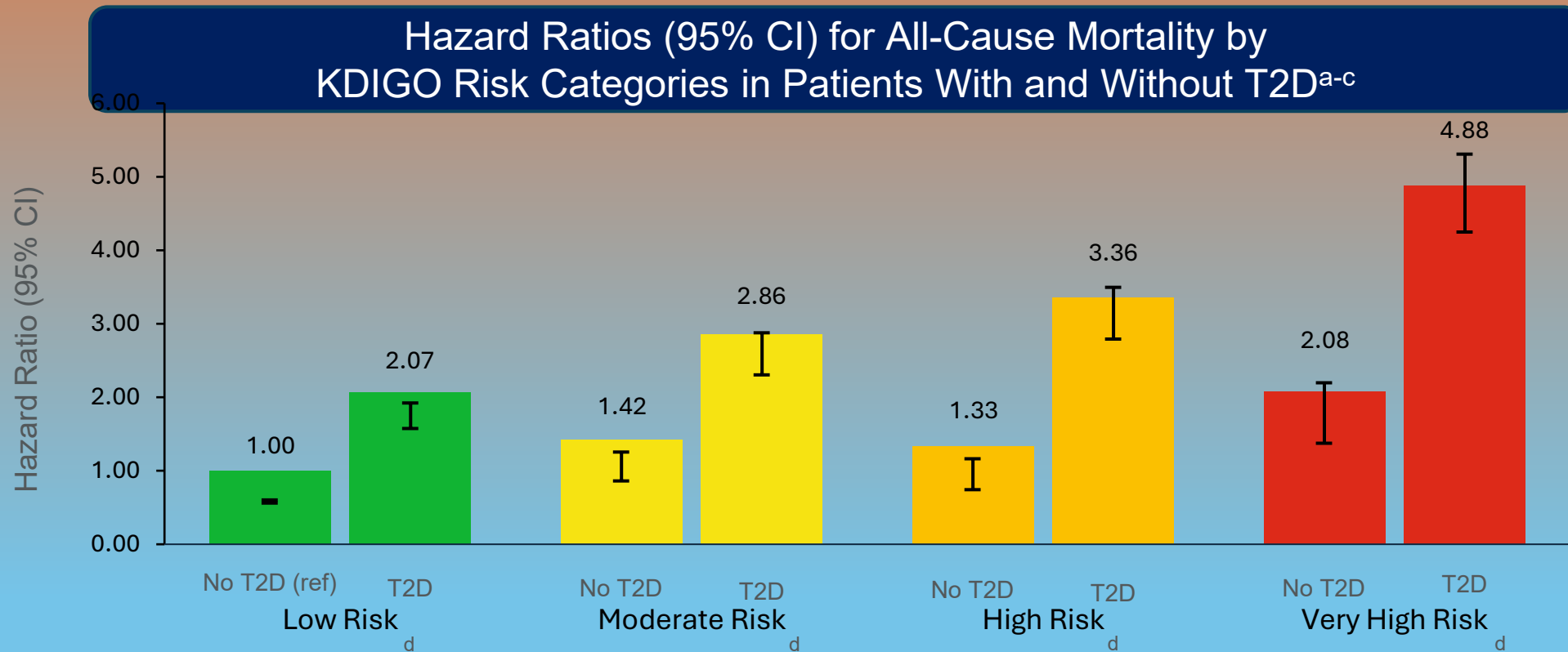


Figure reprinted from BioMed Central: Nichols GA, et al. *BMC Nephrology*. 2020;21:167. doi: 10.1186/s12882-020-01792-y. This is an open access article under the Creative Commons Attribution 4.0 International license (CC BY 4.0; <https://creativecommons.org/licenses/by/4.0/>).

^aObservational cohort study of 31,931 patients with diabetes and 33,201 patients without diabetes. Patients with T2D were matched 1:1 to patients without T2D on age, sex, and year of the first serum creatinine value recorded in the EHR between January 2006 and December 2012. ^bGreen (reference) is low risk, yellow is moderate risk, orange is high risk, red is very high risk. ^cHRs are adjusted for age, sex, nonwhite race/ethnicity, cigarette smoking, ischemic heart disease, HF, and use of a RAAS blockade agent. ^dStudy used the first available serum creatinine value between 2006 and 2012 to calculate baseline eGFR and categorized them and the corresponding UACR/DP values using the KDIGO categories.

CI, confidence interval; DP, dipstick proteinuria; eGFR, estimated glomerular filtration rate; EHR, electronic health record; HF, heart failure; HR, hazard ratio; KDIGO, Kidney Disease Improving Global Outcomes; RAAS, renin-angiotensin-aldosterone system; ref, reference; T2D, type 2 diabetes; UACR, urine albumin-to-creatinine ratio.

Nichols GA, et al. *BMC Nephrology*. 2020;21:167. doi: 10.1186/s12882-020-01792-y.

