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Appendix 1. Data analysis overview and analytic notes for some of individual studies

Overview:
As previously described,[1] the collaborating cohorts were asked to compile a dataset with approximately 40 variables (key exposures [serum creatinine to estimate GFR and albuminuria], covariates [e.g., age, sex, race/ethnicity, diabetes], and outcomes [laboratory tests and hypertension]). To be consistent across cohorts, the CKD-PC Data Coordinating Center sent definitions for those variables to participating cohorts. We instructed studies not to impute any variables.

For 42 of the 55 cohorts in this specific study, the Data Coordination Center at Johns Hopkins University conducted the analysis; the remainder ran the standard code written in STATA by the Data Coordinating Center and shared the output with the Data Coordinating Center. The standard code was designed to automatically save all estimates and variance-covariance matrices needed for the meta-analysis. Then, the Data Coordinating Center meta-analyzed the estimates across cohorts using STATA.

As detailed in our previous reports,[2, 3] each cohort was instructed to standardize their serum creatinine and report its method when available. The reported creatinine standardization allows grouping studies into studies that reported using a standard IDMS traceable method or conducted some serum creatinine standardization to IDMS traceable methods (ARIC, AusDiab, BIS, CanPREDDICT, CARE FOR HOMe, ESTHER, GCKD, Geisinger, Gonryo, Gubbio, Maccabi, MASTERPLAN, MMKD, NHANES, PREVEND, Rancho Bernardo, RCAV, REGARDS, RSIII, SCREAM, SEED, SRR-CKD, Takahata) and studies where the creatinine standardization was not done (AASK, ADVANCE, Aichi, BC CKD, Beijing, CCF, ChinaNS, CHS, CIRCS, CKD-JAC, CRIB, Framingham, IPHS, KHS, MDRD, MESA, MRC, NZDCS, Ohasama, Pima, RENAAL, Sunnybrook, Taiwan MJ, ULSAM, ZODIAC). For those cohorts without standardization, the creatinine levels were reduced by 5%, the calibration factor used to adjust non-standardized MDRD Study samples to IDMS.[2, 4] We did not adjust creatinine levels in those studies with unknown standardization status (JMS, Mt Sinai, NIPPON DATA80, NIPPON DATA90, NIPPON DATA2010, PSP-CKD and SMART).

We calculated eGFR using the CKD-EPI equation: $eGFR_{CKD\text{-}EPI} = 141 \times (\text{minimum of standardized serum creatinine [mg/dL]}/\kappa \text{ or } 1)^{\alpha} \times (\text{maximum of standardized serum creatinine [mg/dL]}/\kappa \text{ or } 1)^{-1.209} \times 0.993^{age} \times (1.018 \text{ if female}) \times (1.159 \text{ if black})$, where κ is 0.7 if female and 0.9 if male and α is -0.329 if female and -0.411 if male.[5] The selection of knots for eGFR and ACR was based on clinical thresholds.[6]

Notes for individual studies:
1. General population cohorts

ChinaNS: Anti-hypertensive medication use was not available.

2. High-risk cohorts

ADVANCE: This study is an intervention study which includes participants with diabetes only.

Geisinger: Due to the requirement of ACR measurement for analyses and the clinical indications that are associated with measurement in this health system dataset, this cohort was categorized as a high-risk cohort for all outcomes except phosphorus and PTH, and as a CKD cohort for outcomes phosphorus and PTH. Urine protein-to-creatinine ratio was converted to urine albumin-to-creatinine ratio by dividing by 2.655 for men and 1.7566 for women.

Maccabi: Due to the requirement of ACR measurement for analyses and the clinical indications that are associated with measurement in this health system dataset, this cohort was categorized as a high-risk cohort. Urine protein-to-creatinine ratio was converted to urine albumin-to-creatinine ratio by dividing by 2.655 for men and 1.7566 for women.

Mt Sinai BioMe: Due to the requirement of ACR measurement for analyses and the clinical indications that are associated with measurement in this health system dataset, this cohort was categorized as a high-risk cohort cohort for all outcomes except phosphorus and PTH, and as a CKD cohort for outcomes phosphorus and PTH. Urine

protein-to-creatinine ratio was converted to urine albumin-to-creatinine ratio by dividing by 2.655 for men and 1.7566 for women.

PIMA: History of CVD was not available.

SCREAM: This cohort does not have data on BMI, smoking and blood pressure. Due to the requirement of ACR measurement for analyses and the clinical indications that are associated with measurement in this health system dataset, this cohort was categorized as a high-risk cohort cohort for all outcomes except phosphorus and PTH, and as a CKD cohort for outcomes phosphorus and PTH.

ZODIAC: Anti-hypertensive medication use was not available.

3. CKD cohorts

AASK: Urine protein-to-creatinine ratio was converted to urine albumin-to-creatinine ratio by dividing by 2.655 for men and 1.7566 for women.

CanPREDDICT: This cohort does not have data on smoking. Urine protein-to-creatinine ratio was converted to urine albumin-to-creatinine ratio by dividing by 2.655 for men and 1.7566 for women.

CRIB: History of heart failure was not available. Use of thiazide diuretics, loop diuretics or potassium sparing diuretics was combined. Individual use of each type of diuretics was not available.

Gonryo: This cohort does not have data on smoking.

MASTERPLAN: This study measured urine albumin-to-creatinine ratio in patients with albuminuria in the low range, urine protein-to-creatinine ratio in patients with overt proteinuria. Urine protein-to-creatinine ratio was converted to urine albumin-to-creatinine ratio by dividing by 2.655 for men and 1.7566 for women.

MDRD: Anti-hypertensive medication use was not available. Urine protein-to-creatinine ratio was converted to urine albumin-to-creatinine ratio by dividing by 2.655 for men and 1.7566 for women.

PSP-CKD: Urine protein-to-creatinine ratio was converted to urine albumin-to-creatinine ratio by dividing by 2.655 for men and 1.7566 for women.

RCAV: This cohort does not have data on smoking. Subset of eGFR<60 of this cohort was included in the analysis thus categorized as a CKD cohort.

RENAAL: History of CVD was not available.

SRR-CKD: This cohort does not have data on smoking. There may be some overlap with the SCREAM cohort, which would capture participants with advanced CKD in the region of Stockholm. Use of thiazide diuretics, loop diuretics or potassium sparing diuretics was combined. Individual use of each type of diuretics was not available.

Sunnybrook: This cohort includes patients seen in the nephrology clinics at Sunnybrook Hospital in Toronto, Ontario, Canada with CKD stage 3-5 or proteinuric CKD stage 1-2. Urine protein-to-creatinine ratio was converted to urine albumin-to-creatinine ratio by dividing by 2.655 for men and 1.7566 for women.

Diabetes Definition Information:

Study	**Diabetes definition requested:** *Glycated hemoglobin A1c ≥6.5% or fasting glucose ≥7.0 mmol/L (≥126 mg/dL) or non-fasting glucose ≥11.1 mmol/L (≥200 mg/dL) or use of glucose lowering drugs (ADA 2010 criteria). Self-report of physician diagnosed diabetes can be included.* Any differences from the above noted below:
CKD Cohorts	
AASK	All participants were free of diabetes as this was an exclusion criterion to have a known history of diabetes.
BC CKD	
CanPREDDICT	
CARE FOR HOMe	Diabetes was defined as diabetes mellitus reported by the patients or the nephrologist and/or intake of diabetic medication and/or fasting plasma glucose > 126 mg/dl at inclusion.
CCF	Diabetes was defined using ICD-9 codes: 250.x
CKD-JAC	
CRIB	Diabetes was defined by clinical diagnosis. This study did not collect use of anti-diabetic medications.
GCKD	Diabetes was defined as HbA1c ≥6.5% or use of at least one antidiabetic medication.
Gonryo	
MASTERPLAN	This study did not use non-fasting glucose or glycated hemoglobin to define diabetes.
MDRD	This study did not collect use of anti-diabetic medications.
MMKD	All participants in this study do not have diabetes.
PSP-CKD	
RCAV	Diabetes was defined using ICD-9 codes: 250.x
RENAAL	All participants had type 2 diabetes defined as those patients who were diagnosed after the age of 30, who did not require insulin within six months of diagnosis, and who had no history of diabetic ketoacidosis.
SRR-CKD	This study did not collect use of anti-diabetic medications. Diabetes was defined by a clinical diagnosis in medical records.
Sunnybrook	
General Population Cohorts	
Aichi	
ARIC	
AusDiab	This study incorporated 2-h plasma glucose after oral glucose tolerance test in addition to the definition for this meta-analysis. This study did not collect use of anti-diabetic medications.
Beijing	This study incorporated 2-h plasma glucose after oral glucose tolerance test in addition to the definition for this meta-analysis. This study did not collect use of anti-diabetic medications.
BIS	Diabetes was defined as glycated hemoglobin A1c ≥6.5% or use of glucose lowering drugs
ChinaNS	Diabetes was defined by fasting glucose ≥7.0 mmol/L (≥126 mg/dL) or use of glucose lowering drugs (ADA 2010 criteria) or self-report of physician diagnosed diabetes.
CHS	
CIRCS	
ESTHER	
Framingham	
Gubbio	
IPHS	
JMS	
KHS	
MESA	

MRC	Diabetes was classified according to self-report of a medical diagnosis, use of antidiabetic medication, or the presence of a high random blood glucose measurement.
NHANES	
NIPPON DATA80	This study did not collect use of anti-diabetic medications.
NIPPON DATA90	This study did not include anti-diabetic medication use to define diabetes.
NIPPON DATA2010	This study did not include anti-diabetic medication use to define diabetes.
Ohasama	This study did not collect use of anti-diabetic medications.
PREVEND	
Rancho Bernardo	This study incorporated 2-h plasma glucose after oral glucose tolerance test in addition to the definition for this meta-analysis.
REGARDS	
RSIII	Type 2 diabetes was defined as a fasting blood glucose concentration of 7.0 mmol/L or higher, a non-fasting blood glucose concentration of 11.1 mmol/L or higher (when fasting samples were unavailable), or the use of blood glucose-lowering drugs.
SEED	
Taiwan MJ	
Takahata	
ULSAM	Diabetes was diagnosed as fasting plasma glucose ≥ 7.0 mmol/l (≥126 mg/dl) or 2-h postload glucose level 11.1 mmol/l (≥200 mg/dl) or by the use of oral hypoglycaemic agents or insulin at both examinations.
High Risk Cohorts	
ADVANCE	This study is an intervention study which includes participants with type 2 diabetes diagnosed at the age of 30 or older only.
Geisinger	Diabetes was defined using ICD-9 codes: 250.x
Maccabi	Diabetes was defined using ICD-9 codes: 250.x
Mt Sinai BioMe	Diabetes was defined using eMERGE Network's type 2 diabetes algorithm developed at Icahn School of Medicine at Mount Sinai.
NZDCS	This study includes only individuals with type 2 diabetes.
Pima	This study incorporated 2-h plasma glucose after oral glucose tolerance test in addition to the definition for this meta-analysis. Self reported diagnosis was accepted only if documented in the medical record.
SCREAM	Diabetes was defined using ICD-10 codes: E10, E11, E13
SMART	
ZODIAC	This study includes only individuals with type 2 diabetes. This study has not collected data on fasting glucose.

Missing Covariates Table:

Study	Region	N	BMI	Smoking	DM	History of CVD
CKD Cohorts						
AASK	USA	1094	0 (0%)	0 (0%)	0 (0%)	0 (0%)
BC CKD	Canada	11880	5463 (46%)	0 (0%)	0 (0%)	0 (0%)
CanPREDDICT	Canada	2061	2025 (98%)	2061 (100%)	0 (0%)	0 (0%)
CARE FOR HOMe	Germany	369	348 (94%)	24 (7%)	229 (62%)	0 (0%)
CCF	USA	19249	2881 (15%)	0 (0%)	0 (0%)	0 (0%)
CKD-JAC	Japan	2679	254 (9%)	342(13%)	0 (0%)	0 (0%)
CRIB	UK	375	N<5	0 (0%)	0 (0%)	0 (0%)
GCKD	Germany	5159	52 (1%)	14 (0%)	0 (0%)	N<5
Geisinger CKD†	USA	24611	2549 (10%)	0 (0%)	0 (0%)	0 (0%)
Gonryo	Japan	3009	1393 (46%)	3009 (100%)	937 (31%)	0 (0%)
MASTERPLAN	Netherlands	670	0 (0%)	14 (2%)	N<5	9 (1%)
MDRD	USA	1736	N<5	5 (0%)	10 (1%)	0 (0%)
MMKD	Multi[§]	202	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Mt Sinai BioMe CKD†	USA	3521	554 (16%)	260 (7%)	0 (0%)	0 (0%)
PSP-CKD	UK	9434	3768 (40%)	0 (0%)	0 (0%)	0 (0%)
RCAV	USA	127812	13342 (10%)	127812 (100%)	0 (0%)	0 (0%)
RENAAL	Multi[¶]	1512	1512 (100%)	N<5	0 (0%)	1512 (100%)
SCREAM CKD†	Sweden	33232	33232 (100%)	33232 (100%)	0 (0%)	0 (0%)
SRR-CKD	Sweden	3051	544 (18%)	3051 (100%)	0 (0%)	0 (0%)
Sunnybrook	Canada	3010	1838 (61%)	0 (0%)	0 (0%)	0 (0%)
General Population Cohorts						
Aichi	Japan	4987	0 (0%)	89 (2%)	0 (0%)	0 (0%)
ARIC*	USA	11889	34 (0%)	436 (4%)	17 (0%)	281 (2%)
AusDiab*	Australia	11198	170 (2%)	178 (2%)	69 (1%)	32 (0%)
Beijing	China	1533	0 (0%)	N<5	61 (4%)	N<5
BIS	Germany	2055	N<5	0 (0%)	0 (0%)	0 (0%)
ChinaNS*	China	46810	228 (0%)	35 (0%)	44 (0%)	4766 (10%)
CHS*	USA	2984	48 (2%)	55 (2%)	0 (0%)	0 (0%)
CIRCS	Japan	11916	N<5	8 (0%)	0 (0%)	0 (0%)
ESTHER*	Germany	9744	10 (0%)	284 (3%)	0 (0%)	10 (0%)
Framingham*	USA	2956	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Gubbio	Italy	1684	0 (0%)	0 (0%)	0 (0%)	0 (0%)
IPHS	Japan	97769	437 (0%)	0 (0%)	0 (0%)	0 (0%)
JMS	Japan	5124	6 (0%)	0 (0%)	0 (0%)	0 (0%)
KHS	Korean	243779	12080 (1%)	0 (0%)	0 (0%)	0 (0%)
MESA*	USA	6796	0 (0%)	34 (1%)	0 (0%)	0 (0%)
MRC	UK	12367	765 (6%)	31 (0%)	0 (0%)	96 (1%)
NHANES	USA	56017	540 (1%)	2741 (5%)	69 (0%)	3343 (6%)
NIPPON DATA80*	Japan	10382	N<5	15 (0%)	N<5	0 (0%)
NIPPON DATA90	Japan	7612	N<5	0 (0%)	0 (0%)	0 (0%)
NIPPON DATA2010	Japan	2749	N<5	8 (0%)	6 (0%)	0 (0%)
Ohasama	Japan	3300	46 (1%)	641 (19%)	89 (3%)	0 (0%)
PREVEND	Netherlands	8060	74 (1%)	0 (0%)	274 (3%)	0 (0%)
Rancho Bernardo	USA	1484	7 (0%)	8 (1%)	0 (0%)	0 (0%)
REGARDS	USA	27727	79 (0%)	101 (0%)	137 (0%)	8 (0%)
RSIII	Netherlands	3519	67 (2%)	10 (0%)	0 (0%)	0 (0%)
SEED*	Singapore	7028	7 (0%)	N<5	51 (1%)	5 (0%)
Taiwan MJ	Taiwan	501704	149 (0%)	0 (0%)	0 (0%)	0 (0%)

Takahata	Japan	3524	0 (0%)	N<5	115 (3%)	0 (0%)
ULSAM	Sweden	1123	N<5	32 (3%)	0 (0%)	0 (0%)
High Risk Cohorts						
ADVANCE	Multi**	11033	22 (0%)	13 (0%)	0 (0%)	0 (0%)
Geisinger	USA	65051	10497 (16%)	0 (0%)	0 (0%)	0 (0%)
Maccabi	Israel	264255	125292 (47%)	0 (0%)	0 (0%)	0 (0%)
Mt Sinai BioMe	USA	8109	1642 (20%)	540 (7%)	7 (0%)	7 (0%)
NZDCS*	New Zealand	31622	604 (2%)	163 (1%)	0 (0%)	0 (0%)
Pima	USA	5074	37 (1%)	2119 (42%)	0 (0%)	5074 (100%)
SCREAM	Sweden	260047	260047 (100%)	260047 (100%)	0 (0%)	0 (0%)
SMART	Netherlands	3691	6 (0%)	34 (1%)	0 (0%)	0 (0%)
ZODIAC	Netherlands	1632	3 (0%)	18 (1%)	0 (0%)	0 (0%)

* Studies with only hypertension

† CKD population from three administrative high risk cohorts, not included in the total N

§ Participants are from Austria, Germany, and Italy

¶ Participants are from Argentina, Austria, Brazil, Canada, Chile, China, Costa Rica, Czech Republic, Denmark, France, Germany, Hungary, Israel, Italy, Japan, Malaysia, Mexico, Netherlands, New Zealand, Peru, Portugal, Russia, Singapore, Slovakia, Spain, United Kingdom, United States of America, Venezuela

** Participants are from Australia, Canada, China, Czech Republic, Estonia, France, Germany, Hungary, India, Ireland, Italy, Lithuania, Malaysia, Netherlands, New Zealand, Philippines, Poland, Russia, Slovakia, United Kingdom

Appendix 2. Acronyms or abbreviations for studies included in the current report and their key references linked to the Web references

AASK:	African American Study of Kidney Disease and Hypertension[7]
ADVANCE:	The Action in Diabetes and Vascular Disease: Preterax and Diamicron Modified Release Controlled Evaluation (ADVANCE) trial[8]
Aichi:	Aichi Workers' Cohort[9]
ARIC:	Atherosclerosis Risk in Communities Study[10]
AusDiab:	Australian Diabetes, Obesity, and Lifestyle Study[11]
BC CKD:	British Columbia CKD Study[12]
Beijing:	Beijing Cohort Study[13]
BIS:	Berlin Initiative Study[14]
CanPREDDICT:	Canadian Study of Prediction of Death, Dialysis and Interim Cardiovascular Events[15]
CARE FOR HOMe:	The Cardiovascular and Renal Outcome in CKD 2-4 Patients—The Fourth Homburg evaluation
CCF:	Cleveland Clinic CKD Registry Study[16]
ChinaNS:	The China National Survey of Chronic Kidney Disease
CHS:	Cardiovascular Health Study[17]
CIRCS:	Circulatory Risk in Communities Study[18]
CKD-JAC:	Chronic Kidney Disease Japan Cohort
CRIB:	Chronic Renal Impairment in Birmingham[19]
ESTHER:	Epidemiologische Studie zu Chancen der Verhütung, Früherkennung und optimierten THerapie chronischer ERkrankungen in der älteren Bevölkerung [GERMAN][20]
Framingham:	Framingham Heart Study[21]
GCKD:	German Chronic Kidney Disease Study[22]
Geisinger:	Geisinger Health System[23]
Gonryo:	Gonryo Study
Gubbio:	Gubbio Study[24]
IPHS:	Ibaraki Prefectural Health Study[25]
JMS:	Jichi Medical School cohort
KHS:	Korean Heart Study
Maccabi:	Maccabi Health System[26]
MASTERPLAN:	Multifactorial Approach and Superior Treatment Efficacy in Renal Patients with the Aid of a Nurse Practitioner[27]
MDRD:	Modification of Diet in Renal Disease Study[28]
MESA:	Multi-Ethnic Study of Atherosclerosis[29]
MMKD:	Mild to Moderate Kidney Disease Study[30]
MRC Older People:	MRC Study of assessment of older people[31]
Mt Sinai BioMe:	Mount Sinai BioMe Biobank Platform[32]
NHANES:	US National Health and Nutrition Examination Survey, using both NHANES III and the continuous NHANES from 1999-2010[33]
NIPPON DATA80:	National Integrated Project for Prospective Observation of Non-communicable Disease and its Trends in the Aged 1980
NIPPON DATA90:	National Integrated Project for Prospective Observation of Non-communicable Disease and its Trends in the Aged 1990
NIPPON DATA2010:	National Integrated Project for Prospective Observation of Non-communicable Disease and its Trends in the Aged 2010
NZDCS:	New Zealand Diabetes Cohort Study[34]
Ohasama:	Ohasama Study[35]
Pima:	Pima Indian Study[36]
PREVEND:	Prevention of Renal and Vascular End-stage Disease Study[37]
PSP-CKD:	Primary-Secondary Care Partnership to Prevent Adverse Outcomes in Chronic Kidney Disease
Rancho Bernardo:	Rancho Bernardo Study[38]

