Screening for CKM Syndrome

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Disclosures Jürgen Floege

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Data Safety Monitoring Boards: NovoNordisk, Visterra

Screening for CKM Syndrome

Early Life Screening Age <21 years

- Annual screening for **overweight and obesity** using sex- and age- specific CDC growth charts
- **Mental and behavioral health** screening
- **Blood pressure** assessment at least annually, and at every visit starting at age 3
- **Fasting lipid panel** between ages 9-11 and again between ages 17-21
- Positive family history of dyslipidemia- begin screening at age 2
- **Screen for glucose intolerance and monitor alanine aminotransferase**
- Assign appropriate CKM Syndrome stage and begin recommended prevention

Ndumele CE, Rangaswami J, Chow SL, et al. *Circulation*. 2023;148(20):1606-1635.

Screening for CKM Syndrome

Adult Screening
Age ≥ 21 years

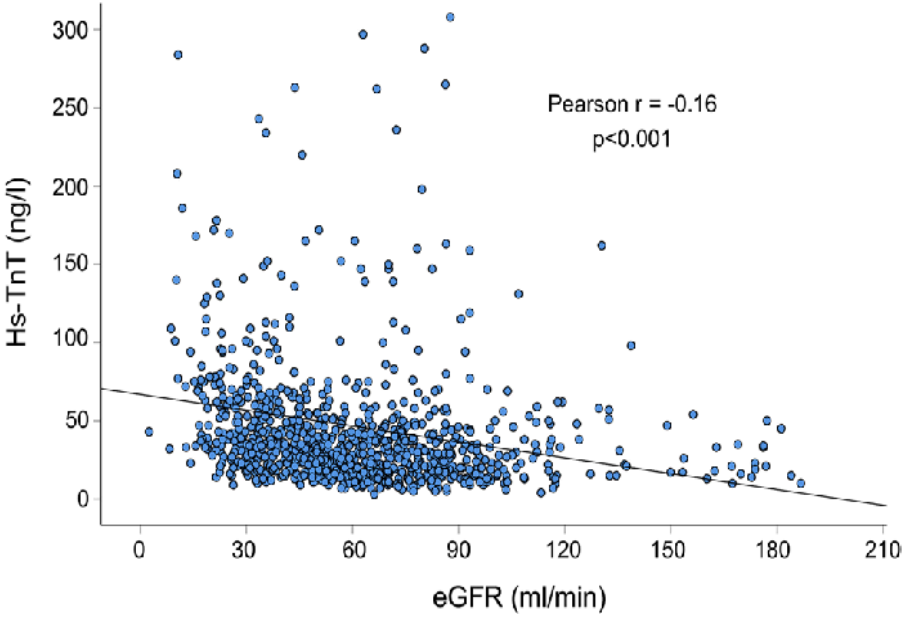
- **BMI and waist circumference** annually
- **Blood pressure, HbA1c and lipid panel** at stage-determined intervals
- **Albuminuria and serum-creatinine** measurements at stage-determined intervals
- **Screening for MASLD** every 1-2 years as directed by guidelines
- **Coronary artery calcification** measurements as directed by guidelines

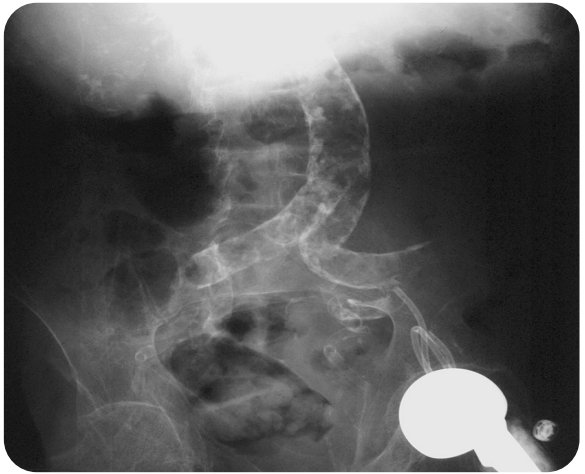
Ndumele CE, Rangaswami J, Chow SL, et al. *Circulation*. 2023;148(20):1606-1635.