Urine Dipstick Underestimates CKD Risk Compared With UACR

Over half of patients in the moderately increased and high-risk categories were classified into lower-risk categories using the dipstick test^a

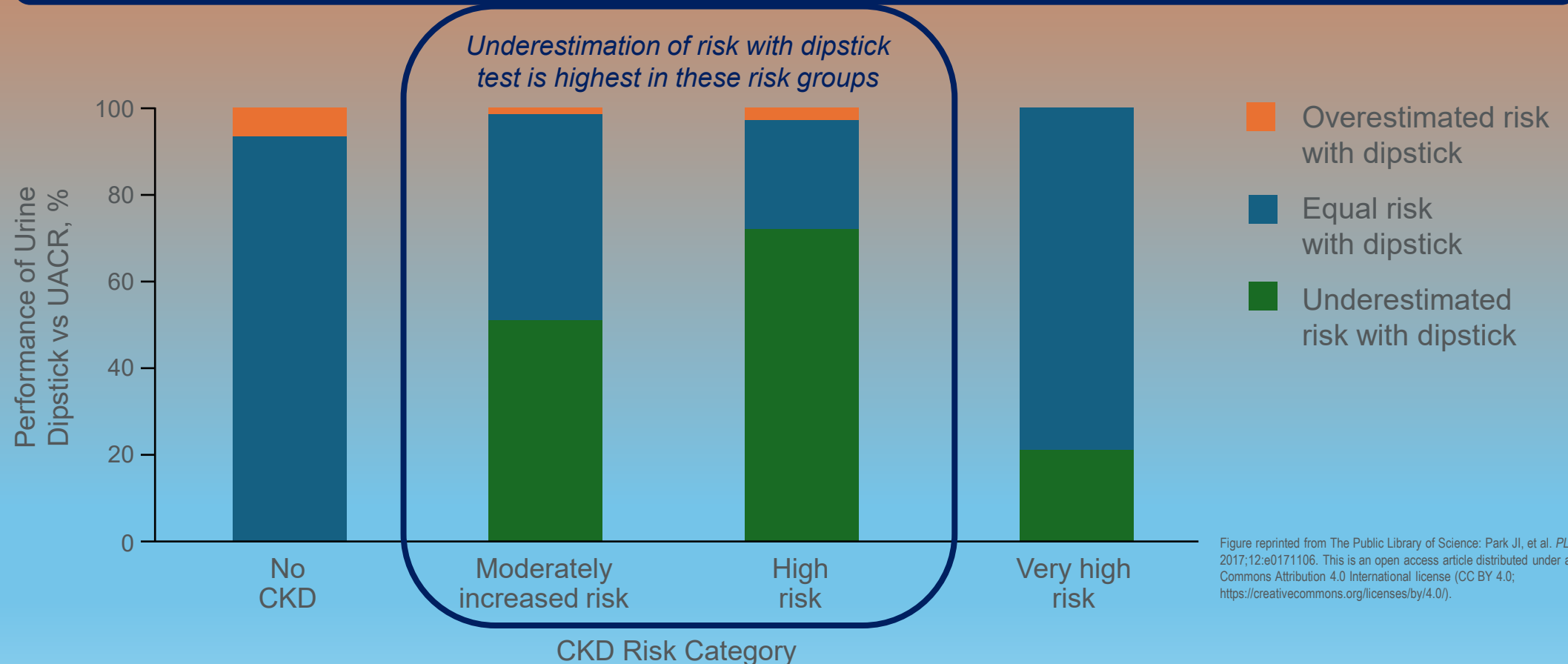


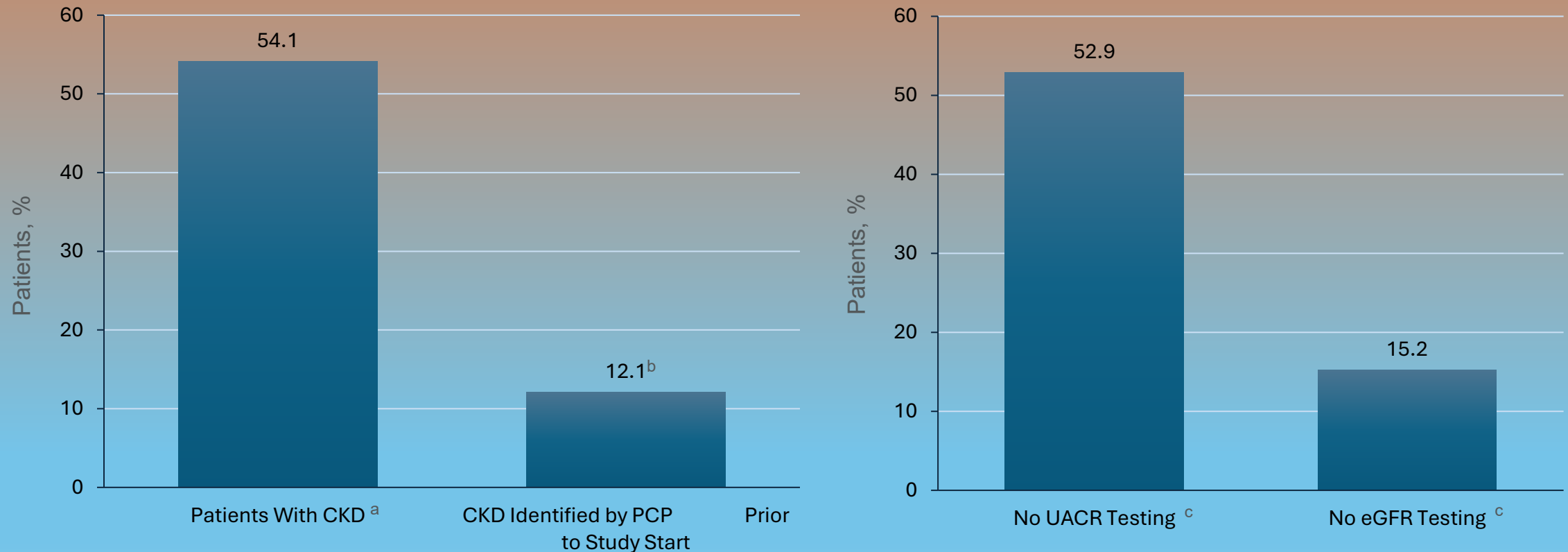
Figure reprinted from The Public Library of Science: Park JI, et al. *PLoS One*. 2017;12:e0171106. This is an open access article distributed under a Creative Commons Attribution 4.0 International license (CC BY 4.0; <https://creativecommons.org/licenses/by/4.0/>).