RCAV:	Racial and Cardiovascular Risk Anomalies in CKD Cohort[39]
REGARDS:	Reasons for Geographic And Racial Differences in Stroke Study[40]
RENAAL:	Reduction of Endpoints in Non-insulin Dependent Diabetes Mellitus with the Angiotensin II Antagonist Losartan[41]
RSIII:	Rotterdam Study Third Cohort[42]
SCREAM:	Stockholm CREAtinine Measurements Cohort[43]
SEED:	Singapore Epidemiology of Eye Diseases[44]
SMART:	Second Manifestations of ARTerial Disease Study
SRR-CKD:	Swedish Renal Registry CKD Cohort[45]
Sunnybrook:	Sunnybrook Cohort[46]
Taiwan MJ:	Taiwan MJ Cohort Study[47]
Takahata:	Takahata Study[48]
ULSAM:	Uppsala Longitudinal Study of Adult Men[49]
ZODIAC:	Zwolle Outpatient Diabetes project Integrating Available Care[50]

Appendix 3. Acknowledgements and funding for collaborating cohorts

Study	List of sponsors
AASK	AASK was supported by grants to each clinical center and the coordinating center from the National Institute of Diabetes and Digestive and Kidney Diseases. In addition, AASK was supported by the Office of Research in Minority Health (now the National Center on Minority Health and Health Disparities, NCMHD) and the following institutional grants from the National Institutes of Health: M01 RR-00080, M01 RR-00071, M0100032, P20-RR11145, M01 RR00827, M01 RR00052, 2P20 RR11104, RR029887, and DK 2818-02. King Pharmaceuticals provided monetary support and antihypertensive medications to each clinical center. Pfizer Inc, AstraZeneca Pharmaceuticals, Glaxo Smith Kline, Forest Laboratories, Pharmacia and Upjohn also donated antihypertensive medications.
ADVANCE	National Health and Medical Research Council (NHMRC)of Australia program grants 358395 and 571281 and project grant 211086
Aichi	KAKENHI (09470112, 13470087, 17390185, 18590594, 20590641, 20790438, 22390133)
ARIC	The Atherosclerosis Risk in Communities study has been funded in whole or in part with Federal funds from the National Heart, Lung, and Blood Institute, National Institutes of Health, Department of Health and Human Services, under Contract nos. (HHSN268201700001I, HHSN268201700003I, HHSN268201700005I, HHSN268201700004I, HHSN2682017000021). The authors thank the staff and participants of the ARIC study for their important contributions.
AusDiab	The Baker IDI Heart and Diabetes Institute, Melbourne, Australia, their sponsors, and the National Health and Medical Research Council of Australia (NHMRC grant 233200), Amgen Australia, Kidney Health Australia and The Royal Prince Alfred Hospital, Sydney, Australia.
BC CKD	BC Provincial Renal Agency, an Agency of the Provincial Health Services Authority in collaboration with University of British Columbia.
Beijing	The research for this study was supported by the Program for New Century Excellent Talents in University (BMU2009131) from the Ministry of Education of the People's Republic of China, and the grants for the Early Detection and Prevention of Non-communicable Chronic Diseases from the International Society of Nephrology Research Committee.
BIS	Foundation for Preventive Medicine of the KfH (Kuratorium für Heimdialyse und Nierentransplantation e.V. – Stiftung Präventivmedizin; www.kfh-stiftung-praeventivmedizin.de). Dr. Werner Jackstädt Foundation
CanPREDDICT	
CARE FOR HOMe	
CCF	Supported by an unrestricted educational grant from Amgen to the Department of Nephrology and Hypertension.
ChinaNS	
CHS	This research was supported by contracts HHSN268201200036C, HHSN268200800007C, N01HC55222, N01HC85079, N01HC85080, N01HC85081, N01HC85082, N01HC85083, N01HC85086, and grants U01HL080295 and U01HL130114 from the National Heart, Lung, and Blood Institute (NHLBI), with additional contribution from the National Institute of Neurological Disorders and Stroke (NINDS). Additional support was provided by R01AG023629 from the National Institute on Aging (NIA). A full list of principal CHS investigators and institutions can be found at CHS-NHLBI.org.
CIRCS	
CKD-JAC	

CRIB	British Renal Society Project Grant Award British Heart Foundation Project Grant Award.
ESTHER	Ministry of Research, Science and the Arts Baden-Württemberg (Stuttgart, Germany), Federal Ministry of Education and Research (Berlin, Germany), Federal Ministry of Family Affairs, Senior Citizens, Women and Youth (Berlin, Germany), European Commission FP7 framework programme of DG-Research (CHANCES Project). Measurement of urinary albumin was funded by Dade-Behring, Marburg, Germany.
Framingham	NHLBI Framingham Heart Study (N01-HC-25195).
GCKD	The GCKD study is supported by grants from the Federal Ministry of Education and Research (Bundesministerium für Bildung und Forschung; www.bmbf.de), FKZ 01ER 0804, 01ER 0818, 01ER 0819, 01ER 0820 und 01ER 0821 and the Foundation for Preventive Medicine of the KfH (Kuratorium für Heimdialyse und Nierentransplantation e.V. – Stiftung Präventivmedizin; www.kfh-stiftung-praeventivmedizin.de) and corporate partners (for a list see www.gckd.org). The GCKD investigators gratefully acknowledge the expert support of all members of study staff, the dedicated contribution of all collaborating nephrologists (for a list of contributors and the 169 study sites, see www.gckd.org) and the support of patients participating in the study.
Geisinger	Geisinger Clinic
Gonryo	
Gubbio	Municipal and Health Authorities of Gubbio, Italy; Center of Gubbio Epidemiological Studies, Gubbio, Italy; University of Salerno, Salerno, Italy.
IPHS	
JMS	
KHS	
Maccabi	
MASTERPLAN	The MASTERPLAN study is a clinical trial with trial registration ISRCTN registry: 73187232. Sources of funding: The MASTERPLAN Study was supported by grants from the Dutch Kidney Foundation (Nierstichting Nederland, number PV 01), and the Netherlands Heart Foundation (Nederlandse Hartstichting, number 2003 B261). Unrestricted grants were provided by Amgen, Genzyme, Pfizer and Sanofi-Aventis.
MDRD	NIDDK UO1 DK35073 and K23 DK67303, K23 DK02904
MESA	This research was supported by contracts HHSN268201500003I, N01-HC-95159, N01-HC-95160, N01-HC-95161, N01-HC-95162, N01-HC-95163, N01-HC-95164, N01-HC-95165, N01-HC-95166, N01-HC-95167, N01-HC-95168 and N01-HC-95169 from the National Heart, Lung, and Blood Institute and by grants UL1-TR-000040 and UL1-TR-001079 from NCRR. The authors thank the other investigators, the staff, and the participants of the MESA study for their valuable contributions. A full list of participating MESA investigators and institutions can be found at http://www.mesa-nhlbi.org.
MMKD	The MMKD study was funded by the Austrian Heart Fund and by the Innsbruck Medical University.
MRC Older People	UK Medical Research Council, Department of Health for England, Wales and the Scottish Office and Kidney Research UK
Mt Sinai BioMe	
NHANES	United States Center for Disease Control

NIPPON DATA80	Health and Labour Sciences Research Grants of the Ministry of Health, Labour and Welfare, Japan (Comprehensive Research on Life-Style Related Diseases including Cardiovascular Diseases and Diabetes Mellitus [H22-Junkankitou-Seishuu-Sitei-017, H25-Junkankitou-Seishuu-Sitei-022])
NIPPON DATA90	Health and Labour Sciences Research Grants of the Ministry of Health, Labour and Welfare, Japan (Comprehensive Research on Life-Style Related Diseases including Cardiovascular Diseases and Diabetes Mellitus [H22-Junkankitou-Seishuu-Sitei-017, H25-Junkankitou-Seishuu-Sitei-022])
NIPPON DATA2010	Health and Labour Sciences Research Grants of the Ministry of Health, Labour and Welfare, Japan (Comprehensive Research on Life-Style Related Diseases including Cardiovascular Diseases and Diabetes Mellitus [H22-Junkankitou-Seishuu-Sitei-017, H25-Junkankitou-Seishuu-Sitei-022])
NZDCS	New Zealand Health Research Council, Auckland Medical Research Foundation and New Zealand Society for the Study of Diabetes
Ohasama	Grant-in-Aid(H20-22Junkankitou[Seishuu]-Ippan-009, 013 and H23-Junkankitou [Senshuu]-Ippan-005) from the Ministry of Health, Labor and Welfare, Health and Labor Sciences Research Grants, Japan; Japan Atherosclerosis Prevention Fund.
Pima	This work was supported by the Intramural Research Program of the National Institute of Diabetes and Digestive and Kidney Diseases.
PREVEND	The PREVEND study is supported by several grants from the Dutch Kidney Foundation, and grants from the Dutch Heart Foundation, the Dutch Government (NWO), the US National Institutes of Health (NIH) and the University Medical Center Groningen, The Netherlands (UMCG). Dade Behring, Marburg, Germany supplied equipment and reagents for nephelometric measurement of urinary albumin.
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RENAAL	The RENAAL trial was supported by Merck and Company.
RSIII	The Rotterdam Study is funded by Erasmus Medical Center and Erasmus University, Rotterdam, Netherlands Organization for the Health Research and Development (ZonMw),

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SCREAM	This study was supported by Stockholm County Council and the Swedish Heart and Lung Foundation.
SEED	This study was supported by grants from the Singapore Ministry of Health's National Medical Research Council (NMRC), NMRC/STaR/0003/2008, NMRC/0796/2003, and NMRC/TA/0008/2012.
SMART	Funded by the University Medical Center Utrecht.
SRR-CKD	The SRR-CKD is a national health care quality register funded by The Swedish Association of Local Authorities and Regions, which is an organization that represents and advocates for local government in Sweden. All of Sweden's municipalities, county councils and regions are members.
Sunnybrook	
Taiwan MJ	This study was supported by Taiwan Department of Health Clinical Trial and Research Centre of Excellence (DOH 101-TD-B-111-004)
Takahata	A Grant-in-Aid from the 21st Century Center of Excellence (COE) and Global COE program of the Japan Society for the Promotion of Science
ULSAM	The Swedish Research Council, the Swedish Heart-Lung Foundation, the Marianne and Marcus Wallenberg Foundation, Dalarna University, and Uppsala University.
ZODIAC	

Table S1. Proportion with anemia and mean value of hemoglobin and hematocrit, by cohort

					Medication use availability		
Study	N	% Anemia	Hemoglobin, mean (SD)	Hematocrit, mean (SD)	% Erythropoietin stimulating agent use	% IV iron supplement use	% oral iron supplement use
CKD Cohorts							
BC CKD	11655	6280 (54%)	12 (2)	37 (5)	NA	NA	NA
CanPREDDICT	2045	1206 (59%)	12 (2)	36 (5)	393 (19%)	477 (23%)	46 (2%)
CARE FOR HOMe	371	71 (19%)	14 (2)	41 (4)	7 (2%)	4 (1%)	6 (2%)
CCF	12696	5307 (42%)	13 (2)	39 (5)	NA	NA	NA
CKD-JAC	2639	1659 (63%)	12 (2)	36 (5)	350 (13%)	21 (1%)	215 (8%)
CRIB	364	218 (60%)	12 (2)	NA	35 (10%)	NA	NA
GCKD	5127	1217 (24%)	14 (2)	NA	123 (2%)	NA	NA
Geisinger CKD†	19008	7696 (40%)	13 (2)	33 (6)	35 (0%)	30 (0%)	1293 (7%)
Gonryo	3044	1113 (37%)	13 (2)	38 (6)	200 (7%)	NA	NA
MASTERPLAN	670	236 (35%)	13 (2)	39 (37)	57 (9%)	NA	2 (6%)
MDRD	1719	602 (35%)	13 (2)	38 (4)	NA	NA	NA
MMKD	202	58 (29%)	13 (2)	40 (6)	NA	NA	NA
Mt Sinai BioMe CKD†	1931	1103 (57%)	12 (2)	36 (6)	69 (4%)	9 (0%)	275 (14%)
PSP-CKD	2223	762 (34%)	13 (2)	NA	36 (2%)	NA	NA
RCAV	108044	43385 (40%)	13 (2)	NA	421 (0%)	20 (0%)	4048 (4%)
RENAAL	1510	791 (52%)	13 (2)	38 (6)	NA	NA	NA
SCREAM CKD†	30209	10291 (34%)	13 (2)	NA	935 (3%)	186 (1%)	1407 (5%)
SRR-CKD	3032	1841 (61%)	12 (2)	NA	623 (21%)	105 (3%)	346 (11%)
Sunnybrook	2822	1048 (37%)	13 (2)	NA	NA	NA	NA
Subtotal	**209311**	**84882 (41%)**	**13 (2)**	**36 (7)**	**3287 (2%)**	**853 (1%)**	**7638 (5%)**
General Population							
Aichi	4987	285 (6%)	15 (1)	NA	NA	NA	NA
BIS	1995	354 (18%)	14 (1)	41 (4)	4 (0%)	1 (0%)	24 (1%)
CIRCS	11475	1422 (12%)	14 (2)	41 (5)	NA	NA	NA
Gubbio	1684	33 (2%)	15 (1)	43 (4)	0 (0%)	0 (0%)	34 (2%)
IPHS	97740	11378 (12%)	14 (1)	41 (4)	NA	NA	NA
JMS	5091	689 (14%)	14 (2)	42 (4)	NA	NA	NA
KHS	243716	16043 (7%)	14 (2)	43 (5)	NA	NA	NA
MRC	12101	2372 (20%)	13 (1)	NA	NA	NA	NA
NHANES	51434	4928 (10%)	14 (2)	42 (4)	NA	NA	NA

NIPPON DATA90	7612	1048 (14%)	14 (2)	44 (5)	NA	NA	NA
NIPPON DATA2010	2730	338 (12%)	14 (2)	42 (4)	NA	NA	NA
Ohasama	1926	389 (20%)	13 (1)	40 (4)	NA	NA	NA
REGARDS	19070	2657 (14%)	14 (1)	40 (4)	NA	NA	NA
RSIII	3525	160 (5%)	14 (1)	45 (4)	NA	NA	NA
Taiwan MJ	501646	36932 (7%)	14 (2)	42 (4)	NA	NA	NA
Takahata	3523	406 (12%)	14 (1)	41 (4)	NA	NA	NA
Subtotal	**970255**	**79434 (8%)**	**14 (2)**	**42 (5)**	**4 (0%)**	**1 (0%)**	**58 (2%)**
High Risk Cohorts							
Geisinger	46072	10189 (22%)	14 (2)	35 (6)	41 (0%)	37 (0%)	1909 (4%)
Maccabi	253333	33080 (13%)	14 (1)	42 (4)	326 (0%)	2 (0%)	2828 (1%)
Mt Sinai BioMe	4346	1764 (41%)	13 (2)	38 (5)	72 (2%)	8 (0%)	462 (11%)
Pima	5058	506 (10%)	NA	42 (5)	NA	NA	NA
SCREAM	232861	27342 (12%)	14 (1)	NA	999 (0%)	264 (0%)	3411 (1%)
SMART	3684	378 (10%)	14 (1)	42 (4)	NA	NA	NA
Subtotal	**545354**	**73256 (13%)**	**14 (2)**	**41 (5)**	**1438 (0%)**	**311 (0%)**	**8610 (2%)**
General population/ high risk subtotal	**1515609**	**152690 (10%)**	**14 (2)**	**42 (5)**	**1442 (0%)**	**312 (0%)**	**8668 (2%)**

Total† **1673772**

Anemia: Hemoglobin <13g/dL for male, <12g/dL for female; Hematocrit <39% for male, <36% for female

† CKD population from three administrative high risk cohorts, not included in the total N

Table S2. Proportion with hyperkalemia and hypokalemia and mean value of serum potassium, by cohort

Study	N	% Hyperkalemia	% Hypokalemia	Potassium mean (SD)	% RAAS inhibitor use	% ACE inhibitor use	% ARB use	% Renin inhibitor use	% K sparing diurtics use	% Other diuretics use	% Loop diuretics use	% thiazide diuretics use	% Kayexalate use
CKD Cohorts													
AASK	1066	91 (9%)	92 (9%)	4.2 (0.6)	620 (59%)	611 (58%)	12 (1%)	NA	NA	NA	NA	NA	NA
BC CKD	11785	2463 (21%)	193 (2%)	4.6 (0.6)	NA	NA	NA	NA	NA	NA	NA	NA	NA
CanPREDDICT	2052	396 (19%)	49 (2%)	4.6 (0.6)	1463 (71%)	871 (42%)	761 (37%)	8 (0%)	122 (6%)	1394 (68%)	917 (45%)	621 (30%)	113 (6%)
CCF	17498	1917 (11%)	621 (4%)	4.4 (0.6)	NA	NA	NA	NA	NA	NA	NA	NA	NA
CKD-JAC	2640	594 (22%)	36 (1%)	4.6 (0.6)	2170 (82%)	726 (28%)	1967 (75%)	0 (0%)	156 (6%)	749 (28%)	638 (24%)	211 (8%)	14 (1%)
CRIB	373	70 (19%)	9 (2%)	4.6 (0.6)	133 (36%)	117 (31%)	16 (6%)	NA	NA	151 (40%)	NA	NA	NA
Geisinger CKD†	24417	2945 (12%)	555 (2%)	4.5 (0.5)	12072 (49%)	9084 (37%)	3326 (14%)	22 (0%)	1771 (7%)	11313 (46%)	5886 (24%)	6287 (26%)	55 (0%)
MASTERPLAN	670	89 (13%)	23 (3%)	4.4 (0.6)	545 (81%)	343 (51%)	254 (38%)	NA	24 (4%)	331 (49%)	119 (18%)	216 (32%)	NA
MDRD	830	85 (10%)	40 (5%)	4.4 (0.6)	NA	NA	NA	NA	NA	NA	NA	NA	NA
Mt Sinai BioMe CKD†	3518	454 (13%)	128 (4%)	4.4 (0.8)	1740 (49%)	1151 (33%)	665 (19%)	8 (0%)	183 (5%)	1284 (36%)	493 (14%)	841 (24%)	144 (4%)
PSP-CKD	9405	1718 (18%)	105 (1%)	4.6 (0.5)	6064 (64%)	4450 (47%)	1844 (20%)	NA	523 (6%)	4197 (45%)	2306 (25%)	2013 (21%)	NA
RCAV	124843	12778 (10%)	3528 (3%)	4.4 (0.5)	56445 (45%)	46162 (37%)	11515 (9%)	9 (0%)	8051 (6%)	41031 (33%)	22212 (18%)	20864 (17%)	223 (0%)
RENAAL	1513	386 (26%)	22 (1%)	4.7 (0.6)	737 (49%)	737 (49%)		NA	NA	910 (60%)	NA	NA	NA
SCREAM CKD†	29383	1639 (6%)	1060 (4%)	4.3 (0.5)	13599 (46%)	7630 (26%)	6730 (23%)	NA	2462 (8%)	10426 (35%)	8932 (30%)	1702 (6%)	322 (1%)
SRR-CKD	2591	363 (14%)	85 (3%)	4.4 (0.6)	1003 (39%)	0 (0%)	1002 (39%)	1 (0%)	NA	1801 (70%)	NA	NA	NA
Sunnybrook	2965	361 (12%)	99 (3%)	4.4 (0.5)	NA	NA	NA	NA	NA	NA	NA	NA	NA
Subtotal	**235549**	**26348 (11%)**	**6645 (3%)**	**4.4 (0.5)**	**97256 (48%)**	**72906 (36%)**	**28129 (14%)**	**48 (0%)**	**13316 (7%)**	**73587 (37%)**	**41503 (21%)**	**32755 (17%)**	**871 (0%)**

