Supplementary Online Content

Appendix 1. 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[1]
ADVANCE:	The Action in Diabetes and Vascular Disease: Preterax and Diamicron Modified Release Controlled Evaluation (ADVANCE) trial[2]
AKDN:	Alberta Kidney Disease Network[3]
ARIC:	Atherosclerosis Risk in Communities Study[4]
BC CKD	British Columbia CKD Study[5]
CCF:	Cleveland Clinic CKD Registry Study[6]
CHS:	Cardiovascular Health Study[7]
CRIB:	Chronic Renal Impairment in Birmingham[8]
Geisinger:	Geisinger CKD Study[9]
GLOMMS-1:	Grampian Laboratory Outcomes, Morbidity and Mortality Studies – 1[10]
KP Hawaii:	Kaiser Permanente Hawaii Cohort[11]
KPNW:	Kaiser Permanente Northwest[12]
Maccabi:	Maccabi[13]
MASTERPLAN:	Multifactorial Approach and Superior Treatment Efficacy in Renal Patients with the Aid of a Nurse Practitioner[14]
MDRD:	Modification of Diet in Renal Disease Study[15]
MRFIT:	Multiple Risk Factor Intervention Trial[16]
Nephro Test:	NephroTest Study[17]
NZDCS:	New Zealand Diabetes Cohort Study[18]
Pima:	Pima Indian Study[19]
RENAAL:	Reduction of Endpoints in Non-insulin Dependent Diabetes Mellitus with the Angiotensin II Antagonist Losartan[20]
Sunnybrook:	Sunnybrook Cohort[21]
VA CKD:	Veterans' Administration CKD Study[22]

Appendix 2. Data analysis overview and analytic notes for some of individual studies.

2.1 Overview:

As previously reported,[23, 24] participating studies were asked to prepare a dataset with approximately 20 variables (event variables and dates and several predictors including age, sex, race, and repeated laboratory and vital data including serum creatinine measurement to estimate change in eGFR over the baseline period). Because the analysis used the CKD-EPI formula, the race variable only distinguished between black and non-black, under the assumption that this formula performs reasonably well in other ethnic groups. To minimize heterogeneity, we circulated guidelines for definitions of variables (e.g. hypertension, diabetes, smoking) and dataset preparation.

Prevalent cardiovascular disease (CVD) was defined as history of myocardial infarction, coronary revascularization, heart failure or stroke. Hypertension was defined as a blood pressure ≥ 140/90 mmHg or taking anti-hypertensive medication. Diabetes mellitus was defined as hemoglobin A1c ≥6.5%, fasting blood glucose ≥7.0 mmol/l, non-fasting glucose ≥11.1 mmol/l, taking glucose lowering drugs, or self-reported diabetes.

Analyses were restricted to subjects aged 18 years or older. We instructed studies not to impute the two key kidney measures, eGFR (i.e., age, gender, race, and serum creatinine) and albuminuria. Zero values of albumin-to-creatinine ration (ACR) were treated as 0.1 for log transformation. For other covariates in the models (total cholesterol, systolic blood pressure, diabetes mellitus, and prevalent cardiovascular disease) with missing values we imputed with the mean value of the covariate only if the missing values were less than 50%. If missing values were more than 50% in some covariates, we excluded those covariates from the models. Values of covariates, e.g., systolic blood pressure <50 or >300 mmHg were excluded from the analysis. Multiple imputation was not feasible in all studies but a sensitivity analysis in cohorts with data at Hopkins where multiple imputation was feasible showed very similar results (section 2.5). Multiple imputation was conducted for missing data on total cholesterol, systolic blood pressure, diabetes mellitus and prevalent cardiovascular disease with 20 imputations using the *mi* command in Stata.