^aData from an analysis of the Korean NHANES 2011-2014 among adults at least 20 years of age with available urinalysis data (N=20,759). CKD, chronic kidney disease; NHANES, National Health and Nutritional Examination Survey; UACR, urine albumin-to-creatinine ratio. Park JI, et al. *PLoS One*. 2017;12:e0171106. 20

There Are Gaps in CKD Identification in Patients With T2D Due to Underutilization of eGFR and UACR Testing

CKD Screening and Identification in Patients With T2D in the Primary Care Setting

(N=9307, ADD-CKD Study)

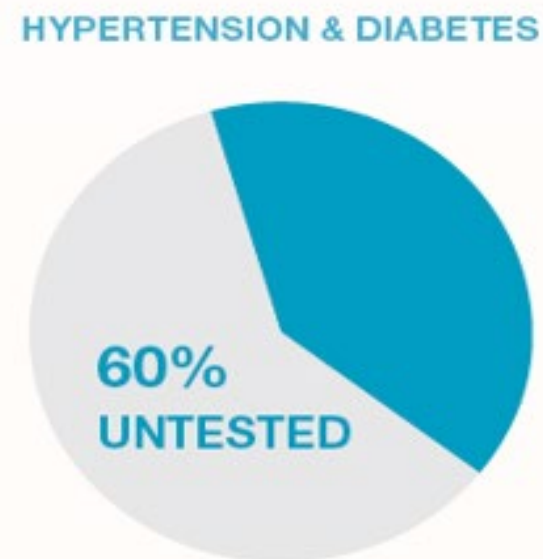
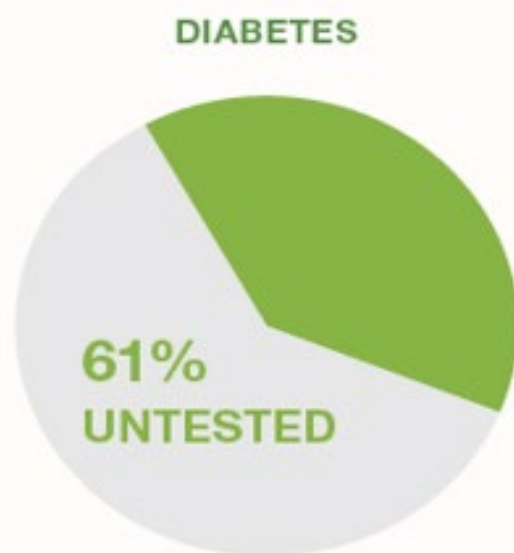
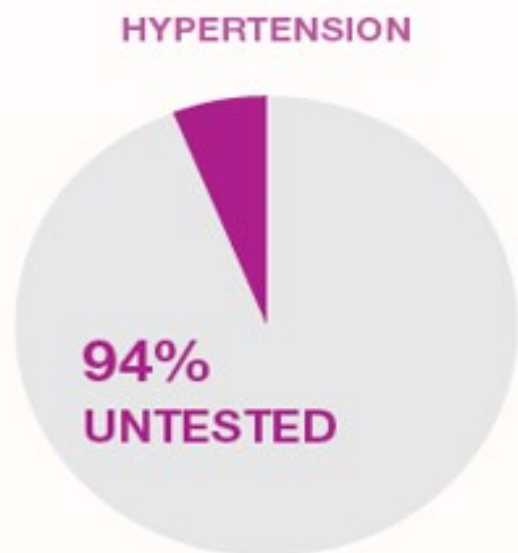