General Population													
Beijing	1530	168 (11%)	4 (0%)	4.5 (0.5)	NA	NA	NA	NA	NA	NA	NA	NA	NA
CIRCS	8034	146 (2%)	66 (1%)	4.2 (0.4)	NA	NA	NA	NA	NA	NA	NA	NA	NA
Gubbio	1684	20 (1%)	36 (2%)	4.2 (0.4)	91 (5%)	91 (5%)	NA	NA	59 (4%)	109 (6%)	9 (1%)	100 (6%)	NA
KHS	108185	1047 (1%)	653 (1%)	4.2 (0.6)	NA	NA	NA	NA	NA	NA	NA	NA	NA
MRC	11840	1081 (9%)	328 (3%)	4.4 (0.6)	NA	NA	NA	NA	NA	NA	NA	NA	NA
NHANES	57208	405 (1%)	2340 (4%)	4.0 (0.3)	5983 (10%)	4325 (8%)	1730 (4%)	14 (0%)	1347 (2%)	5498 (10%)	1548 (3%)	4100 (7%)	NA
PREVEND	7319	204 (3%)	47 (1%)	4.4 (0.7)	334 (5%)	289 (5%)	47 (1%)	NA	13 (0%)	203 (3%)	57 (1%)	150 (2%)	NA
Rancho Bernardo	1484	45 (3%)	17 (1%)	4.3 (0.4)	NA	NA	NA	NA	4 (0%)	256 (17%)	57 (4%)	203 (14%)	NA
TaiwanMJ	159268	1077 (1%)	2896 (2%)	4.1 (0.3)	NA	NA	NA	NA	NA	NA	NA	NA	NA
Takahata	1923	102 (5%)	23 (1%)	4.3 (0.4)	NA	NA	NA	NA	NA	NA	NA	NA	NA
Subtotal	**358475**	**4295 (1%)**	**6410 (2%)**	**4.1 (0.5)**	**6408 (10%)**	**4705 (7%)**	**1777 (4%)**	**14 (0%)**	**1423 (2%)**	**6066 (9%)**	**1671 (3%)**	**4553 (7%)**	**0 (0%)**
High Risk Cohorts													
ADVANCE	11033	843 (8%)	183 (2%)	4.4 (0.5)	4974 (47%)	4490 (43%)	566 (5%)	NA	NA	1536 (14%)	NA	1536 (14%)	NA
Geisinger	64503	3727 (6%)	1298 (2%)	4.3 (0.4)	23817 (37%)	18824 (29%)	5434 (8%)	28 (0%)	2687 (4%)	18889 (29%)	7422 (12%)	12336 (19%)	51 (0%)
Maccabi	246712	12681 (5%)	830 (0%)	4.4 (0.4)	67908 (28%)	45960 (19%)	23442 (10%)	7 (0%)	2518 (1%)	18829 (8%)	5184 (2%)	13841 (6%)	85 (0%)
Mt Sinai BioMe	8044	519 (6%)	293 (4%)	4.3 (0.7)	3126 (39%)	2190 (27%)	1032 (13%)	10 (0%)	246 (3%)	2141 (27%)	602 (7%)	1604 (20%)	141 (2%)
SCREAM	208611	2369 (1%)	7089 (3%)	4.1 (0.4)	51217 (25%)	29420 (14%)	23293 (11%)	1 (0%)	4652 (2%)	22516 (11%)	16036 (8%)	6702 (3%)	308 (0%)
ZODIAC	1153	55 (5%)	7 (1%)	4.4 (0.4)	NA	NA	NA	NA	NA	NA	NA	NA	NA
Subtotal	**540056**	**20192 (4%)**	**9699 (2%)**	**4.3 (0.4)**	**151351 (28%)**	**101364 (19%)**	**53912 (10%)**	**46 (0%)**	**10136 (2%)**	**63911 (12%)**	**29342 (6%)**	**36019 (7%)**	**585 (0%)**
General population/ high risk subtotal	**898531**	**24487 (3%)**	**16109 (2%)**	**4.2 (0.4)**	**157759 (26%)**	**106069 (18%)**	**55689 (9%)**	**60 (0%)**	**11559 (2%)**	**71173 (12%)**	**31013 (5%)**	**40572 (7%)**	**585 (0%)**

Total†	**1076762**												

Hyperkalemia: Potassium >5 mmol/L
Hypokalemia: Potassium <3.5 mmol/L
† CKD population from three administrative high risk cohorts, not included in the total N

Table S3. Proportion with acidosis and mean value of serum bicarbonate, by cohort

Study	N	% Acidosis	Bicarbonate, mean (SD)
CKD Cohorts			
AASK	984	100 (10%)	25 (3)
BC CKD	11162	1300 (12%)	26 (4)
CanPREDDICT	1822	260 (14%)	25 (4)
CCF	16218	1665 (10%)	26 (3)
CRIB	324	151 (47%)	24 (4)
Geisinger CKD†	24358	1302 (5%)	27 (3)
MASTERPLAN	668	124 (19%)	25 (4)
MDRD	1725	549 (32%)	23 (4)
Mt Sinai BioMe CKD†	3520	591 (17%)	25 (4)
PSP-CKD	228	36 (16%)	26 (4)
RCAV	119959	6908 (6%)	27 (3)
SCREAM CKD†	7011	1366 (19%)	24 (4)
SRR-CKD	1613	469 (29%)	23 (3)
Sunnybrook	2748	264 (10%)	26 (4)
Subtotal	**192340**	**15086 (8%)**	**26 (4)**
General Population			
NHANES	41359	3654 (9%)	25 (2)
High Risk Cohorts			
Geisinger	64341	1896 (3%)	27 (3)
Mt Sinai BioMe	8047	794 (10%)	26 (3)
SCREAM	12001	1494 (12%)	25 (3)
General population/ high risk subtotal	**125748**	**7840 (6%)**	**26 (3)**
Total†	**283199**		

Acidosis: Bicarbonate <22 mmol/L
† CKD population from three administrative high risk cohorts, not included in the total N

Table S4. Proportion with hyperparathyroidism and mean value of serum parathyroid hormone, by cohort

Study	N	% Hyperparathyroidism	PTH, median (IQR)
CKD			
BC CKD	10075	6787 (67%)	91 (55-151)
CanPREDDICT	1900	618 (33%)	45 (26-77)
CARE FOR HOMe	371	114 (31%)	51 (36-74)
CCF	1758	1013 (58%)	78 (45-134)
CKD-JAC	2670	1692 (63%)	80 (54-126)
CRIB	316	254 (80%)	134 (73-228)
GCKD	5030	1000 (20%)	37 (25-58)
Geisinger CKD	7803	3947 (51%)	66 (43-105)
MASTERPLAN	638	373 (58%)	75 (46-125)
MMKD	201	104 (52%)	67 (39-160)
Mt Sinai BioMe CKD	1538	1090 (71%)	101 (60-183)
SCREAM CKD	6850	5005 (73%)	99 (63-165)
SRR-CKD	2420	2076 (86%)	135 (86-218)
Sunnybrook	1415	710 (50%)	65 (39-117)
Subtotal	**42985**	**24783 (58%)**	**NA**
General Population			
NHANES	9774	1333 (14%)	40 (29-54)
PREVEND	7314	285 (4%)	35 (28-43)
REGARDS	2700	471 (17%)	42 (32-57)
ULSAM	894	79 (9%)	38 (28-50)
Subtotal	**20682**	**2168 (10%)**	**NA**
High Risk			
Maccabi	19967	6635 (33%)	50 (34-77)
ZODIAC	1203	260 (22%)	47 (36-62)
Subtotal	**21170**	**6895 (33%)**	**NA**
General population/ high risk subtotal	**41852**	**9063 (22%)**	**NA**
Total	**84837**		
Hyperparathyroidism: intact PTH: >65 pg/mL			

Table S5. Proportion with hyperphosphatemia and mean value of serum phosphorus, by cohort

Study	N	% hyperphos	phos, mean (SD)
CKD Cohorts			
AASK	1093	46 (4%)	3.5 (0.6)
BC CKD	11237	1757 (16%)	3.8 (0.8)
CanPREDDICT	1978	283 (14%)	3.8 (0.8)
CARE FOR HOMe	371	8 (2%)	3.3 (0.6)
CCF	3030	372 (12%)	3.7 (0.9)
CKD-JAC	2379	161 (7%)	3.5 (0.7)
CRIB	360	131 (36%)	4.5 (1.3)
GCKD	5160	255 (5%)	3.4 (0.6)
Geisinger CKD	12879	925 (7%)	3.6 (0.7)
Gonryo	2278	133 (6%)	3.5 (0.7)
MASTERPLAN	670	53 (8%)	3.5 (0.8)
MDRD	1735	278 (16%)	3.8 (0.8)
MMKD	202	30 (15%)	3.6 (1.1)
Mt Sinai BioMe CKD	1904	260 (14%)	3.8 (0.8)
PSP-CKD	895	41 (5%)	3.5 (0.6)
RCAV	25507	1774 (7%)	3.5 (0.7)
RENAAL	1510	223 (15%)	3.9 (0.7)
SCREAM CKD	9517	1213 (13%)	3.6 (0.9)
SRR-CKD	2975	777 (26%)	4.1 (0.9)
Sunnybrook	2389	376 (16%)	3.9 (1.0)
Subtotal	**88069**	**9096 (10%)**	**3.6 (0.8)**
General Population			
BIS	2048	116 (6%)	3.5 (0.7)
Gubbio	1684	36 (2%)	3.3 (0.6)
KHS	152742	5454 (4%)	3.6 (0.9)
MRC	11334	362 (3%)	3.4 (0.7)
NHANES	57208	3568 (6%)	3.7 (0.6)
PREVEND	7319	25 (0%)	3.1 (0.5)
Rancho Bernardo	1484	16 (1%)	3.4 (0.5)
REGARDS	1960	40 (2%)	3.5 (0.5)
RSIII	3375	84 (2%)	3.5 (0.5)
Taiwan MJ	369932	8650 (2%)	3.6 (0.5)
Takahata	1923	86 (4%)	3.6 (0.5)
ULSAM	1104	11 (1%)	3.0 (0.6)
Subtotal	**612113**	**19512 (3%)**	**3.6 (0.6)**

High Risk Cohorts			
Maccabi	71310	3254 (5%)	3.6 (0.5)
ZODIAC	1154	19 (2%)	3.4 (0.5)
Subtotal	**72464**	**3273 (5%)**	**3.6 (0.5)**
General population/ high risk subtotal	**684577**	**21721 (3%)**	**3.6 (0.6)**
Total	**772646**		

Hyperphosphatemia: Phosphorus > 4.5 mg/dL

Table S6. Proportion with hypocalcemia and hypercalcemia and mean value of albumin-corrected serum calcium, by cohort

Study	N	% hypocalcemia	% hypercalcemia	corrected calcium, mean (SD)	albumin, mean (SD)
CKD Cohorts					
AASK	984	169 (17%)	7 (1%)	8.8 (0.5)	4.1 (0.3)
BC CKD	10966	590 (5%)	284 (3%)	9.3 (0.5)	4.0 (0.4)
CanPREDDICT	1956	147 (8%)	46 (2%)	9.2 (0.5)	4.0 (0.4)
CARE FOR HOMe	370	27 (7%)	5 (1%)	9.2 (0.5)	4.4 (0.3)
CCF	12923	346 (3%)	631 (5%)	9.4 (0.6)	4.1 (0.5)
CKD-JAC	2413	219 (9%)	11 (0%)	9.0 (0.5)	4.0 (0.4)
CRIB	374	27 (7%)	20 (5%)	9.3 (0.7)	4.2 (0.4)
GCKD	5159	327 (6%)	128 (2%)	9.2 (0.5)	3.8 (0.4)
Geisinger CKD†	1778	52 (3%)	662 (3%)	9.4 (1.1)	4.0 (1.3)
Gonryo	2042	145 (7%)	22 (1%)	9.1 (0.5)	4.0 (0.5)
MASTERPLAN	669	18 (3%)	56 (8%)	9.5 (0.6)	4.0 (0.4)
MDRD	1725	152 (9%)	16 (1%)	9.1 (0.5)	4.0 (0.4)
MMKD	202	41 (20%)	3 (1%)	9.0 (0.8)	4.4 (0.5)
Mt Sinai BioMe CKD†	3112	97 (3%)	208 (7%)	9.5 (0.6)	4.1 (0.5)
PSP-CKD	1462	60 (4%)	33 (2%)	9.3 (0.6)	
RCAV	98308	1593 (2%)	2839 (3%)	9.4 (0.5)	3.9 (0.5)
RENAAL	1509	15 (1%)	44 (3%)	9.5 (0.4)	3.8 (0.4)
SCREAM CKD†	15330	177 (1%)	1002 (7%)	9.6 (0.5)	3.6 (0.4)
SRR-CKD	2833	102 (4%)	186 (7%)	9.5 (0.6)	3.6 (0.5)
Sunnybrook	2426	59 (2%)	97 (4%)	9.4 (1.0)	4.0 (1.2)
Subtotal	**184328**	**4860 (3%)**	**6303 (3%)**	**9.4 (0.5)**	**4.0 (0.5)**
General Population					
BIS	2052	295 (14%)	15 (1%)	9.0 (0.5)	4.0 (0.3)
KHS	224193	26100 (12%)	353 (0%)	9.0 (0.5)	4.5 (0.3)
MRC	12026	459 (4%)	541 (4%)	9.3 (0.5)	4.1 (0.3)
NHANES	41405	591 (1%)	334 (1%)	9.2 (0.4)	4.3 (0.4)
PREVEND	7313	2093 (29%)	9 (0%)	8.7 (0.3)	4.6 (0.3)
Rancho Bernardo	1484	54 (4%)	7 (0%)	9.1 (0.4)	4.1 (0.3)
REGARDS	1347	39 (3%)	24 (2%)	9.2 (0.8)	4.1 (0.3)
TaiwanMJ	369833	91847 (25%)	412 (0%)	8.8 (0.4)	4.5 (0.3)
Takahata	1923	114 (6%)	33 (2%)	9.2 (0.5)	4.5 (0.3)
ULSAM	1089	121 (11%)	2 (0%)	8.9 (0.4)	4.3 (0.3)
Subtotal	**662665**	**121713 (18%)**	**1730 (0%)**	**8.9 (0.5)**	**4.5 (0.3)**
High Risk Cohorts					
Geisinger	51372	1523 (3%)	1036 (2%)	9.3 (0.5)	4.2 (0.4)
Maccabi	153794	4521 (3%)	1646 (1%)	9.2 (0.4)	4.3 (0.3)
Mt Sinai BioMe	7240	183 (3%)	364 (5%)	9.4 (0.5)	4.2 (0.5)
SCREAM	83703	853 (1%)	2074 (2%)	9.4 (0.4)	3.8 (0.4)
ZODIAC	1153	63 (5%)	7 (1%)	9.0 (0.4)	4.5 (0.3)
Subtotal	**297262**	**7144 (2%)**	**5131 (2%)**	**9.3 (0.4)**	**4.2 (0.4)**

General population/ high risk subtotal	**959927**	**128857 (13%)**	**6861 (1%)**	**9.0 (0.5)**	**4.4 (0.4)**
Total†	**1106248**				

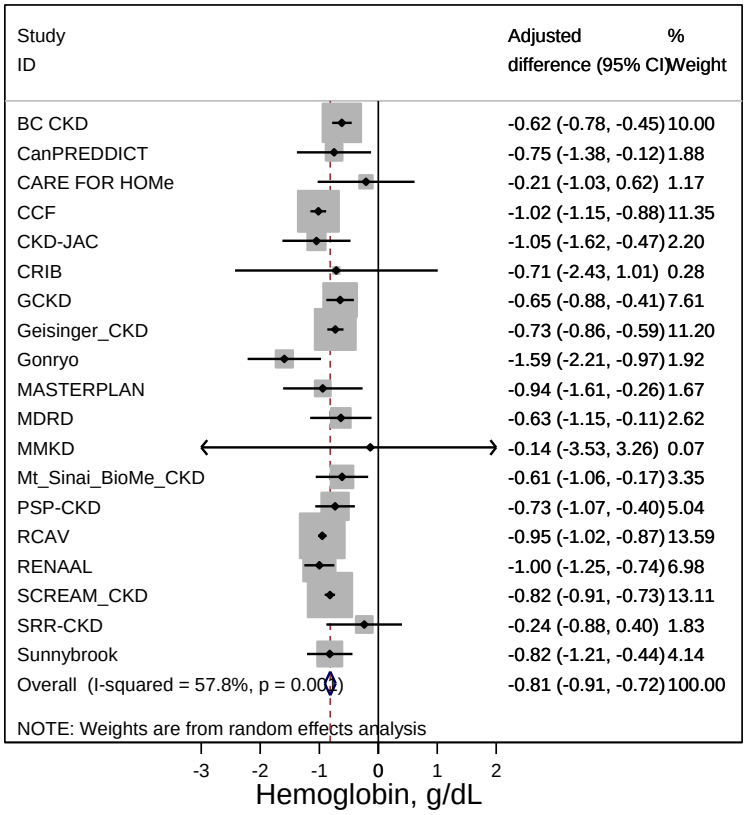
Hypocalcemia: Corrected calcium < 8.5 mg/dL

Hypercalcemia: Corrected calcium > 10.3 mg/dL

† CKD population from three administrative high risk cohorts, not included in the total N

Figure S1. Forest plot of mean difference of hemoglobin at (A) eGFR 30 vs. 50 ml/min/1.73m^2 at stage A1 in CKD cohorts and (B) eGFR 50 vs. 80 ml/min/1.73m^2 at stage A1 in general population and high risk cohorts