PACE-CME Physicians' Academy for Cardiovascular Education

Scientific Understanding of CKM Syndrome

Chronic Kidney Disease as a CONFOUNDER in Screening for Cardiovascular Risk





Mediasclerosis

- Non-inflammatory, no lipid deposition
- Usually asymptomatic

Ledwoch J, Krauth A, Kraxenberger J et al, *Heart and Vessels* 2022; 37(1): 69-76

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Scientific Understanding of CKM Syndrome

Chronic Kidney Disease as an AMPLIFIER of Cardiovascular Risk

Low glomerular filtration rate and albuminuria independently increase the risk of MACE and CV death

Pro-inflammatory state which potentiates CVD risk

CKD and diabetes precipitate peripheral artery disease below the knee

Development of heart failure and/or progressive CKD can increase bidirectional organ damage, in tandem with neurohormonal activation and inflammation

Vascular calcification is common in CKD and increases CVD risk

Anemia is common in CKD and exacerbates CVD

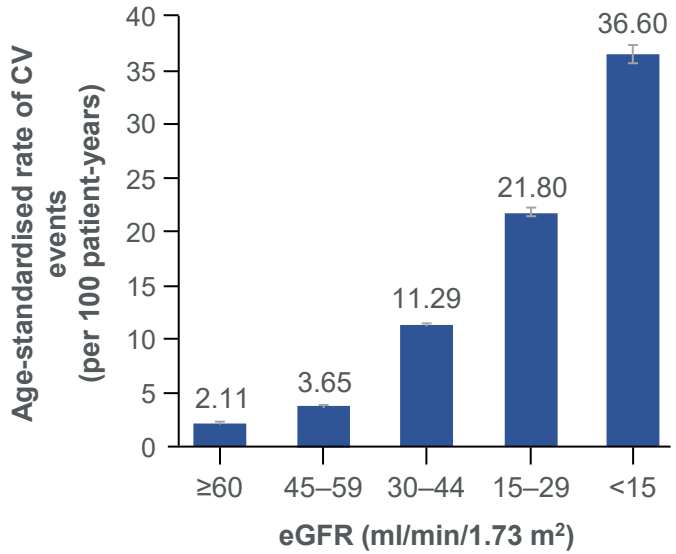
Abbreviations: CKD indicates chronic kidney disease; CKM, Cardiovascular-Kidney-Metabolic; CV, cardiovascular; CVD, cardiovascular disease; and MACE, major adverse cardiovascular events.

Ndumele CE, Rangaswami J, Chow SL, et al. *Circulation*. 2023;148(20):1606-1635.

Lower eGFR is associated with CV events and mortality*

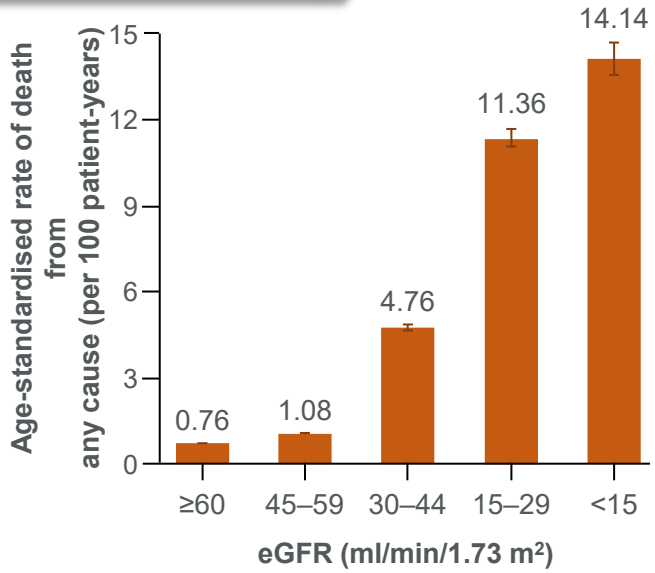
A Decrease in eGFR is associated with increased CV events and mortality

CV events



No. of events:	73,108	34,690	18,580	8809	3824

Mortality



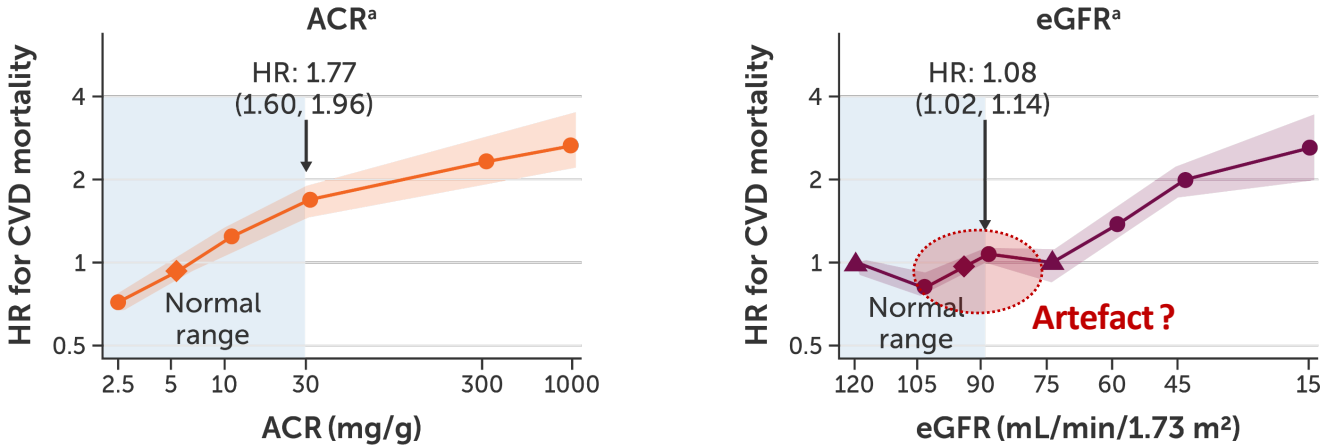
No. of events:	25,803	11,569	7802	4408	1842