^aPatients who were in true positive or false negative groups; true positive, patients who reported as diagnosed with CKD (on CKD History electronic case report form [eCRF] page) and with actual presence of CKD based on laboratory results from the study visit; false negative, patients who reported as not diagnosed with CKD (on CKD History eCRF page) and with actual presence of CKD based on laboratory results from the study visit. ^bn=607/5036 patients with CKD. ^cBased on a 15-month retrospective medical record review of a multicenter, observational, cross-sectional study conducted in the US (2011-2012) in T2D patients.

ADD-CKD, Awareness, Detection and Drug Therapy in Type 2 Diabetes and CKD; CKD, chronic kidney disease; eGFR, estimated glomerular filtration rate; PCP, primary care provider; T2D, type 2 diabetes; UACR, urine albumin-to-creatinine ratio.

Low Rates Of Albumin-Creatinine Ratio Testing for Chronic Kidney Disease (CKD)

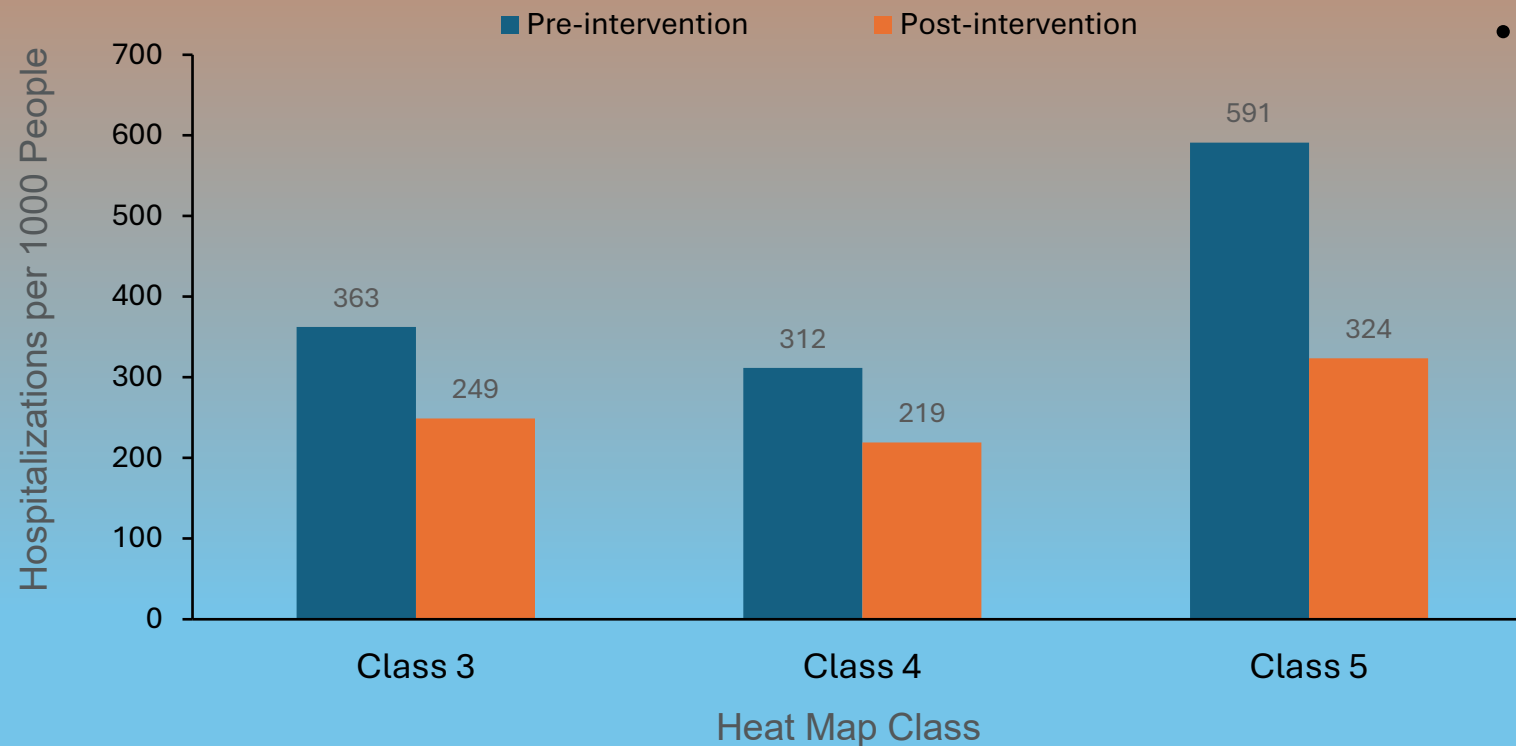
Hypertension and diabetes are the top two risk factors for developing CKD, but many people with these conditions are not receiving recommended testing.