A



B

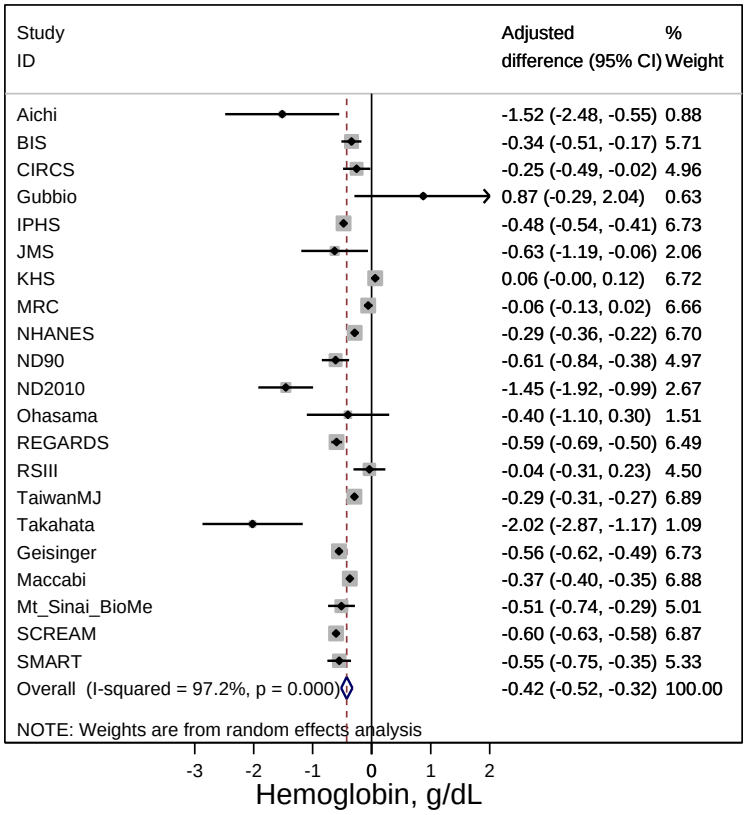
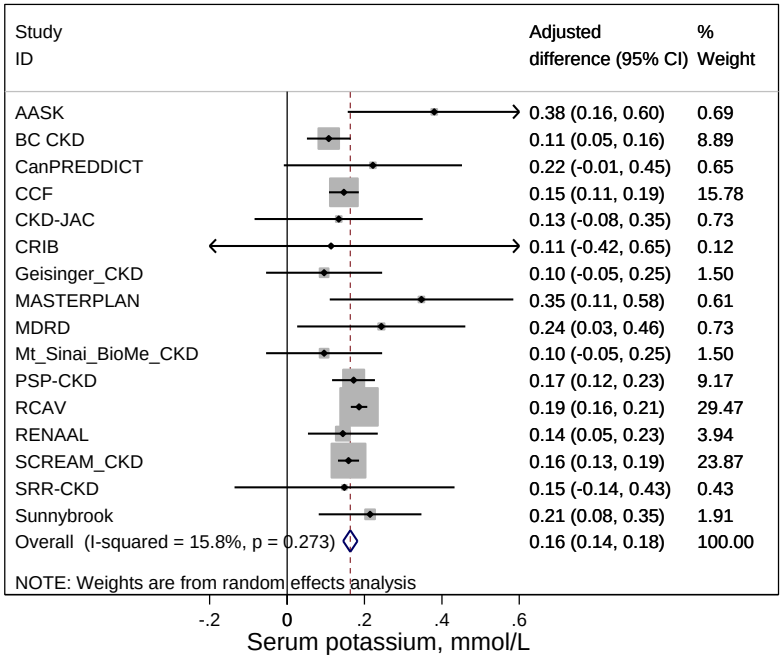


Figure S2. Forest plot of mean difference of serum potassium at (A) eGFR 30 vs. 50 ml/min/1.73m^2 at stage A1 in CKD cohorts and (B) eGFR 50 vs. 80 ml/min/1.73m^2 at stage A1 in general population and high risk cohorts

A



B

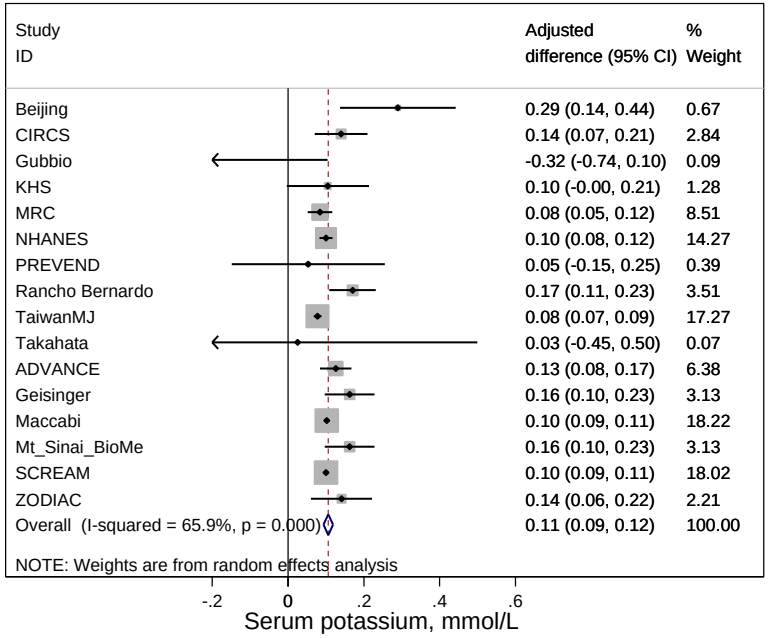
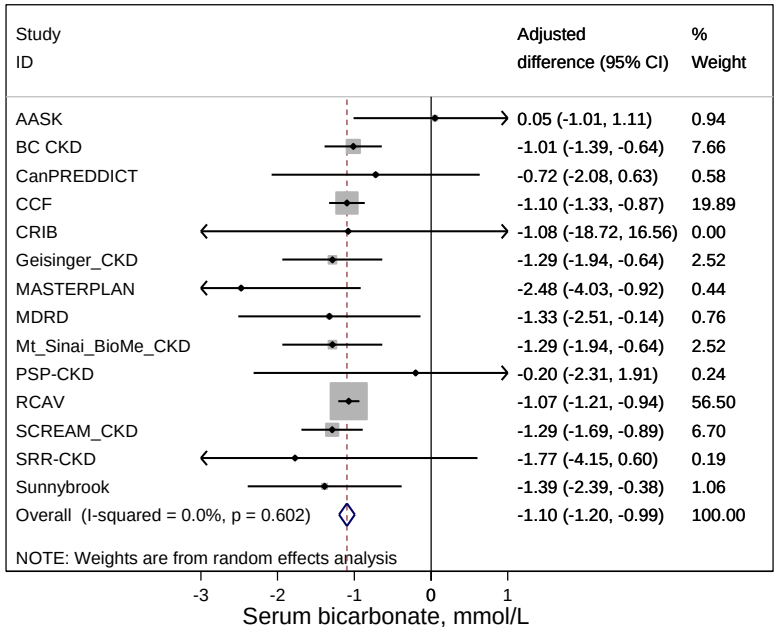


Figure S3. Forest plot of mean difference of serum bicarbonate at (A) eGFR 30 vs. 50 ml/min/1.73m^2 at stage A1 in CKD cohorts and (B) eGFR 50 vs. 80 ml/min/1.73m^2 at stage A1 in general population and high risk cohorts

A



B

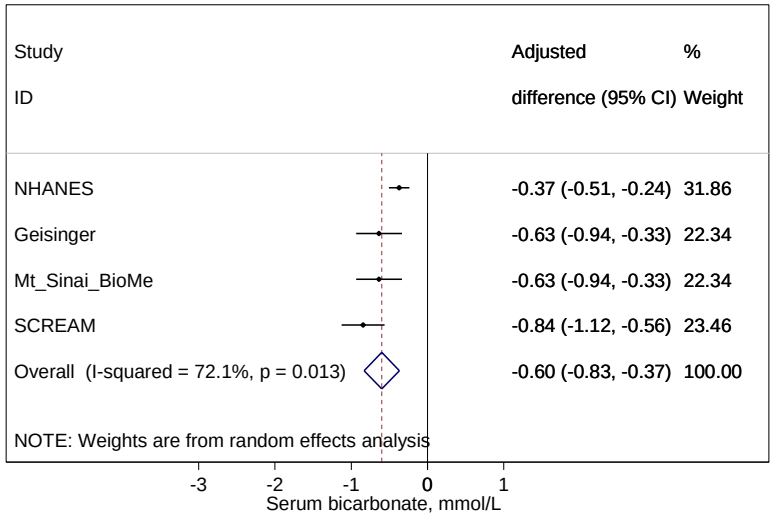
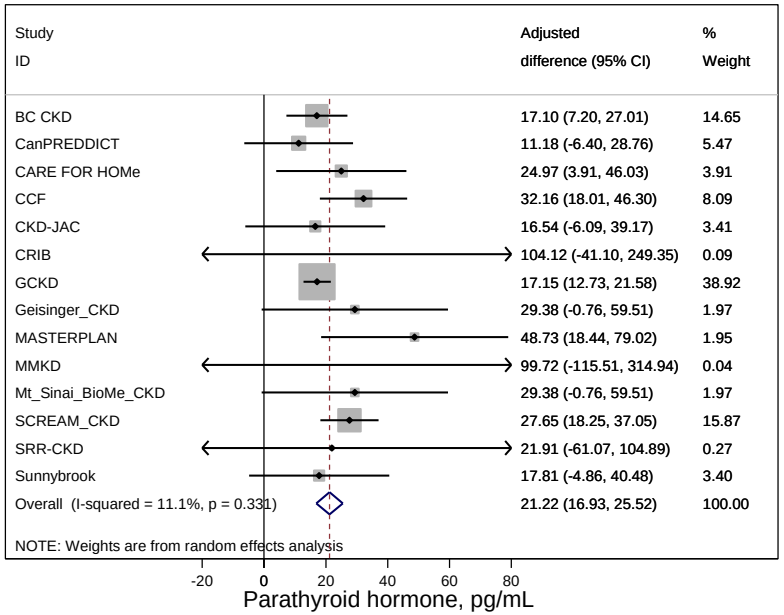


Figure S4. Forest plot of mean difference of serum parathyroid hormone at (A) eGFR 30 vs. 50 ml/min/1.73m^2 at stage A1 in CKD cohorts and (B) eGFR 50 vs. 80 ml/min/1.73m^2 at stage A1 in general population and high risk cohorts

A



B

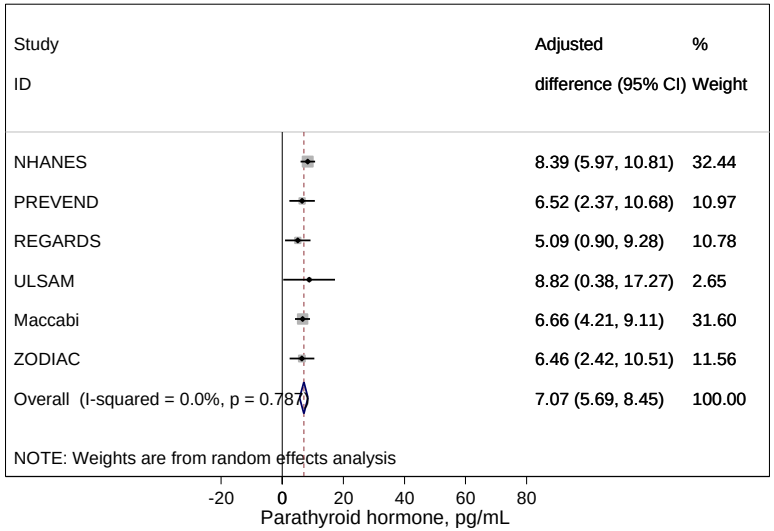
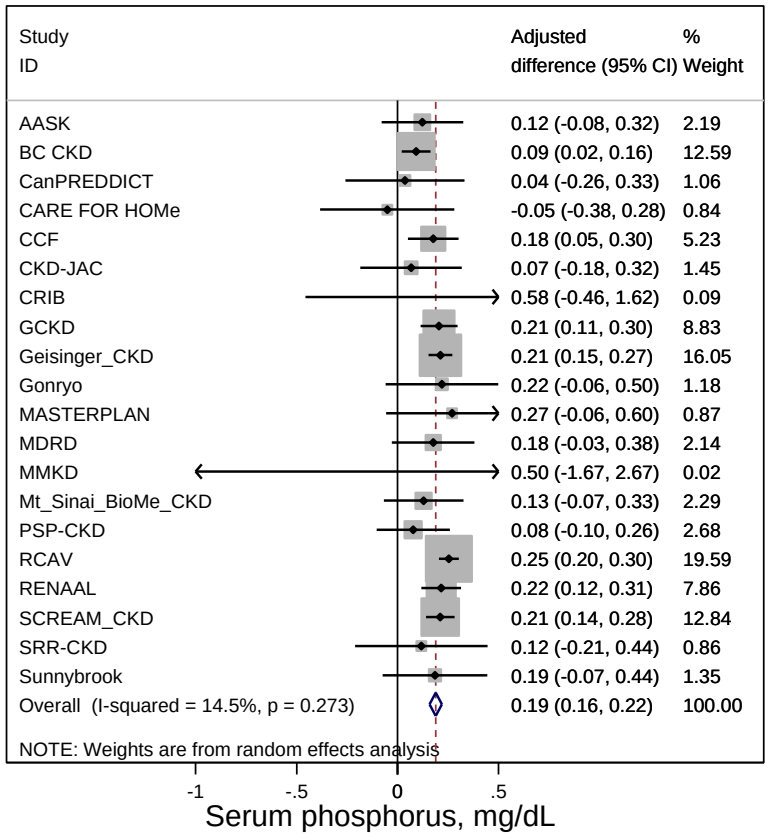


Figure S5. Forest plot of mean difference of serum phosphorus at (A) eGFR 30 vs. 50 ml/min/1.73m^2 at stage A1 in CKD cohorts and (B) eGFR 50 vs. 80 ml/min/1.73m^2 at stage A1 in general population and high risk cohorts

A



B

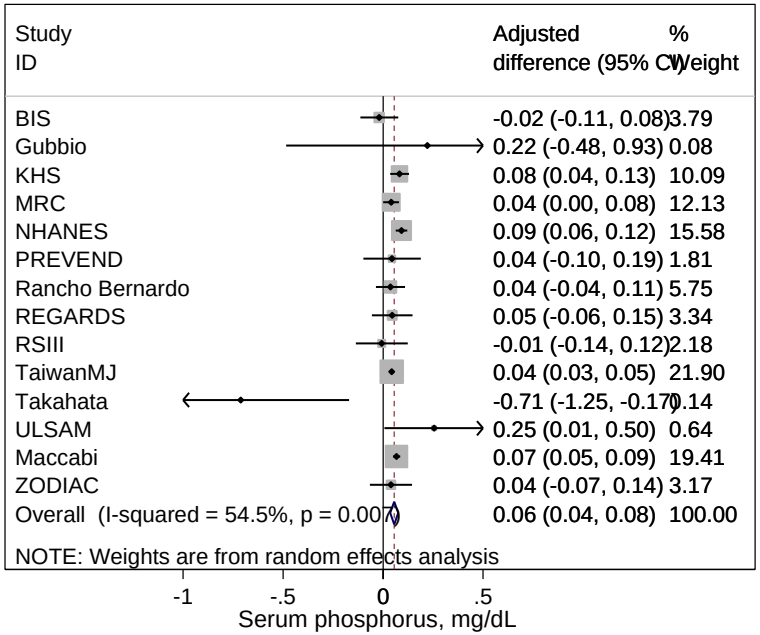
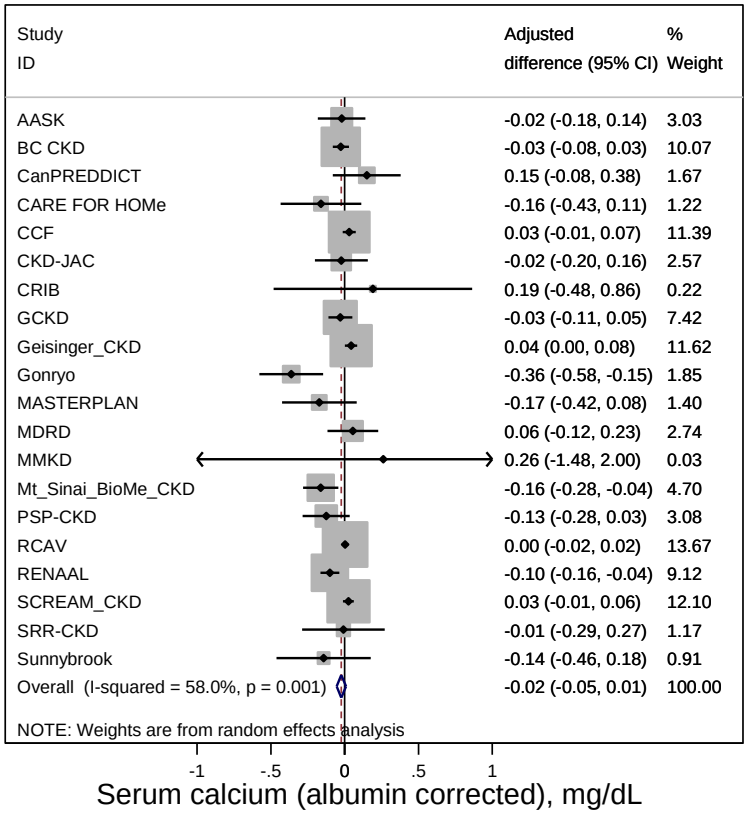


Figure S6. Forest plot of mean difference of corrected serum calcium at (A) eGFR 30 vs. 50 ml/min/1.73m^2 at stage A1 in CKD cohorts and (B) eGFR 50 vs. 80 ml/min/1.73m^2 at stage A1 in general population and high risk cohorts

A



B

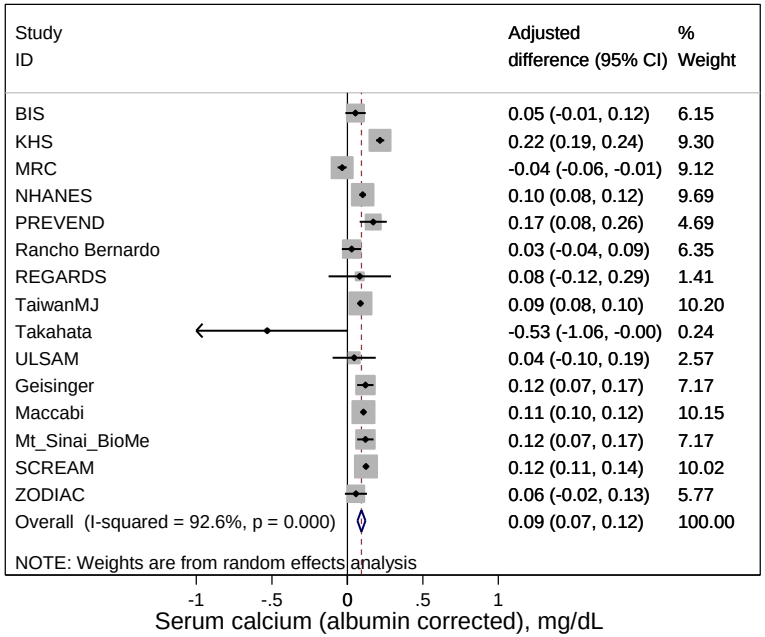


Figure S7. Association between eGFR and hemoglobin by albuminuria stages in CKD cohorts excluding users of iron supplementation and erythropoietin stimulating agents.
Y axis depicts the meta-analyzed adjusted difference from mean value at eGFR 50 ml/min/1.73m^2 and albuminuria <30 mg/g.

