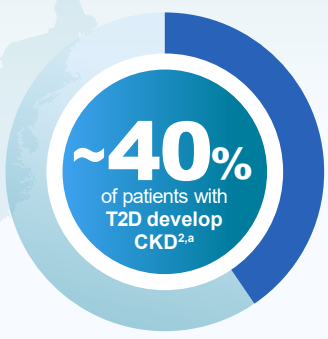
Chronic Kidney Disease

Associated With Type 2 Diabetes

CKD Is a Prevalent Complication of T2D
Yet Many Patients Remain Unaware and Undiagnosed

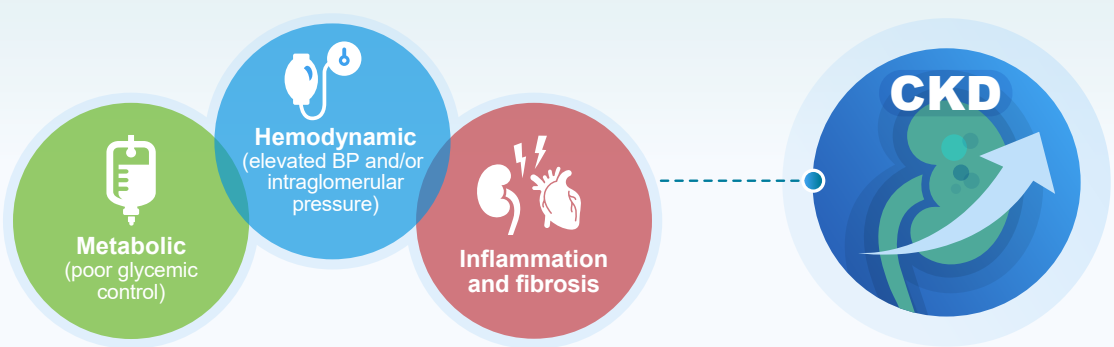
~35.4M
Americans (~10.7%) have T2D[1]



~70% of patients with diabetes and CKD stage 3 or 4 **are not aware of their disease**[3,b]

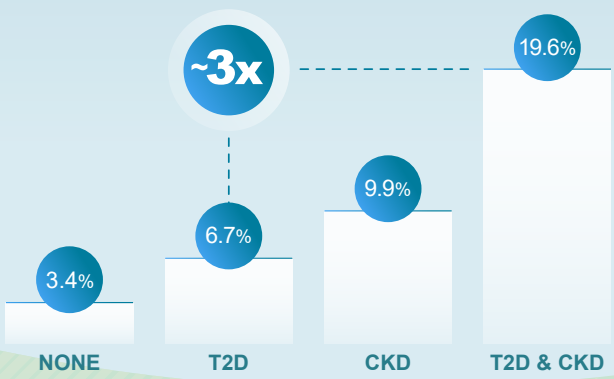
~50% of patients with T2D and CKD **do not have a CKD diagnosis**[4,c]

Pathophysiologic Processes Driving CKD Progression in Patients With T2D[5]



CKD Approximately Triples the Risk of CV Mortality in Patients With T2D

10-Year Standardized CV Mortality Cumulative Incidence[6,d]



Patients with CKD **are 6x more likely to die** from a CV event than to progress to ESKD[7,e]

eGFR and Albuminuria Are Predictive of CKD Progression and Risk for CV Events

Risk for CKD Progression and CV Events by Color Intensity and Recommended Frequency for Monitoring eGFR and UACR[8,f]

GFR categories, mL/min/1.73 m² (Description and range)			Albuminuria categories (Description and range) A1: Normal to mildly increased <30 mg/g <3 mg/mmol	A2: Moderately increased 30-299 mg/g 3-29 mg/mmol	A3: Severely increased ≥300 mg/g ≥30 mg/mmol
G1	Normal or high	≥90	Screen 1	Treat 1	Treat & Refer 3
G2	Mildly decreased	60-89	Screen 1	Treat 1	Treat & Refer 3
G3a	Mildly to moderately decreased	45-59	Treat 1	Treat 2	Treat & Refer 3
G3b	Moderately to severely decreased	30-44	Treat 2	Treat & Refer 3	Treat & Refer 3
G4	Severely decreased	15-29	Treat & Refer 3	Treat & Refer 3	Treat & Refer 4+
G5	Kidney failure	<15	Treat & Refer 4+	Treat & Refer 4+	Treat & Refer 4+

- Low risk (if no other markers of kidney disease, no CKD)
- Moderately increased risk
- High risk
- Very high risk

The numbers in the boxes are a guide to the frequency of screening or monitoring (number of times per year).