Source: United States Renal Data System. 2016 USRDS annual data report: epidemiology of kidney disease in the United States. Bethesda, MD: National Institutes of Health, National Institute of Diabetes and Digestive and Kidney Diseases; 2016.

Implementation of a Care Plan That Includes Routine UACR and eGFR Testing in Patients at Risk of CKD Can Improve Patient Outcomes

Impact of a CKD Intervention in At-Risk Population With Diabetes and/or Hypertension (N=7420)^a



- Care plan implementation individualized to risk stratification enabled PCPs to reduce admissions and readmissions to hospital, as well as reduce several important costs, particularly for advanced CKD

^aResults shown are based on the CareFirst and National Kidney Foundation quality improvement study, which was designed to test the impact of a CKD intervention in the primary care setting in 7420 patients at risk for CKD with diabetes and/or hypertension.

CKD, chronic kidney disease; eGFR, estimated glomerular filtration rate; PCP, primary care provider; UACR, urine albumin-to-creatinine ratio.

Vassalotti JA, et al. *Am J Manag Care.* 2019;25:e326-e333.



Who To Screen – Based on risk factors

Universal screening of adults is not recommended.

- Screen with eGFR and uACR (urine Albumin to Creatine Ratio aka Urine Microalbumin) for ALL the patients with Primary risk factors below:
 - **Hypertension (represents 25% of CKD)** – no current consensus of frequency
 - **Diabetes Mellitus (represents 40-45% of CKD)**
 - (Screen at Diagnosis for Type 2, and after 5 years for Type 1. Then screen **annually**).
- Additionally, the National Kidney Foundation recommends screening ALL patients with increased risk factors with eGFR and uACR as well. There is no defined frequency for screening with these conditions alone. Some of these conditions are not associated with an ICD-10 code, making insurance coverage more problematic.
 - Additional risk factors to consider are:

Conditions with ICD-10 codes:	Cardiovascular Disease (CVD)	Obesity	Fam Hx Kidney disease	Hx of Tobacco use	Social Drivers (Poverty, Food Insecurity) "Z codes"
<u>NO</u> ICD-10 Codes:	Freq NSAID use	Age > 60	Personal Hx AKI		

• **Note:** uACR is most precise with a 1st morning sample

Despite Increased Prevalence of Prescription Medication Use in CKD, Standard of Care Remains Underprescribed

Prevalence of Prescription Medication Use in CKD Categories 3a to 5 in 2006 to 2009, 2010 to 2013, and 2014 to 2017 in CURE-CKD Registry^a