*Data from a large integrated health system including 1,120,295 patients with serum creatinine measured between 1996–2000 and median follow-up of 2.84 years

Go AS, Chertow GM, Fan D, et al. *N Engl J Med.* 2004;351(13):1296-1305.

ACR Is an Independent Predictor of CV Mortality across the Full Range of Kidney Function

CV Mortality



Independent of each other and traditional risk factors, ACR ≥10 mg/g was significantly associated with increased CV mortality, but eGFR was not until <60 mL/min/1.73 m2

[a]Adjusted for each other (ACR or eGFR), age, gender, race, CVD history, systolic blood pressure, diabetes, smoking, and total cholesterol.
ACR, albumin-creatinine ratio; CV, cardiovascular; CVD, cardiovascular disease; eGFR, estimated glomerular filtration rate; HR, hazard ratio.

Chronic Kidney Disease Prognosis Consortium, et al. *Lancet*. 2010;375(9731):2073-2081.

Changes in Albuminuria and Subsequent Risk of Incident Chronic Kidney Disease

KDIGO Heat Map for CKD Classification

CKD is classified based on:
Cause (C)*
GFR (G)†
Albuminuria (A)†

GFR categories (mL/min per 1.73 m²) Description and range				Albuminuria categories Description and range		
				A1	A2	A3
				Normal to mildly increased	Moderately increased	Severely increased
				<30 mg/g <3 mg/mmol	30–299 mg/g 3–29 mg/mmol	≥300 mg/g ≥30 mg/mmol
	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)
Moderately increased risk
High risk
Very high risk

3.5 million US veterans

- eGFR ≥ 60 *mL/min/1.73 m²*
- Mean Age 64 years
- 97% male
- 91% diabetic

56,946 Final cohort

	1-year change in albuminuria	Incident CKD	Rapid eGFR decline
Decrease	> 2 fold	0.82 *(0.77-0.89)*	0.86 *(0.78-0.94)*
Decrease	1.25-2 fold	0.93 *(0.86-1.00)*	0.98 *(0.89-1.07)*
Increase	1.25-2 fold	1.12 *(1.05-1.20)*	1.18 *(1.08-1.29)*
Increase	> 2 fold	1.29 *(1.21-1.38)*	1.67 *(1.54-1.81)*

Conclusion: Relative changes in albuminuria over a 1 year interval were associated with subsequent risk of incident CKD.

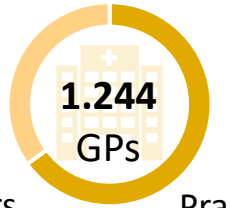
1. Ndumele CE, et al. *Circulation*. 2023;148(20):1606-1635. 2. Sumida K, et al. *Clin J Am Soc Nephrol*. 2017;12(12):1941-1949

InspeCKD: a Study in Germany

Baseline characteristics of the total cohort

448.837 Patients

35% Internists working as General Practicioners



65% General Practicioners

People at Risk

Baseline characteristics

Age	**65.1 years** (± 14,5)
BMI	**29.3 kg/m²** (± 6,1)
sBP	**142** (± 21,7) **mmHg**
Female	**52%**

Comorbidities

- **76%** Arterial Hypertension
- **35%** CV-Disease
- **32%** Diabetes mellitus
- **7.5%** High risk patients (HTN + CVD + DM)

Mean observation time **1.7** (± 0.4) **Years**

InspeCKD-cohort typical for a General Practicioner Practice in Germany

Wanner C, Schaeffner E, Frese M, et al. *MMW Fortschr Med*. 2024; 166(4):9-17

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InspeCKD: a Study in Germany