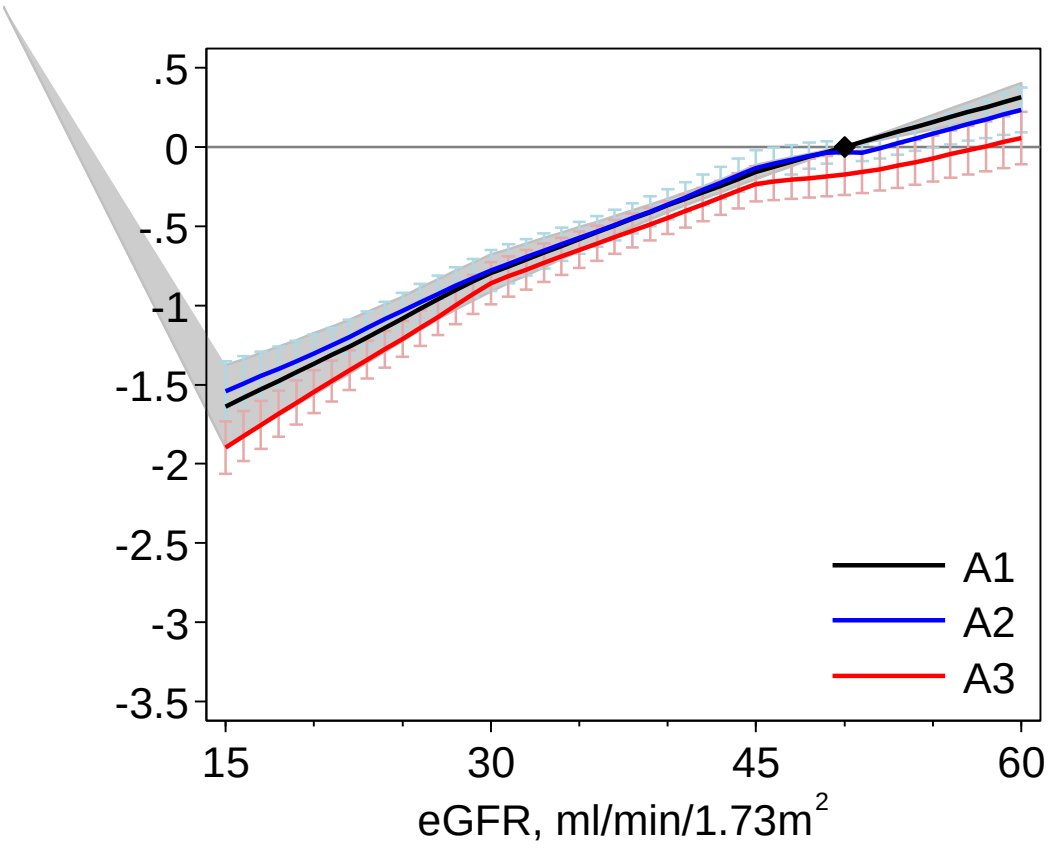


Figure S8. Association between eGFR and serum potassium by albuminuria stages in CKD cohorts excluding users of medications that affect potassium.

Y axis depicts the meta-analyzed adjusted difference from mean value at eGFR 50 ml/min/1.73m^2 and albuminuria <30 mg/g.

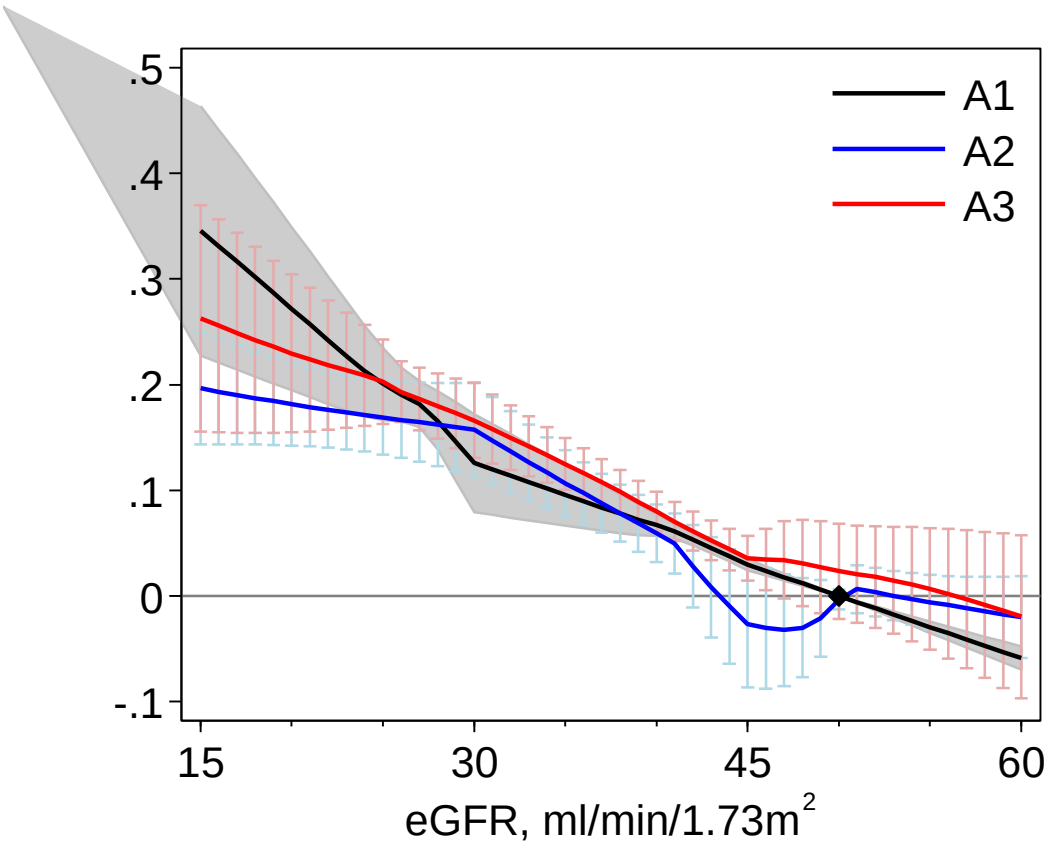


Figure S9. Association between eGFR and continuous laboratory measures (A) hemoglobin, (B) potassium, (C) bicarbonate, (D) parathyroid hormone, (E) phosphorus, (F) calcium, by diabetes status in CKD cohorts.

Y-axis depicts the meta-analyzed adjusted difference from mean value at eGFR 50 ml/min/1.73m^2 and non-diabetics. Individuals with diabetes vs those without diabetes had the following difference: hemoglobin -0.43 (-0.57 to -0.28), potassium 0.10 (0.04 to 0.15), bicarbonate -0.32 (-0.51 to -0.13), parathyroid hormone -1.11 (-3.28 to 1.06), phosphorus 0.09 (0.04 to 0.13), and calcium 0.03 (0.01 to 0.05).

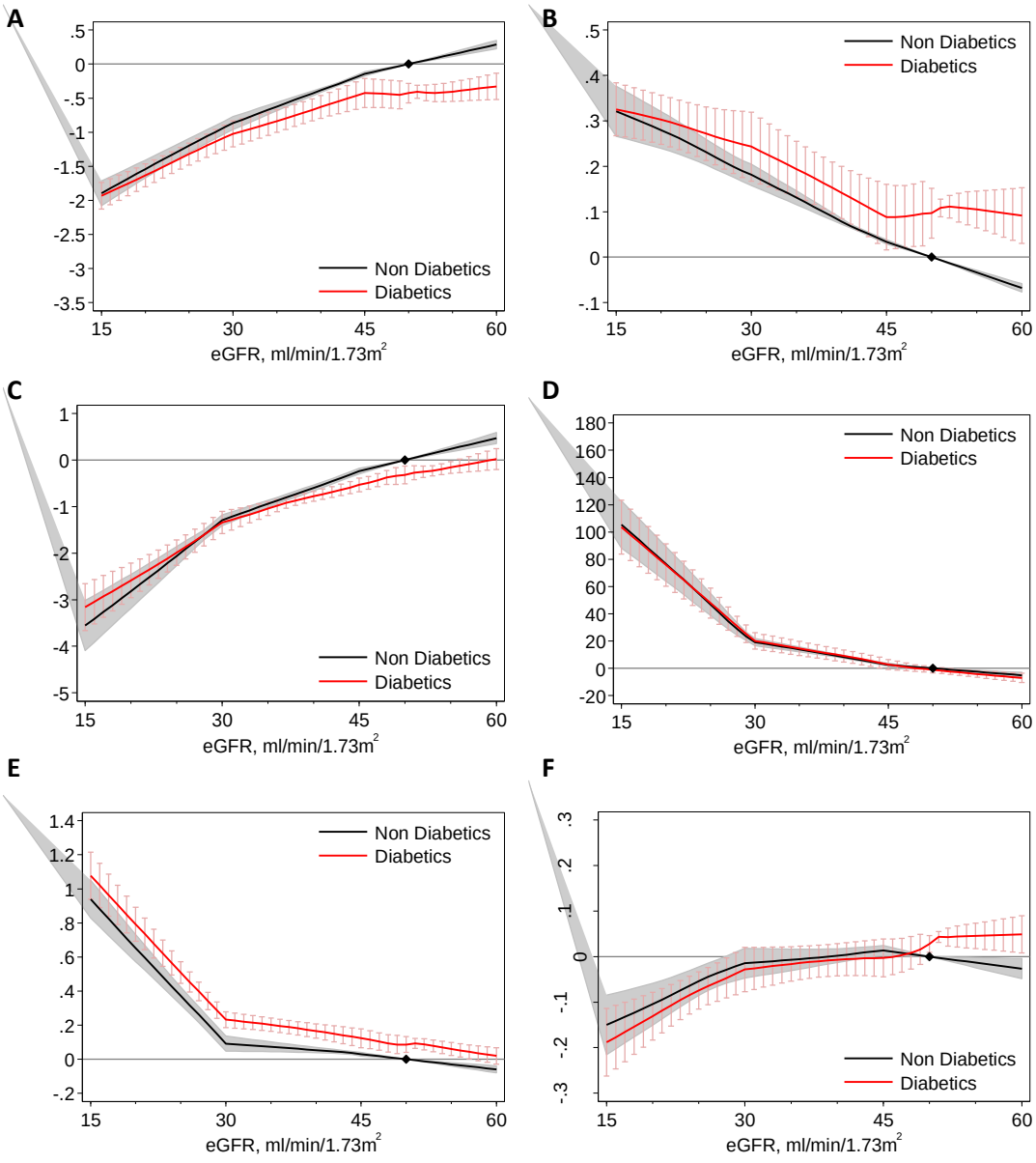


Figure S10. Association between eGFR and continuous laboratory measures (A) hemoglobin, (B) potassium, (C) bicarbonate, (D) parathyroid hormone, (E) phosphorus, (F) calcium, by diabetes status in general population and high risk cohorts.

Y-axis depicts the meta-analyzed adjusted difference from mean value at eGFR 80 ml/min/1.73m^2 and non-diabetics. Individuals with diabetes vs those without diabetes had the following difference: hemoglobin -0.09 (-0.24 to 0.06), potassium 0.07 (0.05to 0.09), bicarbonate -0.31 (-0.49 to -0.13), parathyroid hormone -5.77 (-8.59 to -2.95), phosphorus 0.06 (0.02 to 0.10), and calcium 0.08 (0.06 to 0.10).

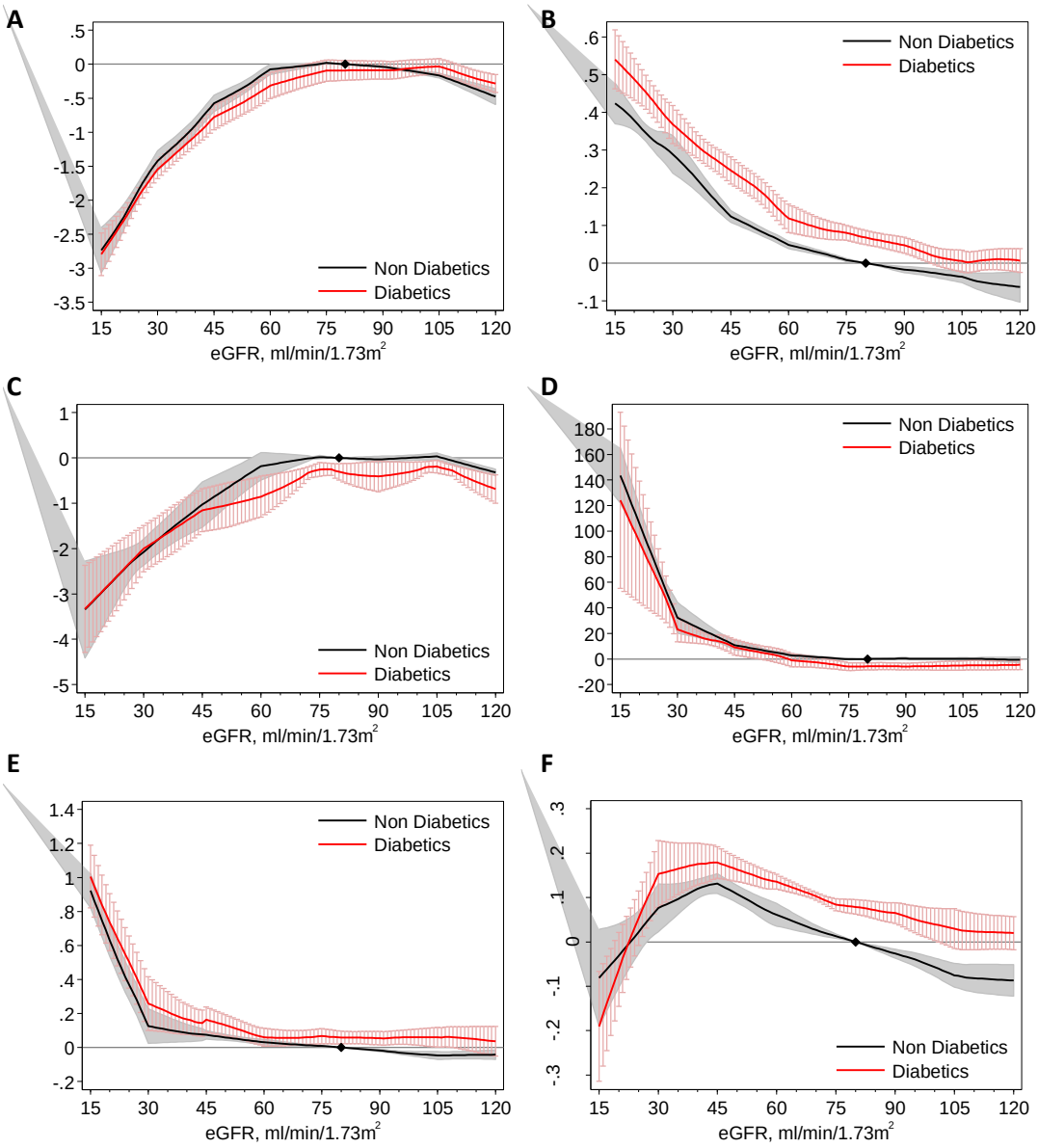


Figure S11. Association between eGFR and continuous laboratory measures (A) hemoglobin, (B) potassium, (C) bicarbonate, (D) parathyroid hormone, (E) phosphorus, (F) calcium, by age in CKD cohorts.

Y-axis depicts the meta-analyzed adjusted difference from mean value at eGFR 50 ml/min/1.73m^2 and Age<55.

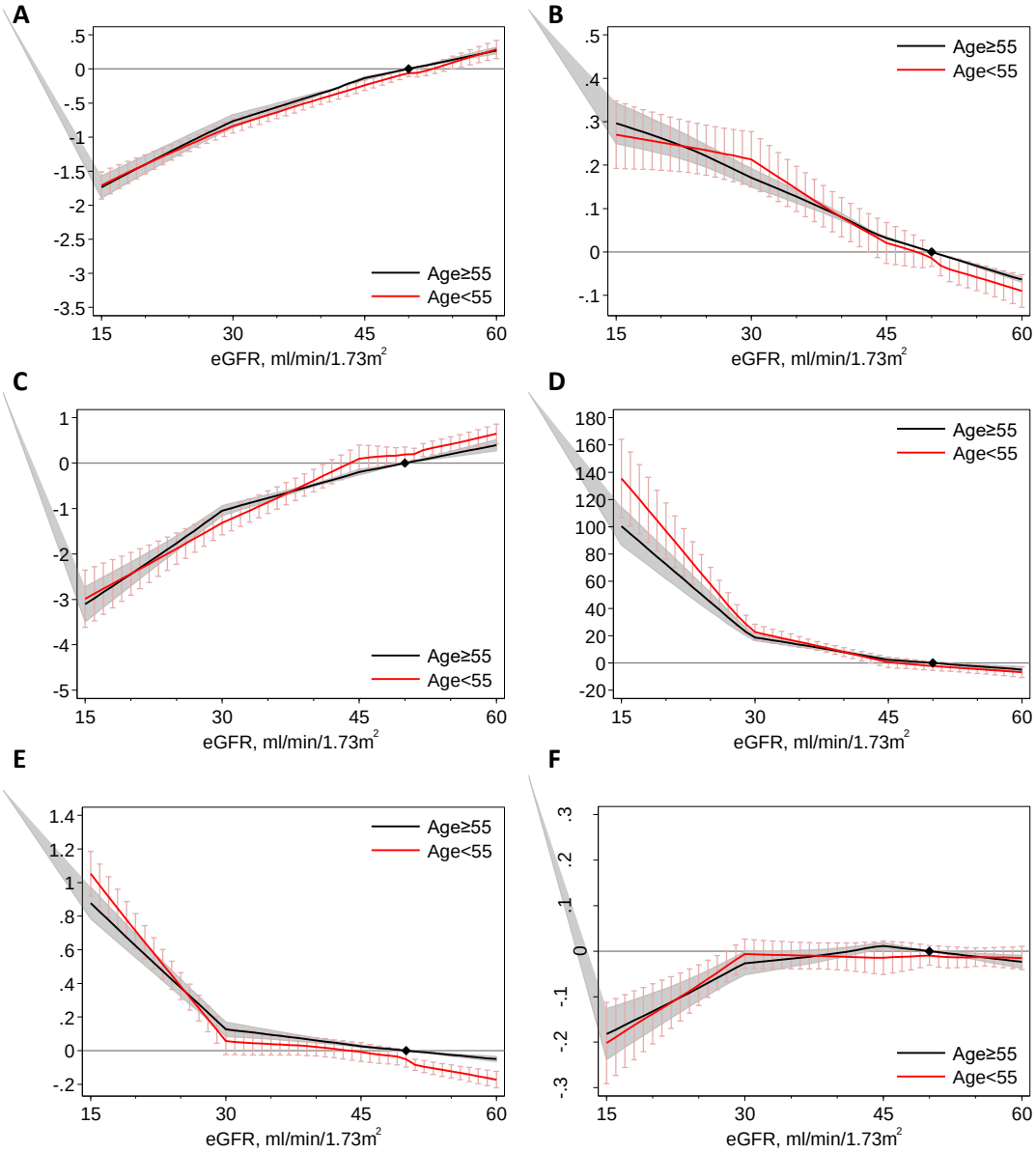


Figure S12. Association between eGFR and continuous laboratory measures (A) hemoglobin, (B) potassium, (C) bicarbonate, (D) parathyroid hormone, (E) phosphorus, (F) calcium, by age in general population and high risk cohorts.

Y-axis depicts the meta-analyzed adjusted difference from mean value at eGFR 80 ml/min/1.73m^2 and Age≥55.