Out of 29 studies with repeated serum creatinine, 7 studies (CARE FOR HOMe, ESTHER, HUNT, Okinawa, PREVEND, Rancho Bernardo, ULSAM) did not have enough data within baseline periods of interest for the present study. For 16 of the 22 studies in the present study, analysis was done at the Data Coordination Center at Johns Hopkins University; for the remainder the standard code was run in-house at individual study centers, with the output returned to the Data Coordinating Center. The code was written in STATA by the Data Coordinating Center. The standard code was designed to automatically save all output needed for the meta-analysis. The Data Coordinating Center then pooled the estimates across studies using STATA. Studies with fewer than 10 outcomes in any stratum for a particular analysis were excluded from that analysis.

Studies were instructed to standardize and calibrate their serum creatinine to their best ability and report the method of standardization. The reported creatinine calibration allows grouping studies into studies that reported using an IDMS traceable method or conducted some serum creatinine calibration to IDMS traceable methods (AKDN, CCF, Geisinger, GLOMMS-1, KPNW, Maccabi, NephroTest, NZDCS, VA CKD) and studies where the creatinine standardization was not done (AASK, ADVANCE, ARIC, British Columbia CKD, CHS, CRIB, KP Hawaii, MASTERPLAN, MDRD, MRFIT, Pima, RENAAL, Sunnybrook). Retrospective assessment of creatinine calibration without direct collection of laboratory data is limited since substantial creatinine calibration differences have been documented even within a single laboratory using the same method over time.

Piecewise-linear splines were used to allow for non-linear association in a manner that still allows for a simple interpretation of the association within each segment and transparently shows changes in slope at clinically interpretable points. Estimates and standard errors for each point are the combination of all terms between that point and the reference point with covariances used for standard error estimates. For points in the same linear segment as the reference points statistical significance compared to the reference point is only dependent on the statistical significance of the slope for that segment. If the slope is statistically significant, all points on the segment will be statistically significant since smaller effect sizes near the reference point have proportionately small standard errors and the same statistical significance test.

Adjusted weighted average absolute risk was calculated using the weighted average baseline risk and meta-analyzed hazard ratios. Baseline risk (the risk when all the covariates are zero) was calculated in each cohort for the following combination of covariates after centering the continuous covariates: age at 60 year, non-black, male, 0% change in eGFR, a first eGFR of 50 ml/min/1.73 m^2 (60 for high eGFR stratum), a systolic blood pressure of 130 mmHg, a total cholesterol of 5 mmol/L, no history of diabetes or CVD. These baseline risks for 1-y follow-up after baseline period across cohorts were averaged with weights based on square root of the number of events. Successive times multiply by the ratio of that time and the previous time (e.g., 3 year risk vs. 1 year risk) to obtain consistent estimates despite fewer cohorts having longer follow-up.

The pooled HRs in this meta-analysis should be interpreted as the average hazard ratio over follow-up time acknowledging that some variation in the hazard ratio over time may exist within individual studies.

2.2 Notes for individual studies:

CKD cohorts:

AASK: This study is an intervention study which includes African American participants only. All participants were free of diabetes.

BC CKD: Includes patients referred to nephrologists and maintained in follow-up practice or with eGFR <60 ml/min/1.73m^2 at enrollment. Total cholesterol and systolic blood pressure were available in 87% and 62% of participants, respectively.

CCF: Includes patients who had at least one face-to-face outpatient encounter with a Cleveland Clinic health care provider and (1) had two eGFR < 60 ml/min/1.73m^2 90 days apart and/or (2) were patients with International Classification of Diseases (ICD-9) diagnosis codes for various kidney diseases. Total cholesterol and systolic blood pressure were available in 69% and 91% of participants, respectively. Albuminuria was available in 35% of participants.

CRIB: This study includes hospital nephrology outpatients with creatinine >130 μmol/L. Serum creatinine was repeated two years apart and this cohort could contribute to 2-y baseline period analysis only.

Geisinger: This study includes all Geisinger primary care recipients, 18 years or older as of index date, and who have CKD, defined as two or more outpatient eGFR values < 60 by CKD-EPI equation. Covariates obtained most closely to index date within a past year were included in models. Total cholesterol and systolic blood pressure were available in 74% and 94% of participants, respectively. Albuminuria was available in 22% of participants.