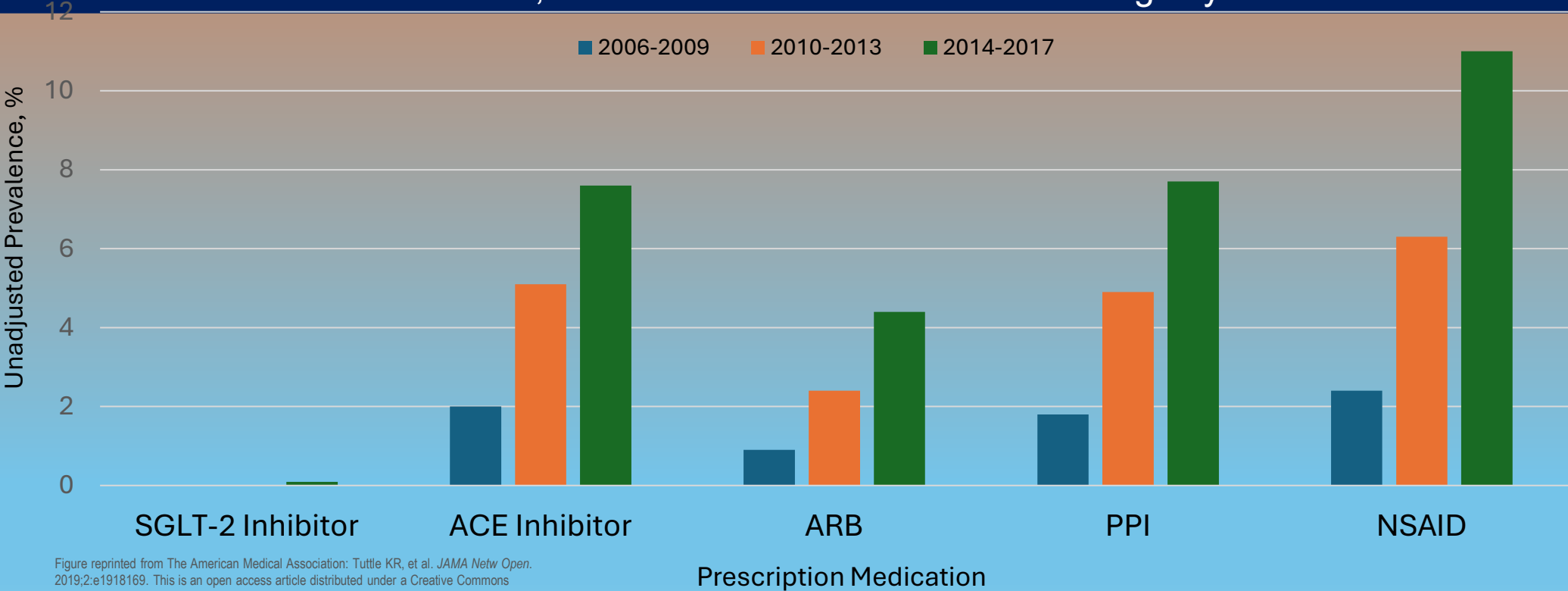


Figure reprinted from The American Medical Association: Tuttle KR, et al. *JAMA Netw Open*. 2019;2:e1918169. This is an open access article distributed under a Creative Commons Attribution 4.0 International license (CC BY 4.0; <https://creativecommons.org/licenses/by/4.0/>).

^aThe CURE-CKD registry is an EHR-based registry, which was jointly curated and sponsored by PSJH and UCLA health, and includes data from more than 2.6 million adults and children with CKD or at risk of CKD during 12 inclusive years (January 2006 to December 2017). ACE, angiotensin-converting enzyme; ARB, angiotensin II receptor blocker; CKD, chronic kidney disease; CURE-CKD, Center for Kidney Disease Research, Education, and Hope; EHR, electronic health record; NSAID, nonsteroidal anti-inflammatory drug; PPI, proton pump inhibitor; PSJH, Providence St Joseph Health; SGLT-2, sodium-glucose cotransporter-2; UCLA, University of California, Los Angeles. Tuttle KR, et al. *JAMA Netw Open*. 2019;2:e1918169.

Overcoming Barriers to Optimal CKD Screening and Management in Patients With Diabetes May Provide Opportunities to Improve Patient Care

Opportunities to Reduce Barriers at the Patient, Provider, and System Level:



Decision Support

- Concise guidelines and protocols
- Electronic care prompts
- Best practice support within lab reports



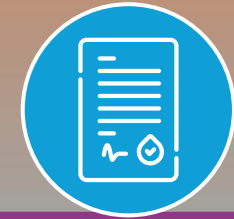
Multidisciplinary Care

- Improved coordination of care between HCPs
 - PCPs
 - Dietitians
 - Case managers
 - Pharmacists
 - Health educators



Better Educational Tools

- Raise awareness of CKD in the at-risk population
- Improve patient access to educational and self-management resources



Policy and Providers

- Payment models focused on preventing kidney failure
- Accurate diagnosis and coding to ensure optimal risk profiles and compensation for CKD care

Kidney Health Evaluation HEDIS[®] Measure Aims to Improve Kidney Disease Testing in Patients With Diabetes¹

Measure: Kidney Health Evaluation for Patients with Diabetes (KED)²

Description: The percentage of patients 18-85 years of age with diabetes (type 1 and type 2) who received a kidney health evaluation defined by **eGFR and UACR** during the measurement year²

NKF and NCQA partnered to develop new Kidney Health Evaluation Measure^{1,a}

- First included in HEDIS[®] publication released July 2020, replacing previous measure that was less specific¹
- Currently included in HEDIS[®] Measurement Year 2022²

This **claims-based measure** can¹:

- Reveal gaps in care
- Recognize the importance of coding
- Provide a focal point for improvement for providers and health plans

HEDIS[®] is a registered trademark of the National Committee for Quality Assurance (NCQA).

^aRepresentatives of several important stakeholder groups participated in the development of this measure including the American Diabetes Association, American Medical Group Association, Centers for Disease Control and Prevention, Indian Health Service, and the National Institute of Diabetes and Digestive and Kidney Diseases.

eGFR, estimated glomerular filtration rate; HEDIS[®], Healthcare Effectiveness Data and Information Set; NCQA, National Committee for Quality Assurance; NKF, National Kidney Foundation; UACR, urine albumin-to-creatinine ratio.

1. National Committee for Quality Assurance. Kidney health: a new HEDIS measure. 2020. <https://blog.ncqa.org/kidneyhealth/>. Accessed January 20, 2022. 2. Healthcare Effectiveness Data and Information Set. HEDIS MY 2022 measure descriptions. 2022. <https://www.ncqa.org/wp-content/uploads/2021/12/HEDIS-MY-2022-Measure-Descriptions.pdf>. Accessed January 20, 2022.

So how's CKD care in America?



186,961,565 weighted visits 2006-2014



2.7%

for patients with CKD

2006-2008

89%

46%

N/A

45%

29%



BP checked?



BP > 130/80?