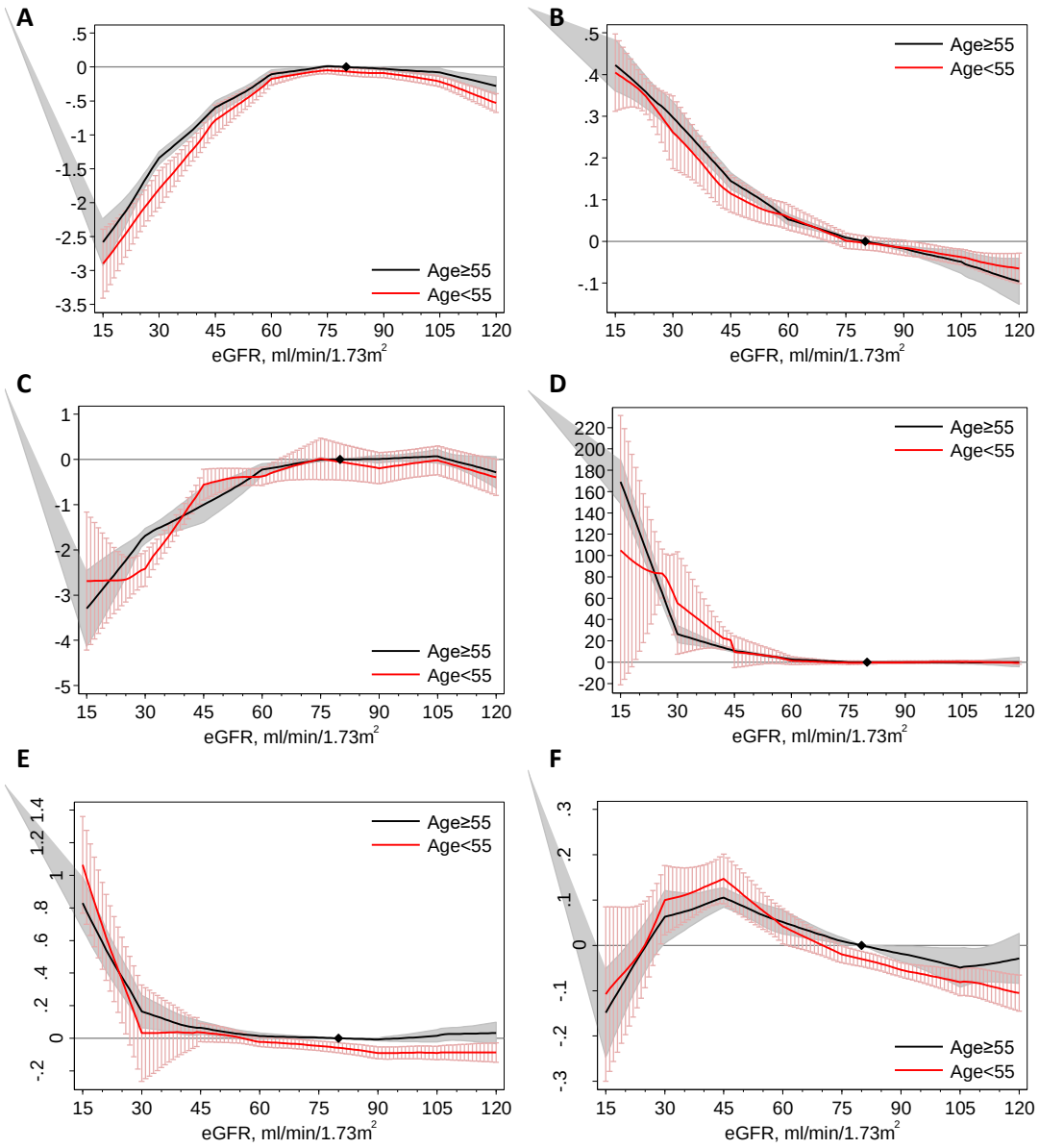


Figure S13. Association between eGFR and continuous laboratory measures (A) hemoglobin, (B) potassium, (C) bicarbonate, (D) parathyroid hormone, (E) phosphorus, (F) calcium, by sex in CKD cohorts.

Y-axis depicts the meta-analyzed adjusted difference from mean value at eGFR 50 ml/min/1.73m^2 and male.

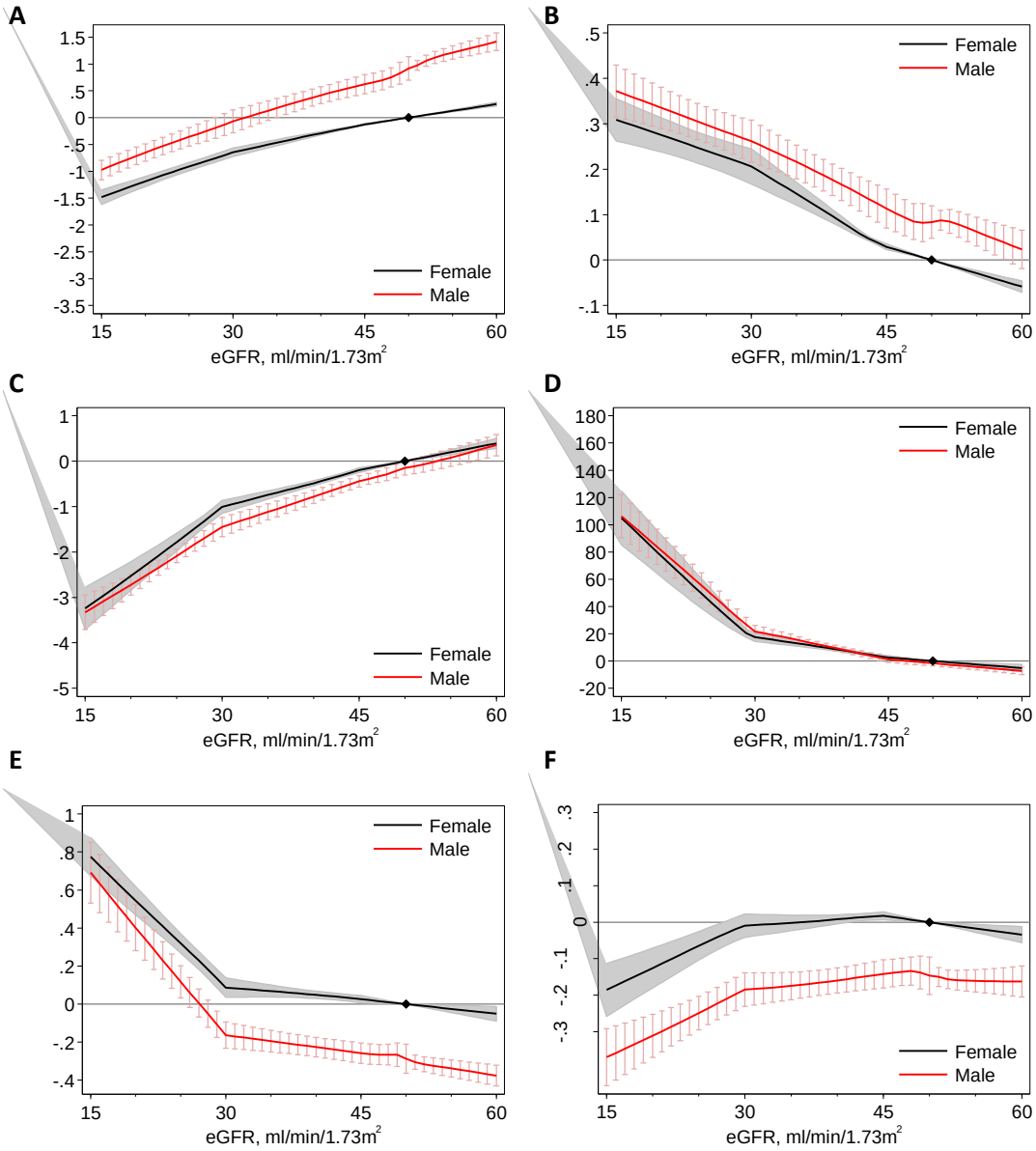


Figure S14. Association between eGFR and continuous laboratory measures (A) hemoglobin, (B) potassium, (C) bicarbonate, (D) parathyroid hormone, (E) phosphorus, (F) calcium, by sex in general population and high risk cohorts.

Y-axis depicts the meta-analyzed adjusted difference from mean value at eGFR 80 ml/min/1.73m^2 and male.

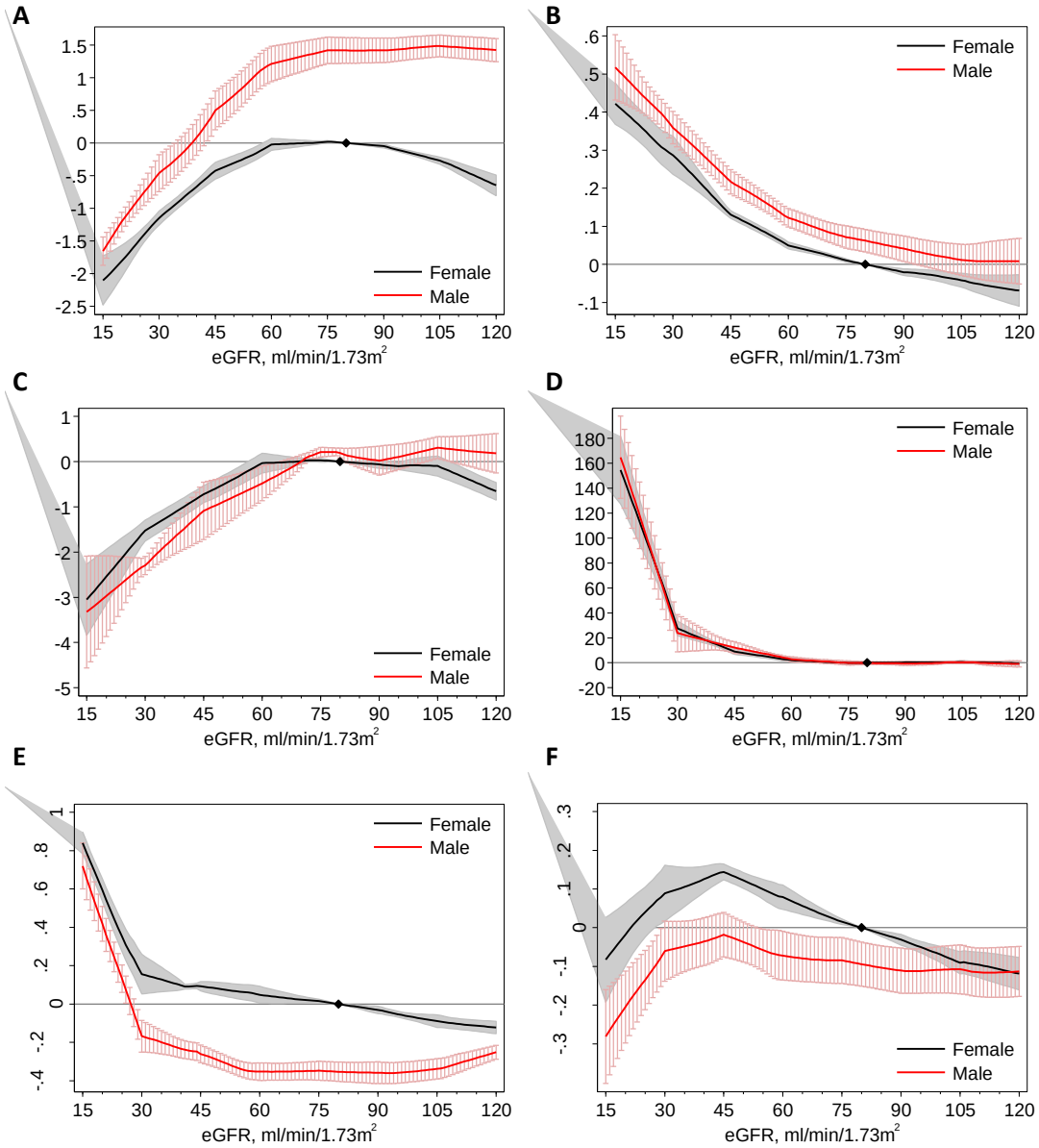


Figure S15. Association between eGFR and continuous laboratory measures (A) hemoglobin, (B) potassium, (C) bicarbonate, (D) parathyroid hormone, (E) phosphorus, (F) calcium, by age and sex in CKD cohorts.

Y-axis depicts the meta-analyzed adjusted difference from mean value at eGFR 50 ml/min/1.73m^2 and Age≥55 and male.

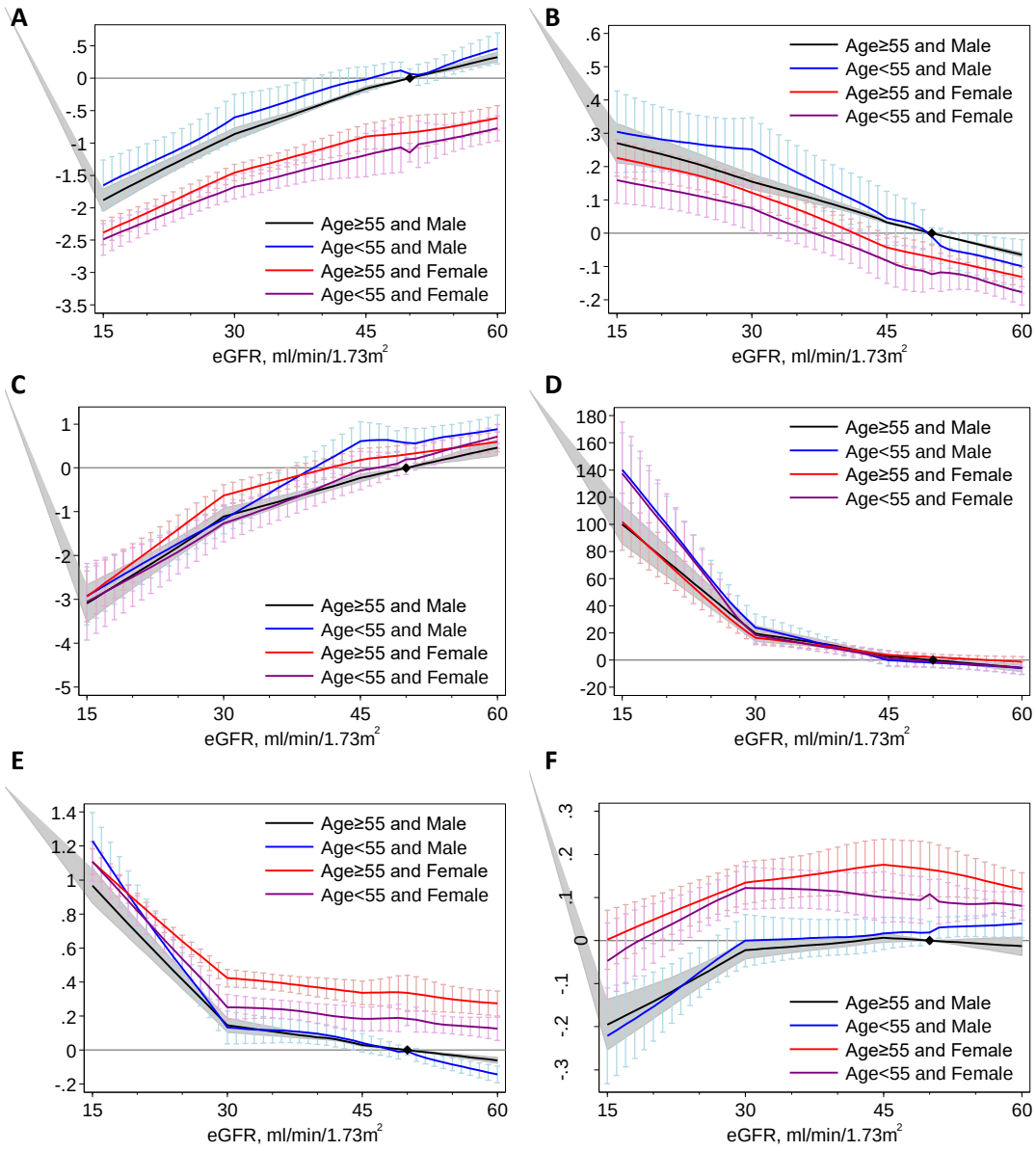


Figure S16. Association between eGFR and continuous laboratory measures (A) hemoglobin, (B) potassium, (C) bicarbonate, (D) parathyroid hormone, (E) phosphorus, (F) calcium, by age and sex in general population and high risk cohorts.

Y-axis depicts the meta-analyzed adjusted difference from mean value at eGFR 80 ml/min/1.73m^2 and Age≥55 and male.

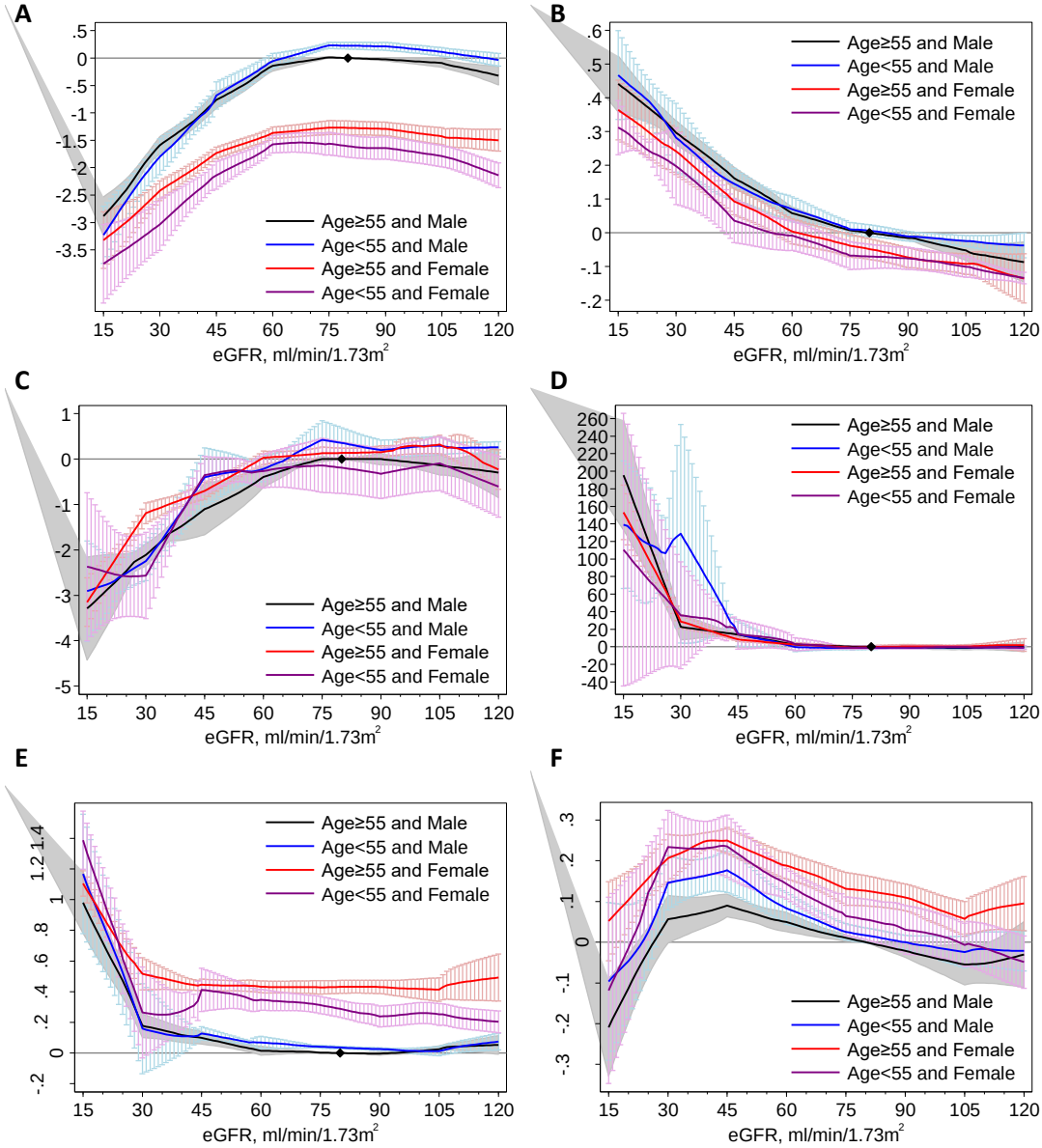


Figure S17. Association between eGFR and continuous laboratory measures (A) hemoglobin, (B) potassium, (C) bicarbonate, (D) parathyroid hormone, (E) phosphorus, (F) calcium, by race in CKD cohorts.

Y-axis depicts the meta-analyzed adjusted difference from mean value at eGFR 50 ml/min/1.73m^2 and non-blacks.