GLOMMS-1: This study included adult patients that resided in Grampian with abnormal renal function tests measured from January to June 2003 (creatinine >150 μmol/L for men and 130 μmol/L for women). This study did not collect data on use of anti-diabetic or anti-hypertensive medication, total cholesterol, systolic or diastolic blood pressure. Diabetes and hypertension status were coded based on hospital physician or general practitioner diagnosis recorded in case notes. Albuminuria was available in 57% of participants. The ethnicity of the Grampian population is relatively homogenous with overall 98.3% of males and 98.4% of females being white. Indians account for 0.2% of the population, Pakistani and other South Asian individuals account for 0.3%, Chinese 0.3% and 0.8% are recorded as other.[25]

KPNW: This study included patients that were HMO members with CKD stage 3 or 4 without a history of renal replacement therapy. This study defined diabetes using their own clinical tool that includes diagnosis codes, treatment codes, and laboratory values and has not collected use of anti-diabetic medications. Total cholesterol and systolic blood pressure were available in 45% and 88% of participants, respectively. Not enough participants with ESRD events had repeated creatinine in 3-year window.

MASTERPLAN: This study measured ACR in patients with albuminuria in the low range, PCR in patients with overt proteinuria. Thus, for those participants with only ACR, PCR was imputed by ACR * 1.5.

MDRD: This clinical trial has not collected use of anti-diabetic or anti-hypertensive medications, use of statins, or hypercholesterolemia.

NephroTest: This study includes nephrologist referred patients with diagnosed CKD stages 1-5. Systolic blood pressure was available in 95% of participants.

RENAAL: This was a clinical trial comparing the effect of angiotensin receptor blocker vs. placebo regarding the prevention of CKD progression in those with diabetic nephropathy. All participants had diabetes.

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. Total cholesterol and systolic blood pressure were available in 29% and 6% of participants, respectively. Albuminuria was available in 30% of participants.

VA CKD: Includes all United States veterans with stable CKD stage 1-5 but not on dialysis. Total cholesterol and systolic blood pressure were available in 67% and 44% of participants, respectively. Albuminuria was available in 16% of participants.

Other cohorts:

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

AKDN: Although this study has not collected information on race, the proportion of blacks in the province of Alberta is considered <1%[3]. Other variables that were not collected in this study are systolic blood pressure, total cholesterol concentration, and smoking. Restricted analyses to those with at least 3 repeated serum creatinine measurement. Albuminuria was available in 88% of participants.

ARIC: Serum creatinine was repeated three years apart and thus this cohort could contribute to 3-y baseline period analysis only. Albuminuria was not available in this time frame.

CHS: This study consists of participants only aged 65 or older. Serum creatinine was repeated three years apart and thus this cohort could contribute to 3-y baseline period analysis only. Albuminuria was not available in this time frame.

KP Hawaii: In this study for participants with only ACR, PCR was imputed by ACR * 1.5. Albuminuria was available in 33% of participants. Total cholesterol and systolic blood pressure were available in 77% and 94% of participants, respectively.

Maccabi: Total cholesterol and systolic blood pressure were available in 88% and 77% of participants, respectively. Albuminuria available in 11% of participants.

MRFIT: This study is an intervention study which includes men at above risk (study specified) for coronary heart disease based on higher levels of blood pressure, serum cholesterol, and cigarette use. Men were excluded if their serum creatinine was > 2.0 mg/dl. The study only included men.

NZDCS: All participants had a diagnosis of diabetes according to primary care provider.

Pima: This study consists entirely of Pima and the closely-related Tohono O'odham Indians. ACR was measured in a spot urine specimen. History of cardiovascular disease was not recorded in this study. Serum creatinine was repeated two and three years apart and thus this cohort could not contribute to 1-y baseline period analysis. Majority of participants in this study had a baseline eGFR≥60.

Appendix 3. Acknowledgements and funding for collaborating cohorts.