A1c > 7%



ACEi or ARB



Statin in Age > 50

2012-2014

93%

48%

40%

36%

31%

P=0.025

p=0.50


p=0.072

p=0.92

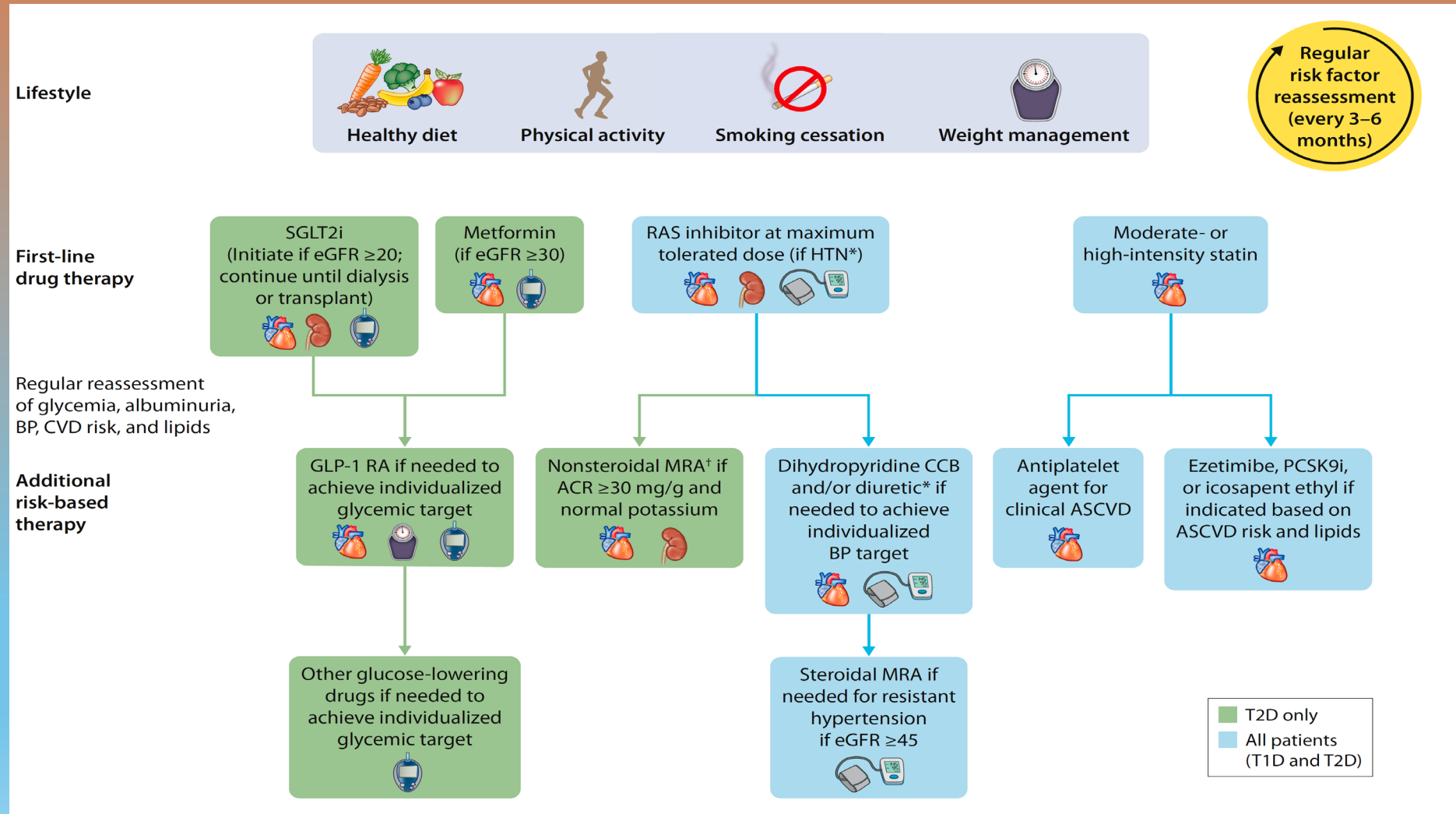
Conclusions Patients with diagnosed CKD had a high prevalence of uncontrolled hypertension and diabetes. ACE and ARB use decreased and statin use was low and did not improve over time.