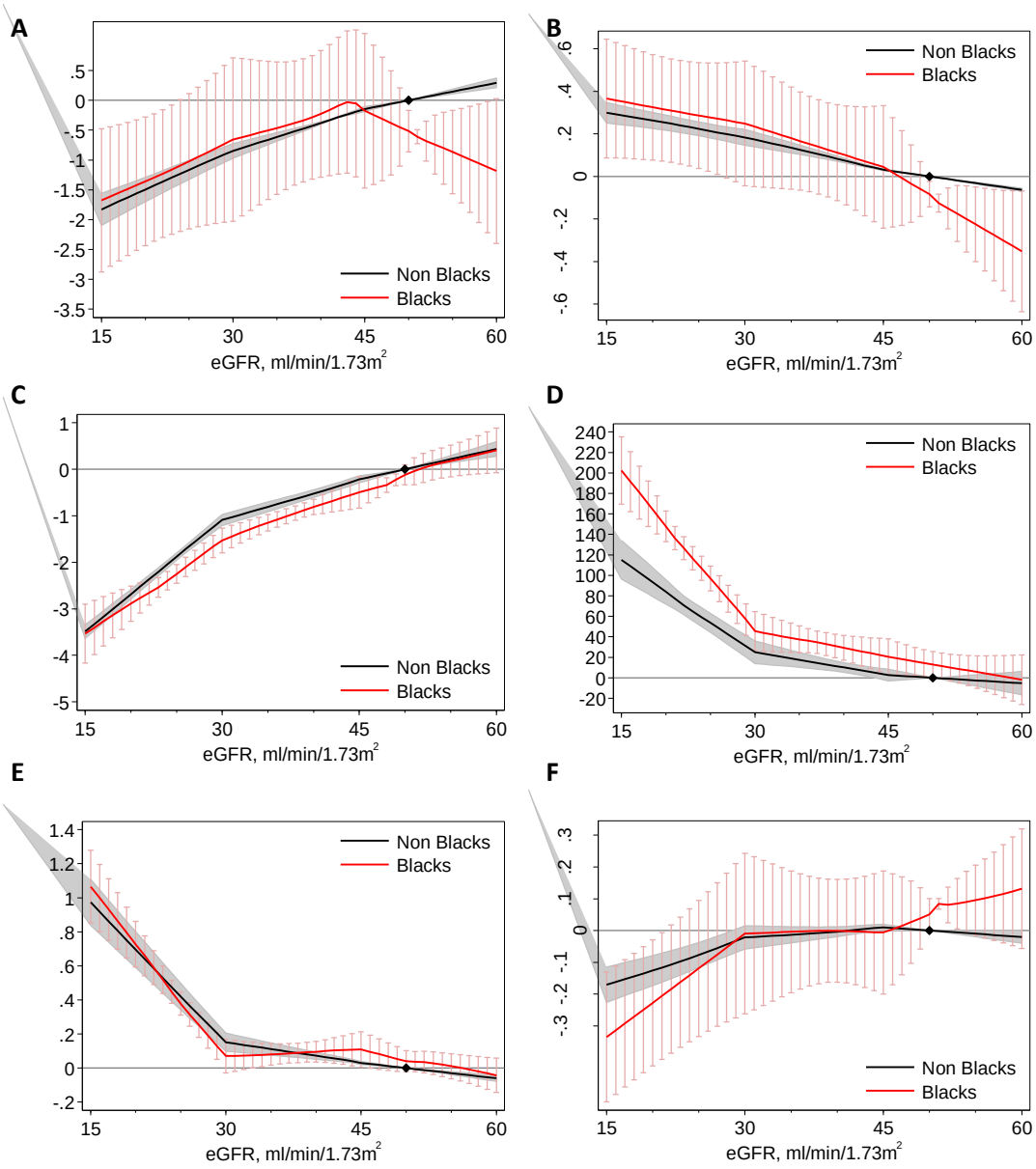


Figure S18. Association between eGFR and continuous laboratory measures (A) hemoglobin, (B) potassium, (C) bicarbonate, (D) parathyroid hormone, (E) phosphorus, (F) calcium, by race in general population and high risk cohorts.

Y-axis depicts the meta-analyzed adjusted difference from mean value at eGFR 80 ml/min/1.73m^2 and non-blacks.

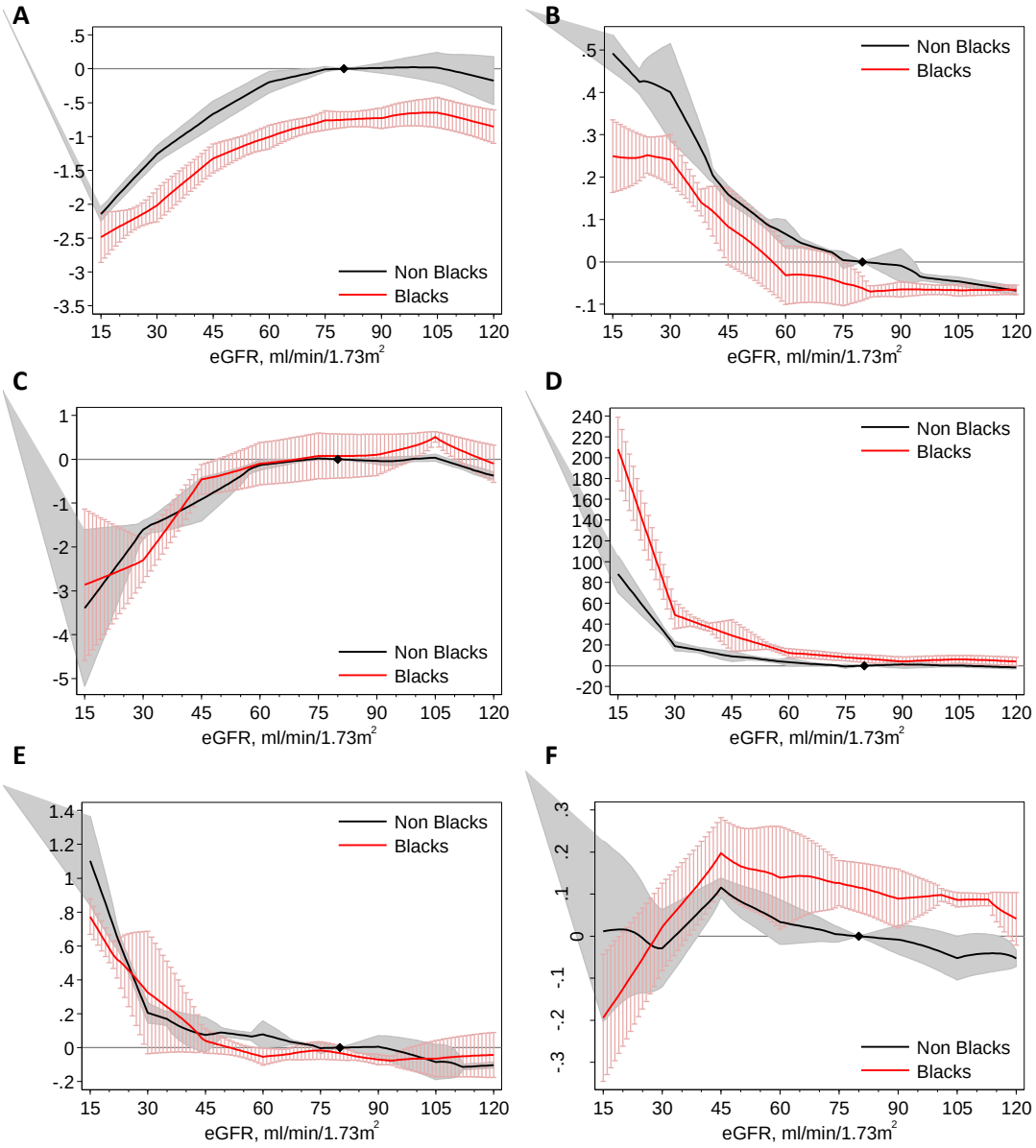


Figure S19. Odds ratios of laboratory abnormalities in CKD (top panels) and general population and high risk cohorts (bottom panels)

Chronic Kidney Disease

Anemia

eGFR	A1	A2	A3
>90			
75-89			
60-74	**0.66 (0.58, 0.74)**	**0.76 (0.59, 0.98)**	1.03 (0.82, 1.29)
45-59	**1.00 (Ref)**	1.11 (0.99, 1.25)	**1.43 (1.17, 1.76)**
20-44	**2.10 (1.98, 2.23)**	**2.08 (1.85, 2.35)**	**2.36 (2.13, 2.62)**
15-29	**5.09 (4.41, 5.87)**	**4.94 (4.18, 5.83)**	**6.34 (5.49, 7.31)**

Hyperkalemia

eGFR	A1	A2	A3
>90			
75-89			
60-74	**0.61 (0.58, 0.64)**	0.84 (0.69, 1.03)	1.01 (0.73, 1.39)
45-59	**1.00 (Ref)**	1.12 (1.00, 1.26)	**1.30 (1.07, 1.58)**
20-44	**1.82 (1.60, 2.09)**	**2.31 (1.94, 2.75)**	**2.32 (2.04, 2.63)**
15-29	**3.49 (2.99, 4.07)**	**3.49 (2.83, 4.31)**	**3.69 (3.01, 4.52)**

Acidosis

eGFR	A1	A2	A3
>90			
75-89			
60-74	**0.72 (0.67, 0.77)**	1.20 (0.98, 1.47)	1.07 (0.76, 1.51)
45-59	**1.00 (Ref)**	**1.53 (1.16, 2.01)**	**1.73 (1.24, 2.41)**
20-44	**2.11 (1.97, 2.27)**	**3.25 (2.76, 3.84)**	**2.94 (2.36, 3.67)**
15-29	**5.78 (4.46, 7.50)**	**8.09 (5.83, 11.21)**	**8.37 (6.48, 10.83)**

Hyperparathyroidism

eGFR	A1	A2	A3
>90			
75-89			
60-74	**0.62 (0.50, 0.77)**	**0.81 (0.66, 0.99)**	**0.63 (0.52, 0.78)**
45-59	**1.00 (Ref)**	1.11 (0.99, 1.24)	1.26 (0.98, 1.62)
20-44	**2.44 (2.06, 2.88)**	**2.90 (2.27, 3.71)**	**3.23 (2.67, 3.92)**
15-29	**4.39 (3.35, 5.75)**	**6.44 (4.92, 8.43)**	**10.15 (7.67, 13.45)**

Hyperphosphatemia

eGFR	A1	A2	A3
>90			
75-89			
60-74	**0.80 (0.69, 0.93)**	1.04 (0.55, 1.95)	1.24 (0.91, 1.69)
45-59	**1.00 (Ref)**	1.06 (0.99, 1.13)	**1.64 (1.14, 2.36)**
20-44	**1.72 (1.48, 2.01)**	**1.78 (1.48, 2.13)**	**2.40 (2.05, 2.80)**
15-29	**8.46 (6.83, 10.49)**	**7.61 (5.44, 10.65)**	**10.89 (8.10, 14.65)**

Hypocalcemia

eGFR	A1	A2	A3
>90			
75-89			
60-74	0.95 (0.73, 1.23)	1.00 (0.62, 1.63)	0.83 (0.63, 1.08)
45-59	**1.00 (Ref)**	1.14 (0.88, 1.46)	0.87 (0.68, 1.10)
20-44	**1.40 (1.22, 1.60)**	**1.58 (1.11, 2.26)**	1.12 (0.81, 1.54)
15-29	**3.34 (2.72, 4.10)**	**3.86 (2.79, 5.34)**	**3.16 (2.31, 4.32)**

General Population and High Risk

Anemia

eGFR	A1	A2	A3
>90	**0.47 (0.38, 0.57)**	**0.57 (0.47, 0.69)**	**0.80 (0.69, 0.92)**
75-89	**0.43 (0.37, 0.51)**	**0.62 (0.54, 0.71)**	0.88 (0.74, 1.04)
60-74	**0.55 (0.51, 0.61)**	**0.83 (0.75, 0.92)**	1.12 (0.97, 1.29)
45-59	**1.00 (Ref)**	**1.34 (1.23, 1.47)**	**1.93 (1.66, 2.26)**
20-44	**2.26 (1.99, 2.57)**	**2.74 (2.31, 3.25)**	**4.00 (3.21, 4.99)**
15-29	**6.94 (4.83, 9.98)**	**8.22 (5.61, 12.04)**	**12.54 (8.29, 18.99)**

Hyperkalemia

eGFR	A1	A2	A3
>90	**0.26 (0.17, 0.38)**	**0.36 (0.26, 0.50)**	**0.35 (0.23, 0.53)**
75-89	**0.34 (0.24, 0.47)**	**0.48 (0.38, 0.61)**	**0.43 (0.31, 0.59)**
60-74	**0.51 (0.41, 0.65)**	**0.68 (0.50, 0.91)**	0.81 (0.65, 1.01)
45-59	**1.00 (Ref)**	1.09 (0.92, 1.28)	**1.38 (1.04, 1.83)**
20-44	**1.94 (1.46, 2.58)**	**2.30 (1.85, 2.86)**	**2.46 (1.91, 3.16)**
15-29	**3.91 (2.46, 6.20)**	**4.33 (3.17, 5.92)**	**5.42 (3.75, 7.82)**

Acidosis

eGFR	A1	A2	A3
>90	**0.46 (0.33, 0.65)**	**0.58 (0.38, 0.89)**	**0.34 (0.20, 0.58)**
75-89	**0.55 (0.44, 0.68)**	0.62 (0.33, 1.17)	**0.56 (0.36, 0.88)**
60-74	**0.66 (0.56, 0.77)**	**0.79 (0.62, 0.99)**	1.09 (0.79, 1.49)
45-59	**1.00 (Ref)**	**1.44 (1.15, 1.81)**	**1.82 (1.45, 2.27)**
20-44	**2.15 (1.83, 2.52)**	**3.43 (2.78, 4.25)**	**3.12 (2.59, 3.75)**
15-29	**4.11 (3.26, 5.18)**	**7.05 (4.64, 10.72)**	**7.13 (5.16, 9.86)**

Hyperparathyroidism

eGFR	A1	A2	A3
>90	**0.47 (0.32, 0.71)**	**0.68 (0.57, 0.80)**	0.76 (0.39, 1.48)
75-89	**0.46 (0.32, 0.67)**	**0.66 (0.46, 0.94)**	0.59 (0.31, 1.10)
60-74	**0.62 (0.46, 0.84)**	0.95 (0.67, 1.35)	0.88 (0.68, 1.14)
45-59	**1.00 (Ref)**	**1.46 (1.11, 1.92)**	**1.83 (1.48, 2.26)**
20-44	**2.11 (1.79, 2.49)**	**3.07 (1.64, 5.75)**	**4.80 (3.87, 5.95)**
15-29	**5.04 (2.95, 8.62)**	**11.16 (7.81, 15.96)**	**21.27 (15.74, 28.74)**

Hyperphosphatemia

eGFR	A1	A2	A3
>90	**0.56 (0.42, 0.75)**	**0.55 (0.47, 0.64)**	**0.68 (0.53, 0.87)**
75-89	**0.66 (0.53, 0.81)**	**0.69 (0.59, 0.80)**	0.75 (0.52, 1.09)
60-74	**0.82 (0.70, 0.95)**	0.87 (0.74, 1.02)	0.87 (0.56, 1.33)
45-59	**1.00 (Ref)**	1.04 (0.86, 1.26)	1.12 (0.81, 1.55)
20-44	**1.81 (1.54, 2.12)**	**1.31 (0.95, 1.82)**	**1.68 (1.09, 2.60)**
15-29	**6.76 (5.42, 8.42)**	**4.52 (2.55, 8.00)**	**6.43 (3.70, 11.18)**

Hypocalcemia

eGFR	A1	A2	A3
>90	**1.99 (1.10, 3.59)**	**1.79 (1.04, 3.07)**	1.80 (0.88, 3.66)
75-89	**1.45 (1.03, 2.04)**	1.22 (0.90, 1.64)	1.11 (0.75, 1.65)
60-74	1.17 (0.96, 1.43)	1.21 (0.88, 1.67)	0.88 (0.67, 1.15)
45-59	**1.00 (Ref)**	1.00 (0.80, 1.25)	**0.77 (0.60, 0.99)**
20-44	1.05 (0.68, 1.62)	1.48 (0.79, 2.78)	1.12 (0.46, 2.72)
15-29	**2.31 (1.37, 3.92)**	**3.09 (1.47, 6.47)**	**2.91 (1.17, 7.25)**

Adjustment was to 60 years old, half male, non-black, 30% diabetes, 20% history of CVD, 40% ever smoker, SPB 130 mmHg, BMI 30kg/m^2, stage A1, eGFR 50

Bold font indicates statistical significance ($p<0.05$). Color coding is based on odds ratio quartile within each abnormality.

Definitions of each abnormality are as follows: Anemia: Hgb: male<13 g/dL, female<12 g/dL; Hct: male<39%, female<36%. Hyperkalemia: potassium >5 mmol/L. Acidosis: bicarbonate <22 mmol/L. Hyperparathyroidism: intact PTH >65 pg/mL. Hyperphosphatemia: phosphorus >4.5 mg/dL. Hypocalcemia: corrected calcium <8.5 mg/dL.

Figure S20. Meta-analyzed adjusted prevalence (25th and 75th percentile cohort) of abnormalities (categorical laboratory measures) in general population and high risk cohorts by diabetes status

No Diabetes

Anemia

eGFR	A1	A2	A3
>90	5.0% (3.9, 7.0)	6.5% (5.1, 9.2)	9.8% (7.8, 13.6)
75-89	4.5% (3.5, 6.4)	6.9% (5.5, 9.7)	8.5% (6.7, 11.8)
60-74	6.0% (4.7, 8.5)	8.7% (6.9, 12.1)	10.4% (8.3, 14.3)
45-59	11.5% (9.2, 15.9)	13.8% (11.0, 18.7)	17.0% (13.7, 22.8)
30-44	22.5% (18.4, 29.6)	25.6% (21.1, 33.2)	30.3% (25.2, 38.6)
15-29	50.4% (44.2, 59.5)	51.3% (45.0, 60.4)	57.4% (51.1, 66.0)

Hyperkalemia

eGFR	A1	A2	A3
>90	1.5% (0.4, 4.6)	1.1% (0.3, 3.2)	1.4% (0.4, 4.4)
75-89	1.7% (0.5, 5.1)	1.6% (0.5, 4.8)	1.5% (0.5, 4.7)
60-74	2.3% (0.7, 7.0)	2.0% (0.6, 6.0)	2.3% (0.7, 7.0)
45-59	4.5% (1.4, 12.8)	3.5% (1.1, 10.3)	5.2% (1.6, 14.6)
30-44	9.5% (3.0, 24.8)	10.5% (3.3, 26.9)	11.3% (3.6, 28.5)
15-29	16.1% (5.3, 37.5)	19.0% (6.4, 42.5)	23.7% (8.3, 49.4)

Acidosis

eGFR	A1	A2	A3
>90	3.3% (2.7, 4.7)	3.9% (3.2, 5.6)	1.7% (1.4, 2.5)
75-89	3.4% (2.9, 5.0)	3.7% (3.1, 5.3)	4.6% (3.9, 6.6)
60-74	4.0% (3.4, 5.8)	5.6% (4.7, 8.0)	6.3% (5.3, 9.0)
45-59	6.7% (5.7, 9.6)	10.7% (9.1, 15.0)	11.3% (9.6, 15.9)
30-44	14.5% (12.4, 20.1)	24.0% (20.9, 31.8)	20.9% (18.0, 28.0)
15-29	24.9% (21.7, 32.9)	39.4% (35.2, 49.0)	38.3% (34.2, 47.9)

Hyperparathyroidism

eGFR	A1	A2	A3
>90	9.7% (7.1, 12.7)	12.2% (9.1, 15.8)	11.5% (8.5, 14.9)
75-89	9.9% (7.3, 12.9)	12.5% (9.2, 16.1)	14.1% (10.5, 18.1)
60-74	11.7% (8.7, 15.1)	15.7% (11.7, 20.0)	12.8% (9.5, 16.4)
45-59	21.0% (15.9, 26.3)	29.5% (23.0, 35.9)	34.7% (27.5, 41.6)
30-44	38.0% (30.5, 45.2)	31.6% (24.8, 38.3)	51.6% (43.3, 58.9)
15-29	64.8% (56.8, 71.2)	61.6% (53.4, 68.3)	75.8% (69.1, 80.8)