Study	List of sponsors
AASK	NIDDK
ADVANCE	National Health and Medical Research Council of Australia program grant 571281; Servier
AKDN	Canadian Institutes of Health Research; Alberta Innovates - Health Solutions; Kidney Foundation of Canada
ARIC	The Atherosclerosis Risk in Communities Study is carried out as a collaborative study supported by National Heart, Lung, and Blood Institute contracts (HHSN268201100005C, HHSN268201100006C, HHSN268201100007C, HHSN268201100008C, HHSN268201100009C, HHSN268201100010C, HHSN268201100011C, and HHSN268201100012C). The authors thank the staff and participants of the ARIC study for their important contributions.
BC Cohort	BC Provincial Renal Agency, an Agency of the Provincial Health Services Authority in collaboration with University of British Columbia.
CCF	Supported by an unrestricted educational grant from Amgen to the Department of Nephrology and Hypertension.
CHS	This research was supported by contracts HHSN268201200036C, HHSN268200800007C, N01 HC55222, N01HC85079, N01HC85080, N01HC85081, N01HC85082, N01HC85083, N01HC85086, and grant U01HL080295 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.
CRIB	British Renal Society Project Grant Award British Heart Foundation Project Grant Award.
Geisinger	Geisinger Clinic
GLOMMS-1	Chief Scientist Office CZH/4/656
KP Hawaii	N/A
KPNW	Amgen
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
MRFIT	The Multiple Risk Factor Intervention Trial was contracted by the National Heart, Lung, and Blood Institute (NHLBI), National Institutes of Health (NIH), Bethesda, Md. Follow-up after the end of the trial was supported with NIH/NHLBI grants R01-HL-43232 and R01-HL-68140. The principal investigators and senior staff of the clinical centers, coordinating center, other support centers and key committees are listed in a previous report (JAMA 1982; 248: 1465-1477).
NephroTest	The NephroTest CKD cohort study is supported by grants from: Inserm GIS-IReSP AO 8113LS TGIR; French Ministry of Health AOM 09114 and AOM 10245; Inserm AO 8022LS; Agence de la Biomédecine R0 8156LL, AURA, and Roche 2009-152-447G. The Nephrotest initiative was also sponsored by unrestricted grants from F.Hoffman-La Roche Ltd. The authors thank the collaborators and the staff of the NephroTest Study: François Vrtovsnik,

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NZDCS	The New Zealand Diabetes Cohort study was supported by the New Zealand Health Research Council and Auckland Medical Research Foundation and the New Zealand Society for the Study of Diabetes.
Pima	This work was supported by the Intramural Research Program of the National Institute of Diabetes and Digestive and Kidney Diseases.
RENAAL	The RENAAL trial was supported by Merck and Company.
Sunnybrook	
VA CKD	This study was supported by resources from the US Department of Veterans Affairs. Support for VA/CMS data is provided by the Department of Veterans Affairs, Veterans Health Administration, Office of Research and Development, Health Services Research and Development, VA Information Resource Center (Project Numbers SDR 02-237 and 98-004) Opinions expressed in this paper are those of the authors' and do not represent the official opinion of the US Department of Veterans Affairs.

Supplemental Table 1. 3-year baseline period characteristics by slope category in other cohorts.

