

Supplementary Table SI. Clinical and Laboratory Indicators and Thresholds for Defining CKM Conditions Based on NHANES Data

CKM conditions	Definition	CKM indicators	Threshold for CKM indicators
CVD	Individuals with clinical CVD or subclinical CVD	Clinical CVD	History of chronic heart failure, coronary heart disease, heart attack, or stroke
		Subclinical CVD	Any of the following criterion is met: 1) Very high-risk CKD in KDIGO classification: UACR \geq 300 mg/g and eGFR \leq 45–59 ml/min/1.73 m ² , UACR \geq 30 mg/g and eGFR \leq 30–44 ml/min/1.73 m ² , or eGFR \leq 29 ml/min/1.73 m ² . 2) Predicted 10-year CVD risk \geq 20%
Kidney diseases	Individuals with CKD	CKD	Moderate-to-high-risk CKD in KDIGO classification: UACR \geq 30 mg/g and eGFR \geq 60 ml/min/1.73 m ² , UACR $<$ 300 mg/g and eGFR \leq 45–59 ml/min/1.73 m ² , or UACR $<$ 30 mg/g and eGFR \leq 30–44 ml/min/1.73 m ² .
Metabolic disorders	Individuals with overweight/obesity, abdominal obesity, prediabetes, diabetes, hypertension, hypertriglyceridemia or MetS	Overweight/obesity	BMI \geq 25 kg/m ²
		Abdominal obesity	Waist circumference \geq 88/102 cm in female/male (or if Asian ancestry \geq 80/90 cm in female/male)
		Prediabetes	Fasting blood glucose \geq 100–124 mg/dl or HbA1c \geq 5.7%–6.4% and without self-reported diagnosis of diabetes, use of insulin, or oral hypoglycemic agents
		Diabetes	Fasting blood glucose \geq 125 mg/dl or HbA1c \geq 6.5% or self-reported diagnosis of diabetes, use of insulin, or oral hypoglycemic agents
		Hypertension	SBP \geq 130 mm Hg or DBP \geq 80 mm Hg or self-reported diagnosis of hypertension or use of antihypertensive medications
		Hypertriglyceridemia	Triglycerides \geq 135 mg/dl
		MetS	MetS is defined by the presence of 3 or more of the following: 1) Waist circumference \geq 88/102 cm in female/male (or if Asian ancestry \geq 80/90 cm in female/male). 2) HDL cholesterol $<$ 50/40 mg/dl in female/male. 3) Triglycerides \geq 150 mg/dl. 4) Elevated blood pressure (SBP \geq 130 mm Hg or DBP \geq 80 mm Hg and/or use of antihypertensive medications). 5) Fasting blood glucose \geq 100 mg/dl.

BMI – body mass index, CKD – chronic kidney disease, CKM – cardiovascular-kidney-metabolic syndrome, CVD – cardiovascular disease, DBP – diastolic blood pressure, eGFR – estimated glomerular filtration rate, HDL-C – high-density lipoprotein cholesterol, KDIGO – The Kidney Disease: Improving Global Outcomes, MetS – metabolic syndrome, SBP – systolic blood pressure, UACR – urinary albumin to creatinine ratio.

Supplementary Table SII. Operationalized Hierarchical Algorithm for the Classification of CKM Stages 0 through 4

CKM stages	Definition	Criterion	Threshold for CKM conditions
Stage 0: No CKM risk factors	Individuals with normal BMI and waist circumference, normoglycemia, normotension, a normal lipid profile, and no evidence of CKD or subclinical or clinical CVD	All criteria are met	BMI < 25 kg/m ² (or < 23 kg/m ² if Asian ancestry)
			Waist circumference < 88/102 cm in female/male (or if Asian ancestry < 80/90 cm in female/male)
			Fasting blood glucose < 100 mg/dl and HbA1c < 5.7% and without self-reported diagnosis of diabetes, use of insulin, or oral hypoglycemic agents
			SBP < 130 mm Hg and DBP < 80 mm Hg without self-reported diagnosis of hypertension or use of antihypertensive medications
			HDL cholesterol > 50/40 mg/dl in female/male and triglycerides < 150 mg/dl
			Low-risk CKD in KDIGO classification according to eGFR and UACR: UACR < 30 mg/g and eGFR ≥ 60 ml/min/1.73 m ²
			Predicted 10-year CVD risk < 20%
Stage 1: Excess or dysfunctional adiposity	Individuals with overweight/obesity, abdominal obesity, or dysfunctional adipose tissue, without the presence of other metabolic risk factors or CKD	Any of the three criteria is met	Overweight/obesity
			Abdominal obesity
			Prediabetes
		All criteria are met	SBP < 130 mm Hg and DBP < 80 mm Hg without self-reported diagnosis of hypertension or use of antihypertensive medications
			HDL cholesterol > 50/40 mg/dl in female/male and triglycerides < 150 mg/dl
			Low-risk CKD in KDIGO classification according to eGFR and UACR: UACR < 30 mg/g and eGFR ≥ 60 ml/min/1.73 m ²
			Predicted 10-year CVD risk < 20%
Stage 2: Metabolic risk factors and CKD	Individuals with metabolic risk factors (hypertriglyceridemia, hypertension, MetS, diabetes), or CKD	Any of the five criteria is met	Hypertriglyceridemia
			Hypertension
			Diabetes
			MetS
			Moderate-to-high-risk CKD in KDIGO classification
		All criteria are met	No very high-risk CKD in KDIGO classification
			Predicted 10-year CVD risk < 20%
			No clinical CVD

Supplementary Table SII. Operationalized Hierarchical Algorithm for the Classification of CKM Stages 0 through 4 (cont.)

CKM stages	Definition	Criterion	Threshold for CKM conditions
Stage 3: Subclinical CVD in CKM	Subclinical CVD among individuals with excess/dysfunctional adiposity, other metabolic risk factors, or CKD	Any of the two criteria is met	Very high-risk CKD in KDIGO classification
		Any of the eight criteria is met	Predicted 10-year CVD risk \geq 20%
			Overweight/obesity
			Abdominal obesity
			Prediabetes
			Hypertriglyceridemia
			Hypertension
			Diabetes
Mets			
Stage 4: Clinical CVD in CKM	Clinical CVD among individuals with excess/dysfunctional adiposity, other metabolic risk factors, or CKD	The criterion is met	No clinical CVD
		The criterion is met	Clinical CVD
		Any of the nine criteria is met	Overweight/obesity
			Abdominal obesity
			Prediabetes
			Hypertriglyceridemia
			Hypertension
			Diabetes
Mets			
Moderate-to-high-risk CKD in KDIGO classification			
Very high-risk CKD in KDIGO classification			

BMI – body mass index, CKD – chronic kidney disease, CKM – cardiovascular-kidney-metabolic syndrome, CVD – cardiovascular disease, DBP – diastolic blood pressure, eGFR – estimated glomerular filtration rate, HDL-C – high-density lipoprotein, KDIGO – The Kidney Disease: Improving Global Outcomes, NHANES – National Health and Nutrition Examination Survey, SBP – systolic blood pressure, UACR – urinary albumin to creatinine ratio.