

Supplementary Material

Supplementary Table 1. Associations of creatinine-based estimated glomerular filtration rate with impaired fasting glucose and impaired glucose tolerance (dichotomous outcomes) among 4136 participants without diabetes in the Cardiovascular Health Study

		Adjusted difference (95% confidence interval)	
Estimated GFR (mL/min/1.73m ²)	Unadjusted Prevalence (%)	Model 1	Model 2
Impaired Fasting Glucose (mg/dL)			
≥ 90	44.3	1 (reference)	1 (reference)
75-89	44.1	0.89 (0.73,1.08)	0.90 (0.73,1.11)
60-74	49.2	1.02 (0.83,1.26)	0.98 (0.79,1.22)
45-59	51.6	1.13 (0.90,1.42)	1.02 (0.80,1.29)
< 45	50.2	1.02 (0.75,1.40)	0.81 (0.58,1.14)
Continuous**		1.05 (1.02,1.09)	1.01 (0.97,1.05)
		P=0.02	P=0.51
Impaired Glucose Tolerance (mg/dL)			
≥ 90	41.5	1 (reference)	1 (reference)
75-89	42.5	0.96 (0.78,1.17)	0.95 (0.77,1.17)
60-75	41.7	0.88 (0.71,1.09)	0.83 (0.66,1.03)
45-59	42.9	0.88 (0.71,1.12)	0.77 (0.61,0.98)
< 45	46.8	0.88 (0.64,1.21)	0.69 (0.49,0.97)
Continuous**		0.98(0.42,1.02)	0.94 (0.90,0.98)
		P=0.33	P=0.006

Included are 607 participants with estimated GFR ≥ 90 mL/min/1.73m², 1379 participants with estimated GFR 75-89 mL/min/1.73m², 1109 participants with estimated GFR 60-74 mL/min/1.73m², 774 participants with estimated GFR 45-59 mL/min/1.73m², and 267 participants with estimated GFR < 45 mL/min/1.73m².

IFG: impaired fasting glucose (fasting glucose 100-125mg/dL)

IGT: impaired glucose tolerance (2-hour glucose 149-199mg/dL)

Model 1 is adjusted for age, sex, race, site, and education

Model 2 is additionally adjusted for leisure time physical activity, smoking, alcohol, waist circumference, dietary score, medications and prevalent cardiovascular disease.

**Continuous models evaluate eGFR models per 10 mL/min/1.73m² lower eGFR

Supplementary Table 2. Associations of cystatin C-based estimated glomerular filtration rate with fasting insulin, ISI, beta cell function, and 2-hour glucose among 3638 participants without prevalent diabetes in the Cardiovascular Health Study.

Estimated GFR (mL/min/1.73m ²)	Unadjusted Mean, SD	Adjusted difference* (95% confidence interval)	
		Model 1	Model 2
Fasting insulin (% difference)			
≥ 90	12.0(6.0)	1(reference)	1(reference)
75-89	13.1(7.1)	8.4(4.5,12.4)	4.7(1.3,8.2)
60-74	14.6(7.6)	22.5(18.0,27.2)	10.9(7.0,14.9)
45-59	16.1(8.0)	37.6(30.9,44.7)	20.2(14.8,25.9)
< 45	16.7(8.7)	45.3(34.4,57.0)	23.7(15.0,33.0)
Continuous**		6.0(5.3,6.8) P<0.001	3.5(2.8,4.2) P<0.001
ISI (% difference)			
≥ 90	4.0(2.5)	1.0(reference)	1.0(reference)
75-89	3.8(2.3)	-4.7(-9.6,0.4)	-0.5(-5.2,-0.4)
60-74	3.4(2.1)	-16.7(-21.0,-12.0)	-5.3(-10.1,-0.3)
45-59	3.1(2.0)	-25.0(-30.2,-19.4)	-10.2(-16.1,-4.0)
< 45	2.9(1.8)	-30.6(-37.4,-23.0)	-13.2(-21.6,-4.0)
Continuous**		-6.2(-7.4,-5.1) P<0.001	-2.5(-3.6,-1.4) P<0.001
Beta-cell function index (pmol/L)			
≥ 90	1264(508)	0(reference)	0(reference)
75-89	1377(572)	130.4(82.5,178.2)	99.9(53.7,146.0)
60-74	1435(636)	217.4(164.7,270.1)	131.4(78.6,184.1)
45-59	1511(665)	332.8(260.7,404.8)	214.5(143.7,285.4)
< 45	1509(761)	368.1(242.1,494.1)	225.2(102.3,348.1)
Continuous**		43.9(33.6,54.2) P<0.001	38.5(27.3,49.7) P<0.001
2-hour glucose (mg/dl)			
≥ 90	137.8(44)	0(reference)	0(reference)
75-89	133.1(40)	-5.3(-9.0,-1.2)	-6.8(-10.4,-3.1)
60-74	138.6(42)	-0.7(-4.6,3.2)	-5.4(-9.3,-1.4)
45-59	142.0(43)	0.7(-4.2,5.7)	-6.2(-11.2,-1.1)
< 45	153.7(46)	9.6(1.9,17.3)	0.8(-7.2,8.8)
Continuous**		0.9(0.16,1.8)	-0.4(-1.3,0.4)

P=0.02

P=0.32

Included are 897 participants with estimated GFR ≥ 90 mL/min/1.73m², 1120 participants with estimated GFR 75-89 mL/min/1.73m², 1010 participants with estimated GFR 60-74 mL/min/1.73m², 448 participants with estimated GFR 45-59 mL/min/1.73m², and 163 participants with estimated GFR < 45 mL/min/1.73m².