Frequency of CKD-specific laboratory tests in the subgroup of high-risk patients

High risk cohort (HTN, DM, CVD)
n=33.698

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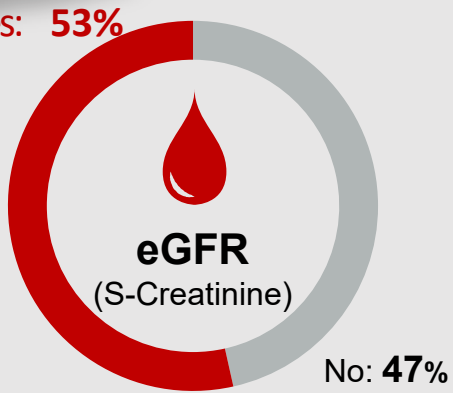
Which tests were done at least once during the next 1.7 years ?



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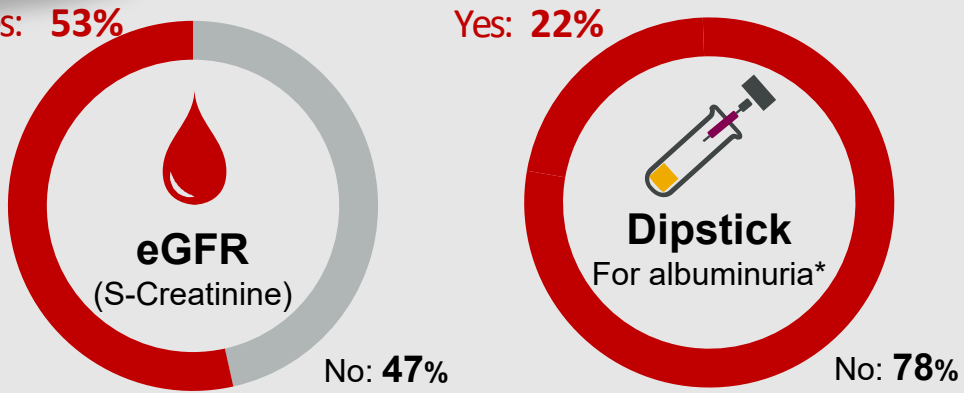

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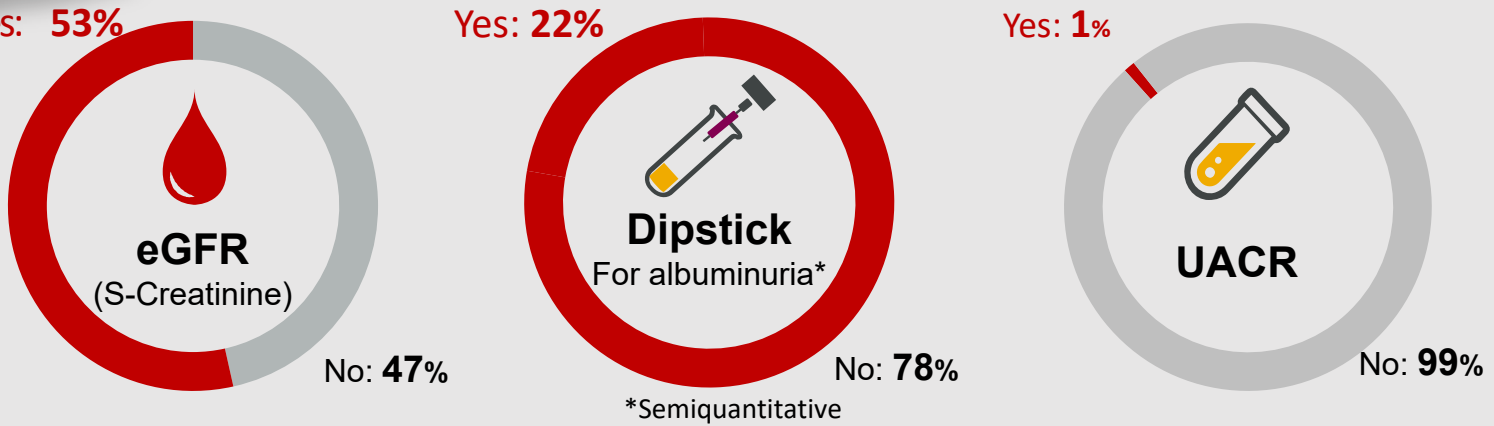

Guideline recommended CKD-Screening for high risk patients is inadequate[1,2]

1. Wanner C, Schaeffner E, Frese M, et al. *MMW Fortschr Med*. 2024; 166(4):9-17 2. Kidney Disease: Improving Global Outcomes (KDIGO) CKD Work Group. Kidney Int. 2024;105(4S):S117-S314.