Sri Lekha Tummalapalli, Neil Powe, and Salomeh Keyhani. **Trends in Quality of Care for Patients with CKD in the United States.** CJASN doi: 10.2215/CJN.00060119. **Visual Abstract by Joel Topf, MD, FACP**

First Step Interventions

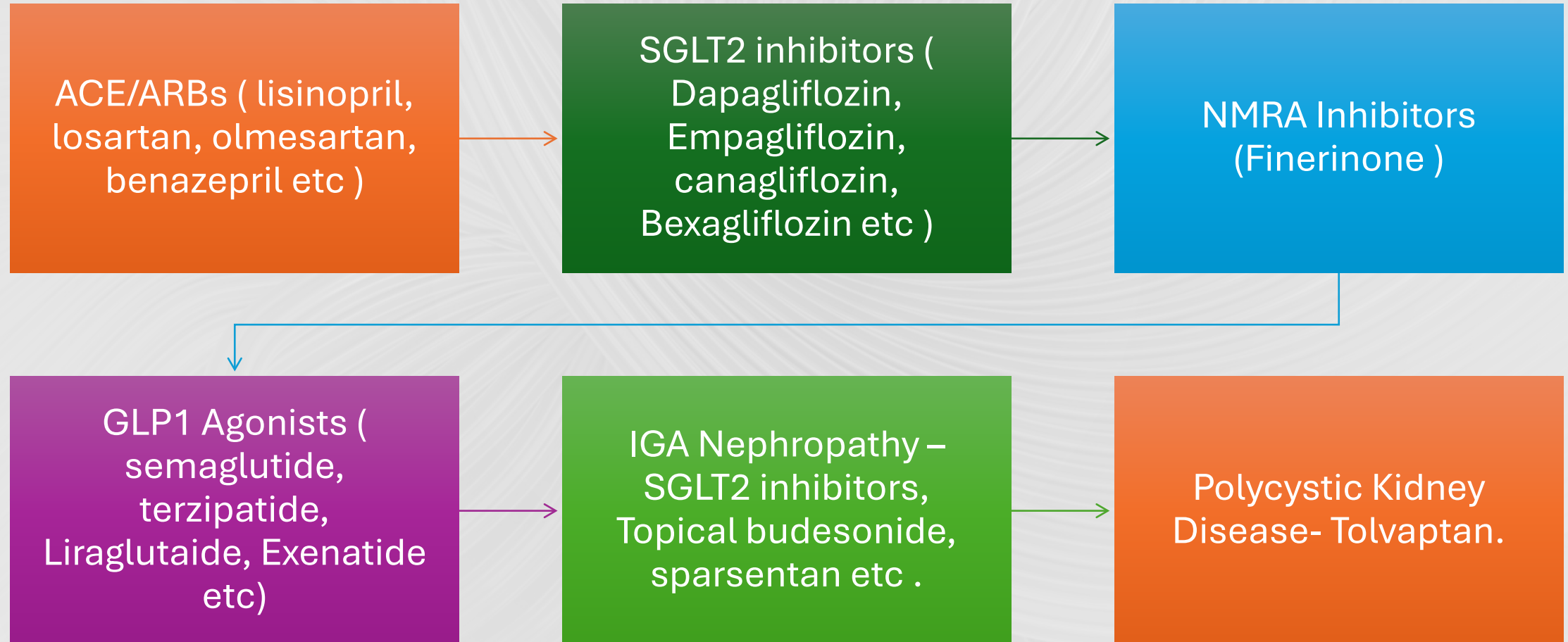
- **Treat Co-morbidities**
 - Diabetes –A1C goal < 7%
 - HTN- BP < 120/80 
 - Cardiovascular disease
 - Stones
 - Prostate issues
- **Referral to Dietician upon diagnosis** (covered benefit at all CKD stages for Medicare, commercial coverage may vary).
 - Follow a heart healthy diet until able to see dietician.
 - Avoid volume depletion (dehydration)
- **Smoking cessation**
- **AVOID Nephrotoxins**
 - NSAIDS
 - IV contrast, but premedicate if IV contrast is absolutely needed.
 - Gadolinium MRI contrast in CKD 4 & 5 is contra-indicated due to risk of Nephrogenic Systemic Fibrosis
- **Adjust doses for renally excreted medications**
 - Consider pharmacy consult if available.

ADA-KDIGO Holistic Approach for Improving Outcomes in Patients With Diabetes and CKD¹



1. Kidney Disease: Improving Global Outcomes. KDIGO 2022 Clinical Practice Guideline for Diabetes Management in Chronic Kidney Disease. *Kidney Int* 2022;102:S1–S128

Drugs in the Market with proven Efficacy for CKD



Key Takeaways

1

CKD is COMMON, SERIOUS, and COSTLY

CKD can be considered a disease multiplier or accelerator

2

Screen for CKD in patients with DM, HTN, and other selected risk factors

There are effective treatments that have been shown to reduce progression of CKD

3

Standard of care is for CKD patients to be on ACE/ARB therapy and SGLT2 inhibitors

Create an EMR alert to make it easy to do the right thing

4

Monitor CKD patients with a GFR and ACR annually

Make this a Best Practice to improve quality care for your patients

5

Prescription Organ Preserving Therapy is available and should be widely used.

Titrate therapy to reduce ACR by 30% per ADA recommendations

Dialysis Options

In Center Hemodialysis

Home Hemodialysis

Home Peritoneal dialysis

Nocturnal Hemodialysis

Continuous Veno Venous Hemodiafiltration

And the
Journey
Continues....

Thank You