ADA, KDIGO, and AACE Guidelines Recommend eGFR and UACR Testing in All Patients With T2D

When to Screen
All patients with T2D should be screened **at least annually** for CKD[8-10]

Screening Tests
eGFR
(measures kidney function)
+
UACR
(measures kidney damage)[8-11]

Diagnosis
For ≥3 months[8]:
UACR ≥30 mg/g[g]
OR
eGFR <60 mL/min/1.73 m²
OR
Both

Early Diagnosis and Treatment of CKD Associated With T2D Can Improve Patient Outcomes by[11-13]

Slowing
CKD progression

Reducing
CV events

Reducing
Health care costs

FOOTNOTES

[a]Study was conducted using NHANES 1999-2012 data. Projections for the US T2D population were based on NHANES sampling weights.[2]

[b]Data from CDC Chronic Kidney Disease Surveillance System using NHANES 2017-2020.[3]

[c]Retrospective observational study of 123,169 patients with lab-confirmed CKD associated with T2D using the Optum Clinformatics database (2010-2017).[4]

[d]Data from 15,046 NHANES III participants aged ≥20 years who had follow-up mortality data through 2006.[6]

[e]Cardiovascular Health Study of 1268 community-dwelling adults ≥65 years old with eGFR <60 mL/min/1.73 m².[7]

[f]The numbers in the boxes are a guide to the frequency of screening or monitoring (number of times per year). Green reflects no evidence of CKD by eGFR or albuminuria, with screening indicated once per year. For monitoring of prevalent CKD, suggested monitoring varies from once per year (yellow) to four times or more per year (ie, every 1-3 months, [deep red]) according to risks of CKD progression and CKD complications. These are general parameters only, based on expert opinion, and underlying comorbid conditions and disease state must be taken into account, as well as the likelihood of impacting a change in management for any individual patient.[8]

[g]UACR has marked variability; therefore, a confirmatory urine sample within 3-6 months is recommended.[8]

ABBREVIATIONS

AACE, American Association of Clinical Endocrinology; **ADA**, American Diabetes Association; **CDC**, Centers for Disease Control and Prevention; **CKD**, chronic kidney disease; **CV**, cardiovascular; **eGFR**, estimated glomerular filtration rate; **ESKD**, end-stage kidney disease; **GFR**, glomerular filtration rate; **KDIGO**, Kidney Disease Improving Global Outcomes; **NHANES**, National Health and Nutrition Examination Survey; **NHANES III**, Third National Health and Nutritional Examination Survey; **T2D**, type 2 diabetes; **UACR**, urine albumin-to-creatinine ratio.

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1. American Diabetes Association: Statistics about diabetes. 2022. https://diabetes.org/about-us/statistics/about-diabetes/. Accessed January 6, 2023. **2.** Bailey RA, et al. *BMC Res Notes*. 2014;7:415. **3.** Centers for Disease Control and Prevention. Chronic Kidney Disease Surveillance System—United States. https://nccd.cdc.gov/CKD/detail.aspx?QNum=Q98#%20%20refreshPosition. Accessed January 6, 2023. **4.** Bakris G, et al. Presented at NKF 2019 Spring Clinical Meeting May 8-12, 2019. Poster. **5.** Alicic RZ, et al. *Clin J Am Soc Nephrol*. 2017;12(12):2032-2045. **6.** Afkarian M, et al. *J Am Soc Nephrol*. 2013;24(2):302-308. **7.** Dalrymple LS, et al. *J Gen Intern Med*. 2010;26(4):379-385. **8.** de Boer IH, et al. ADA and KDIGO Consensus Report. *Diabetes Care*. 2022;45(12):3075-3090. **9.** American Diabetes Association Professional Practice Committee; 11. Chronic Kidney Disease and Risk Management: Standards of Care in Diabetes—2025. Diabetes Care 1 January 2025; 48 (Supplement_1): S239–S251. **10.** Blonde L, et al. *Endocr Pract*. 2022;28(10):923-1049. **11.** Kidney Disease Improving Global Outcomes. *Kidney Int Suppl*. 2013;3(1):1-150. **12.** Yarnoff BO, et al. *BMC Nephrol*. 2017;18(1):85. **13.** Shlipak MG, et al. *Kidney Int*. 2021;99(1):34-47.