Hyperphosphatemia

eGFR	A1	A2	A3
>90	3.3% (1.4, 3.8)	4.1% (1.8, 4.7)	4.3% (1.9, 4.9)
75-89	4.0% (1.8, 4.6)	4.2% (1.8, 4.7)	5.2% (2.3, 5.9)
60-74	5.3% (2.3, 5.9)	4.5% (2.0, 5.1)	3.5% (1.5, 4.0)
45-59	6.6% (2.9, 7.4)	6.0% (2.7, 6.8)	7.6% (3.4, 8.6)
30-44	10.6% (4.8, 11.9)	8.3% (3.7, 9.4)	11.8% (5.4, 13.2)
15-29	28.3% (14.3, 30.9)	31.1% (16.1, 34.0)	33.2% (17.4, 36.1)

Hypocalcemia

eGFR	A1	A2	A3
>90	15.0% (7.9, 22.5)	10.2% (5.3, 15.9)	9.8% (5.0, 15.2)
75-89	12.0% (6.2, 18.4)	9.6% (4.9, 15.0)	8.1% (4.1, 12.7)
60-74	9.8% (5.0, 15.3)	8.2% (4.2, 12.9)	6.0% (3.0, 9.6)
45-59	6.2% (3.1, 9.9)	8.4% (4.3, 13.2)	5.2% (2.6, 8.4)
30-44	6.2% (3.1, 9.8)	12.2% (6.3, 18.7)	1.7% (0.8, 2.7)
15-29	12.4% (6.4, 18.9)	18.1% (9.7, 26.7)	7.2% (3.6, 11.3)

Diabetes

Anemia

eGFR	A1	A2	A3
>90	6.3% (4.9, 8.8)	8.8% (6.9, 12.2)	8.7% (6.9, 12.2)
75-89	6.5% (5.1, 9.1)	10.5% (8.4, 14.5)	14.4% (11.5, 19.5)
60-74	8.7% (6.9, 12.2)	13.5% (10.8, 18.4)	15.9% (12.8, 21.4)
45-59	14.9% (12.0, 20.2)	19.6% (15.9, 26.0)	25.9% (21.4, 33.6)
30-44	26.9% (22.2, 34.7)	31.3% (26.2, 39.7)	40.3% (34.4, 49.4)
15-29	45.6% (39.5, 54.8)	48.8% (42.6, 57.9)	60.7% (54.6, 69.1)

Hyperkalemia

eGFR	A1	A2	A3
>90	1.8% (0.5, 5.5)	3.6% (1.1, 10.5)	1.0% (0.3, 3.0)
75-89	2.8% (0.8, 8.3)	4.0% (1.2, 11.6)	4.6% (1.4, 13.0)
60-74	3.9% (1.2, 11.2)	5.0% (1.5, 14.2)	6.6% (1.8, 17,4)
45-59	8.8% (2.7, 23.3)	9.9% (3.1, 25.5)	11.4% (3.6, 28.8)
30-44	12.8% (4.1, 31.5)	18.7% (6.3, 41.9)	87.5% (67.1, 95.6)
15-29	24.7% (8.8, 50.8)	31.5% (11.9, 59.1)	34.4% (13.3, 62.2)

Acidosis

eGFR	A1	A2	A3
>90	4.7% (4.0, 6.8)	5.0% (4.2, 7.2)	3.7% (3.1, 5.3)
75-89	5.3% (4.4, 7.6)	6.2% (5.2, 8.8)	4.7% (3.9, 6.7)
60-74	6.3% (5.3, 9.0)	7.2% (6.0, 10.2)	10.4% (8.8, 14.6)
45-59	7.7% (6.5, 11.0)	11.7% (10.0, 16.4)	15.8% (13.6, 21.7)
30-44	15.3% (13.1, 21.1)	20.2% (17.5, 27.3)	21.4% (18.5, 28.7)
15-29	29.7% (26.1, 38.4)	32.1% (28.3, 41.1)	35.9% (31.8, 45.2)

Hyperparathyroidism

eGFR	A1	A2	A3
>90	5.8% (4.2, 7.7)	6.8% (4.9, 8.9)	10.7% (7.9, 13.8)
75-89	7.3% (5.3, 9.6)	7.2% (5.2, 9.4)	7.3% (5.4, 9.6)
60-74	8.6% (6.3, 11.2)	9.5% (7.0, 12.4)	15.7% (11.8, 20.1)
45-59	13.6% (10.1, 17.5)	18.7% (14.1, 23.6)	16.9% (12.6, 21.4)
30-44	22.0% (16.8, 27.5)	28.6% (22.2, 35.0)	43.5% (35.4, 50.8)
15-29	40.1% (32.3, 47.3)	65.2% (57.2, 71.5)	72.5% (65.3, 77.9)

Hyperphosphatemia

eGFR	A1	A2	A3
>90	5.1% (2.2, 5.8)	4.8% (2.1, 5.4)	6.4% (2.8, 7.2)
75-89	6.0% (2.6, 6.8)	6.1% (2.7, 6.8)	5.7% (2.5, 6.5)
60-74	7.1% (3.1, 8.0)	8.3% (3.7, 9.3)	5.9% (2.6, 6.6)
45-59	10.2% (4.6, 11.4)	12.3% (5.6, 13.7)	9.9% (4.5, 11.2)
30-44	17.3% (8.2, 19.3)	12.7% (5.8, 14.1)	18.2% (8.6, 20.2)
15-29	43.7% (24.8, 46.9)	28.9% (14.7, 31.6)	52.2% (31.7, 55.4)

Hypocalcemia

eGFR	A1	A2	A3
>90	12.1% (6.3, 18.6)	7.1% (3.6, 11.2)	5.8% (2.9, 9.2)
75-89	8.8% (4.5, 13.7)	6.3% (3.2, 10.1)	3.9% (1.9, 6.2)
60-74	6.8% (3.4, 10.7)	5.6% (2.8, 9.0)	4.7% (2.4, 7.6)
45-59	3.1% (1.5, 5.0)	4.3% (2.1, 6.9)	3.8% (1.9, 6.1)
30-44	4.7% (2.3, 7.6)	2.5% (1.2, 4.0)	3.2% (1.6, 5.2)
15-29	12.0% (6.2, 18.4)	8.8% (4.5, 13.8)	8.8% (4.5, 13.8)

The adjusted prevalence of each abnormality at each eGFR and albuminuria stage was computed as follows: first, we converted the random-effects weighted adjusted mean odds at the reference point (eGFR 50 ml/min/1.73m^2) into a prevalence estimate. To the reference estimate, we applied the meta-analyzed odds ratios to obtain prevalence estimates at eGFR 95, 80, 65, 35, and 20 ml/min/1.73 m^2 for each stage of albuminuria. The prevalence estimates were adjusted to 60

years old, half male, non-black, 20% history of CVD, 40% ever smoker, and body-mass index 30 kg/m^2. The 25th and 75th percentiles for predicted prevalence were the estimates from individual cohorts in the corresponding percentiles of the random-effects weighted distribution of adjusted odds. This was done separately for each abnormality.

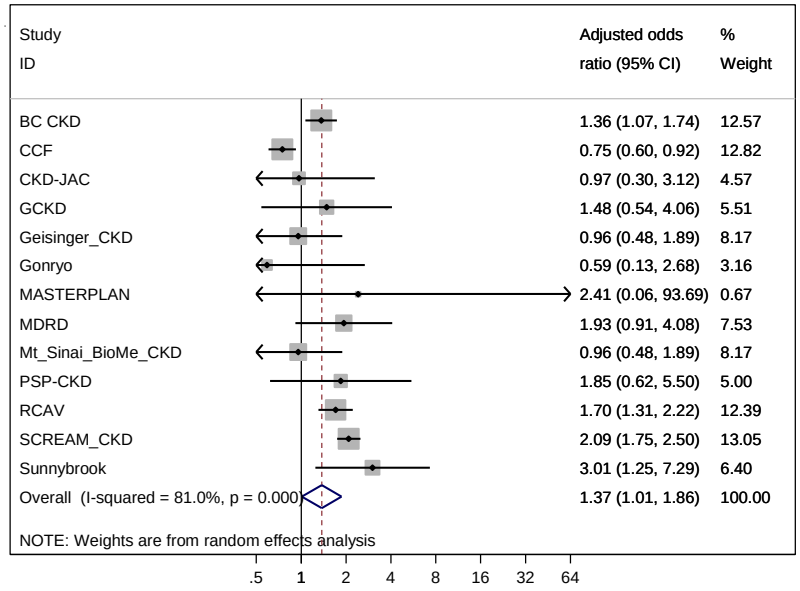
Note that the cohorts included in the analyses of each abnormality may differ based on data availability. For example, the cohort in the 25^{th} percentile of anemia may not be the same as the cohort in the 25^{th} percentile of hyperparathyroidism.

Color coding is based on odds ratio quartile within each abnormality. Bold red font indicates the reference cell.

Definitions of each abnormality are as follows: Anemia: Hgb: male<13 g/dL, female<12 g/dL; Hct: male<39%, female<36%. Hyperkalemia: potassium >5 mmol/L. Acidosis: bicarbonate <22 mmol/L. Hyperparathyroidism: intact PTH >65 pg/mL. Hyperphosphatemia: phosphorus >4.5 mg/dL. Hypocalcemia: corrected calcium <8.5 mg/dL.

Figure S21. Forest plot of adjusted odds ratio of hypertension at (A) eGFR 30 vs. 50 ml/min/1.73m^2 at stage A1 in CKD cohorts and (B) eGFR 50 vs. 80 ml/min/1.73m^2 at stage A1 in general population and high risk cohorts

A



B

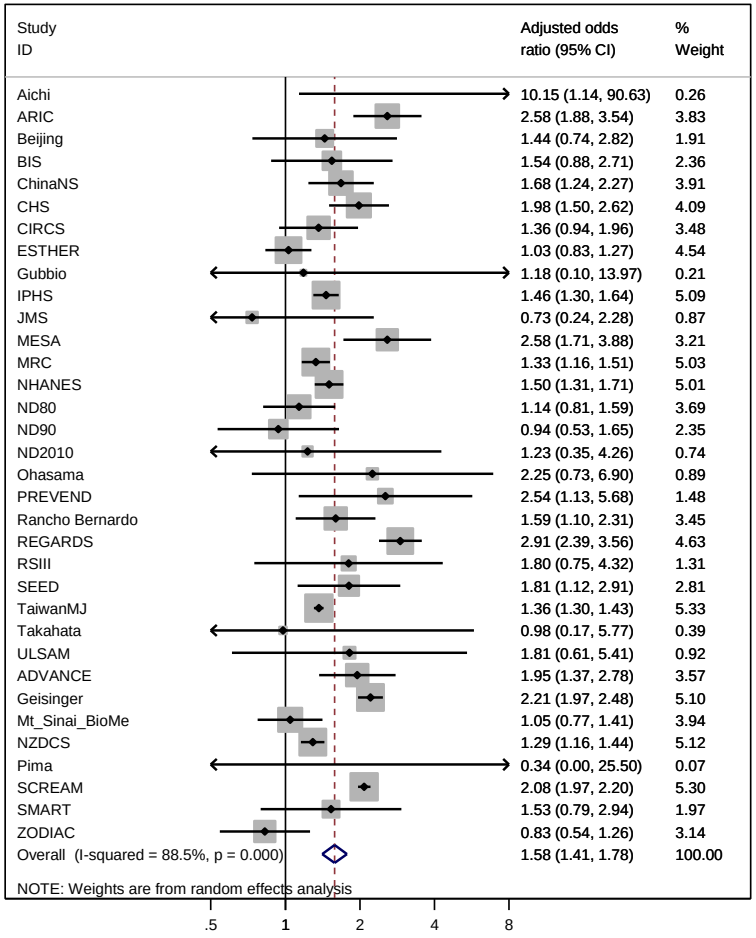


Figure S22. Association between eGFR and hypertension by (A) diabetes, (B) age, (C) sex, (D) age and sex, and (E) race in CKD cohorts

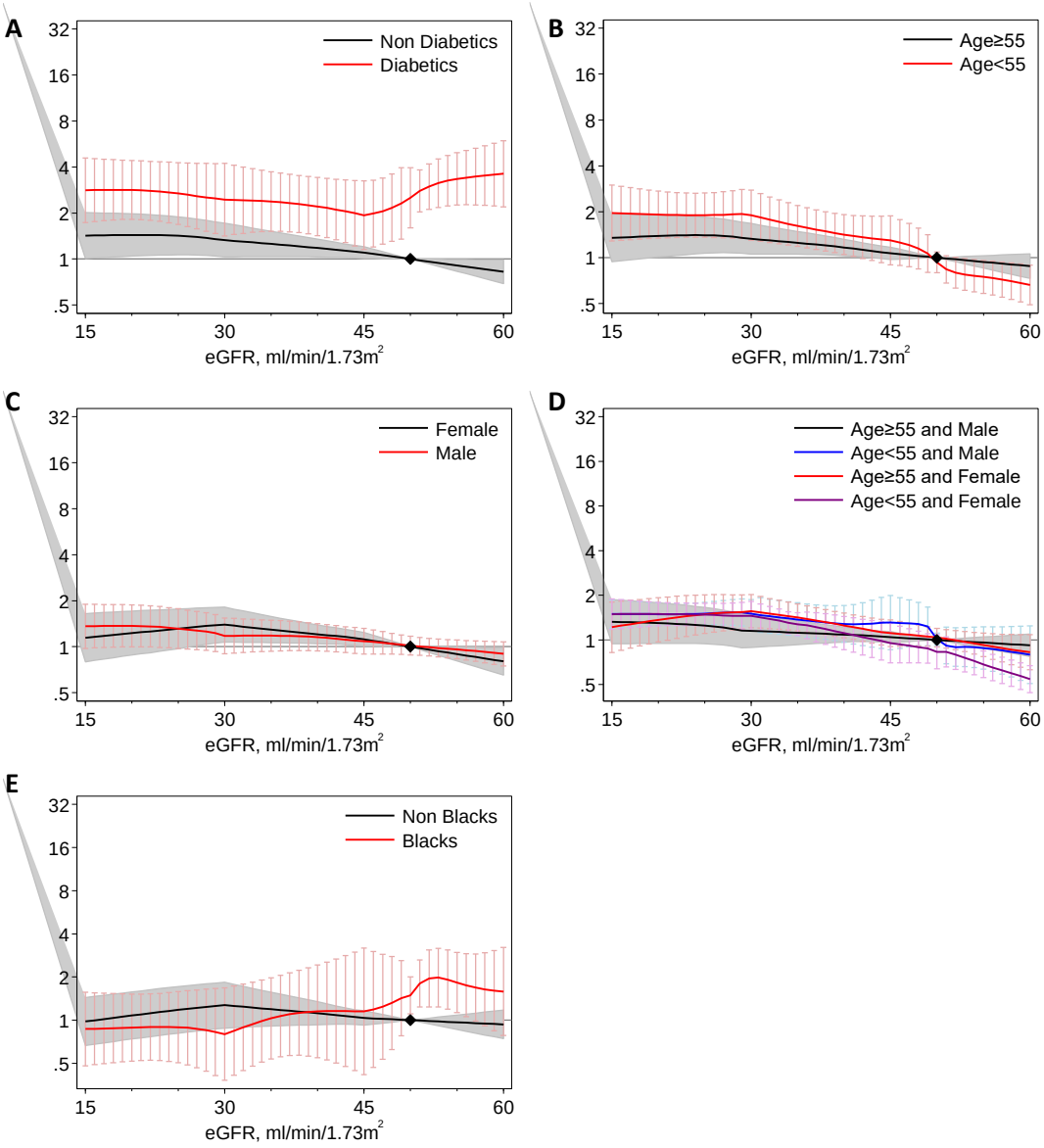
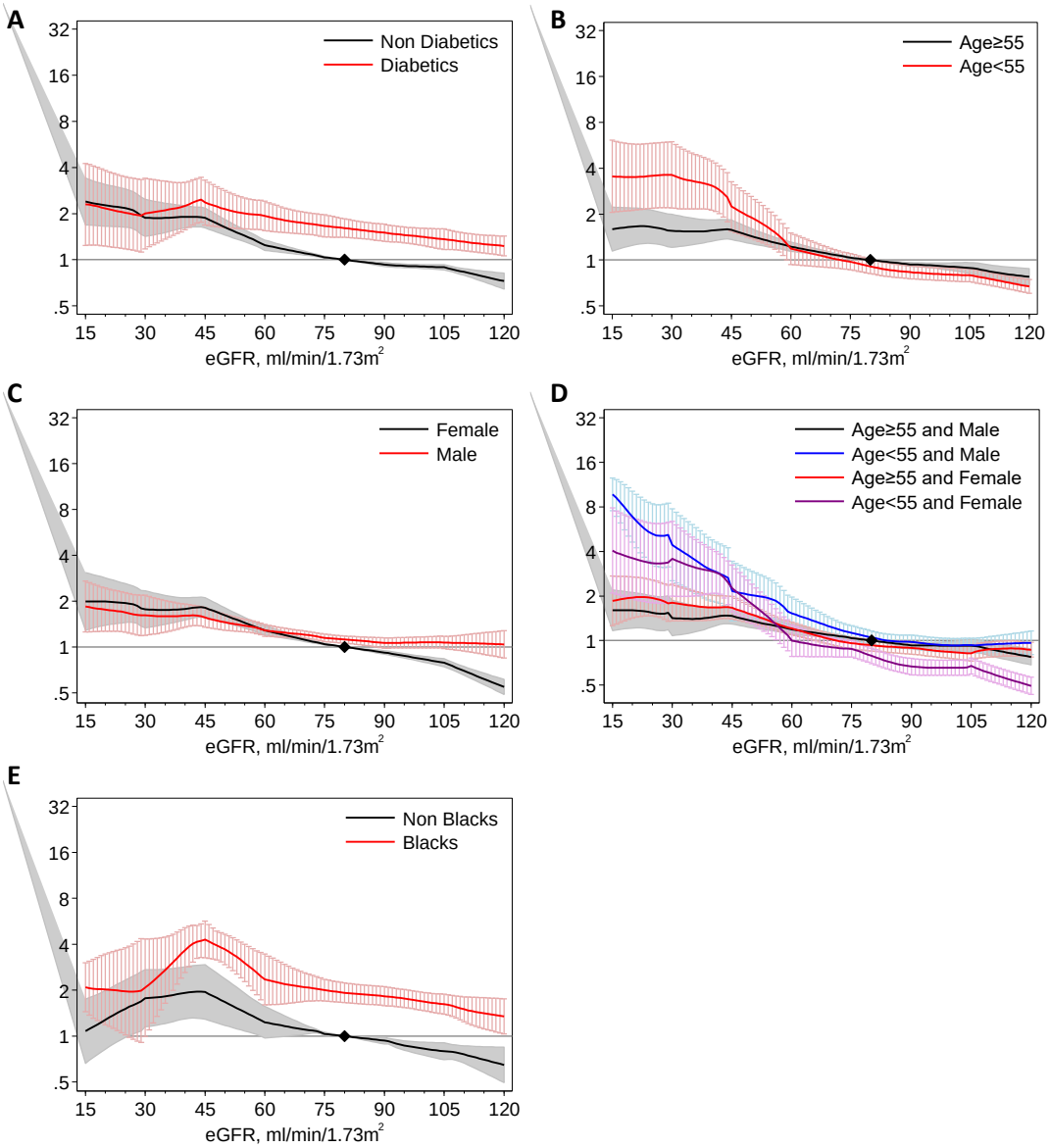


Figure S23. Association between eGFR and hypertension by (A) diabetes, (B) age, (C) sex, (D) age and sex, and (E) race in general population and high risk cohorts



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