Model 1 is adjusted for age, sex, race, site, and education

Model 2 is additionally adjusted for leisure time physical activity, smoking, alcohol, waist circumference, dietary score, medications and prevalent cardiovascular disease.

* Differences expressed in mg/dL for fasting and 2-hour glucose concentration (absolute difference), pmol/L for beta cell function (absolute difference) or as percent difference for fasting insulin concentration and ISI (relative difference).

**Continuous models evaluate eGFR models per 10 mL/min/1.73m² lower eGFR; p-values are generated using this continuous model.

Supplementary Table 3. Associations of cystatin C-based estimated glomerular filtration rate with incident diabetes among 4170 participants in the Cardiovascular Health Study.

Estimated GFR (mL/min/1.73m ²)	Incident DM Number of events	Incidence rate	Model 1	Model 2
≥ 90	117	8.8	1(reference)	1(reference)
75-89	118	7.6	0.86(0.66,1.10)	0.75(0.58,0.97)
60-74	110	9.1	1.06(0.82,1.37)	0.77(0.58,1.00)
45-59	42	9.7	1.21(0.84,1.73)	0.80(0.54,1.17)
< 45	14	11.5	1.41(0.80,2.48)	0.84(0.45,1.55)
Continuous**			1.04(0.98,1.11)	0.96(0.90,1.02)
			P=0.16	P=0.15

Included are 1056 participants with estimated GFR ≥ 90 mL/min/1.73m², 1295 participants with estimated GFR 75-89 mL/min/1.73m², 1146 participants with estimated GFR 60-74 mL/min/1.73m², 492 participants with estimated GFR 45-59 mL/min/1.73m², and 181 participants with estimated GFR < 45 mL/min/1.73m².

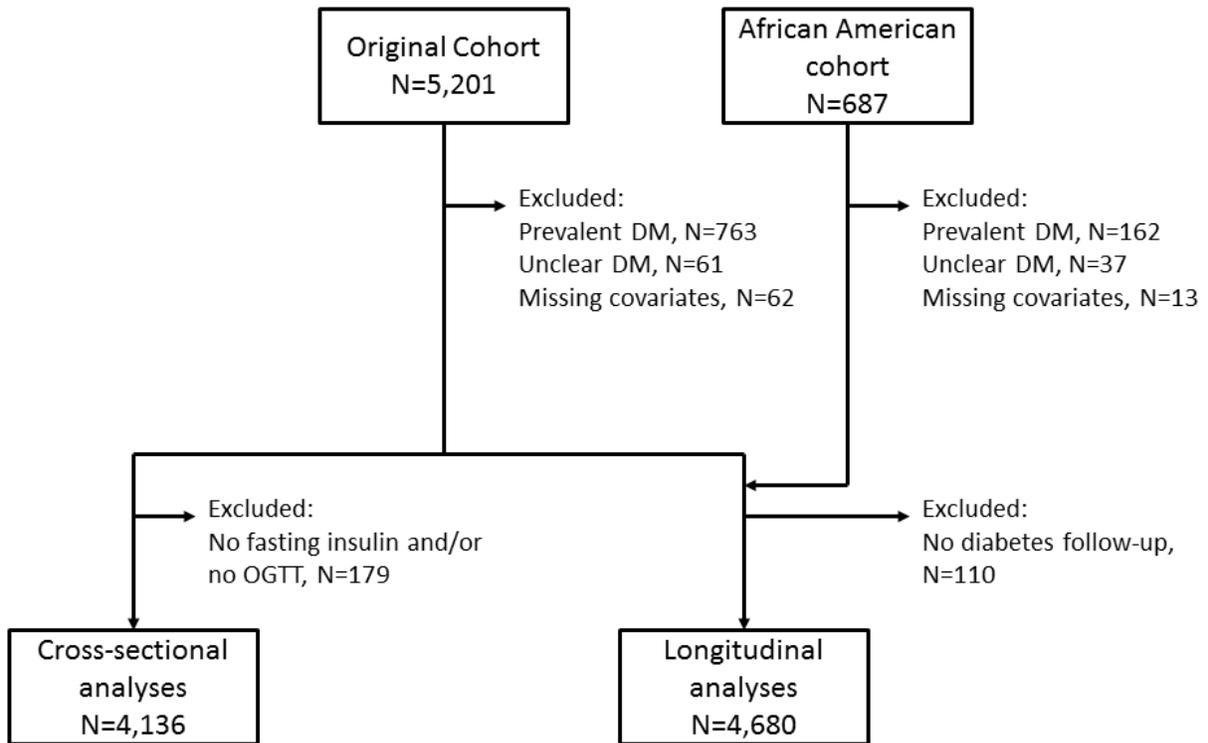
Model 1 is adjusted for age, sex, race, site, and education

Model 2 is additionally adjusted for leisure time physical activity, smoking, alcohol, waist circumference, dietary score, medications and prevalent cardiovascular disease.

**Continuous models evaluate eGFR models per 10 mL/min/1.73m² lower eGFR; p-values are generated using this continuous model.

Supplementary Figures

Supplementary Figure 1. Cardiovascular Health Study participants included in this study.



Supplementary Figure 2. Correlation of beta-cell function index (pmol/L) with insulin sensitivity index among 4136 participants in the Cardiovascular Health Study.