		Slope <-5ml/y						Slope ≥-5ml/y to ≤5ml/y						Slope >5ml/y					
Study	Total N	%N	% DM	% CVD	eGFR First	eGFR Last	% Alb*	%N	% DM	% CVD	eGFR First	eGFR Last	% Alb*	%N	% DM	% CVD	eGFR First	eGFR Last	% Alb*
Other cohorts																			
ADVANCE	9402	20	100	30	85 (16)	59 (15)	33	72	100	28	78 (17)	76 (17)	30	9	100	28	66 (13)	88 (11)	30
AKDN	230470	11	12	7	90 (20)	68 (21)		84	8	5	84 (20)	82 (20)		4	8	7	71 (18)	92 (17)	
ARIC	13833	20	18	12	100 (14)	78 (15)		78	15	11	95 (14)	91 (14)		3	22	12	76 (12)	97 (12)	
CHS	4012	6	25	70	77 (13)	57 (14)		86	16	63	68 (15)	69 (15)		8	16	64	61 (11)	80 (10)	
KP Hawaii	13350	13	84	24	80 (22)	58 (24)	67	81	72	22	76 (23)	75 (24)	49	5	65	22	67 (19)	86 (18)	47
Maccabi	560426	9	17	4	100 (21)	79 (22)	28	87	15	3	96 (20)	94 (20)	17	4	10	3	85 (17)	104 (18)	17
MRFIT	11306	6	10	8	94 (12)	74 (13)	7	89	10	4	88 (13)	88 (13)	5	5	15	4	78 (9)	97 (9)	3
NZDCS	4388	26	100	17	86 (22)	59 (22)	15	69	100	11	76 (21)	73 (21)	8	4	100	11	66 (20)	87 (19)	7
Pima	786	8	54	0	115 (28)	87 (34)	57	89	32	0	123 (15)	121 (15)	20	3	31	0	110 (19)	132 (20)	12
Total	**847973**	**10**	**20**	**7**	**96 (21)**	**74 (22)**	**29**	**86**	**15**	**4**	**92 (21)**	**90 (21)**	**17**	**4**	**13**	**5**	**80 (19)**	**99 (18)**	**17**

Slope <-5ml/yr – declining eGFR group with an annualized eGFR slope of less than minus 5 ml/min/1.73m^2/year; Slope ≥-5ml/y to ≤5ml/y – stable eGFR group with an annualized eGFR greater than or equal to minus 5 and less than or equal to plus 5 ml/min/1.73m^2/year; Slope >5ml/yr – increasing eGFR group with an annualized eGFR slope of greater than plus 5 ml/min/1.73m^2/year

DM: diabetes mellitus; CVD: cardiovascular disease; eGFR: estimated glomerular filtration rate

*Proportion of participants with urine albumin-to-creatinine ratio ≥30 mg/g or urine protein-to-creatinine ratio ≥50 mg/g or dipstick protein ≥1+

Supplemental Table 2. 3-year baseline period events by slope category in other cohorts

	Slope <-5ml/y				Slope ≥-5ml/y to ≤5ml/y				Slope >5ml/y			
Cohorts (n=9)	**N**	**ESRD events**	**Mean (SD) Follow-up**	**Median # Scre (IQR)**	**N**	**ESRD events**	**Mean (SD) Follow-up**	**Median # Scre (IQR)**	**N**	**ESRD events**	**Mean (SD) Follow-up**	**Median # Scre (IQR)**
Other cohorts												
ADVANCE	1860	17	2 (0)	5 (5-5)	6734	6	2 (0)	5 (5-5)	808	1	2 (0)	5 (5-5)
AKDN	26003	68	1 (1)	5 (3-7)	194160	66	1 (1)	4 (3-6)	10307	3	1 (1)	4 (3-6)
ARIC	2718	128	17 (5)	2 (2-2)	10739	269	17 (5)	2 (2-2)	376	11	17 (5)	2 (2-2)
CHS	240	15	8 (3)	2 (2-2)	3467	44	9 (3)	2 (2-2)	305	1	8 (3)	2 (2-2)
KP Hawaii	1800	53	1 (0)	10 (6-16)	10825	30	1 (0)	8 (6-11)	725	0	1 (0)	8 (5-13)
Maccabi	50304	410	2 (1)	5 (3-7)	486959	344	2 (1)	5 (3-7)	23163	3	2 (1)	4 (3-6)
MRFIT	678	21	20 (6)	4 (4-4)	10062	241	20 (6)	4 (4-4)	566	9	20 (6)	4 (4-4)
NZDCS	1156	64	5 (2)	4 (3-8)	3049	56	6 (1)	4 (3-7)	183	2	6 (2)	4 (3-4)
Pima	63	20	9 (7)	2 (2-2)	697	24	11 (7)	2 (2-2)	26	1	12 (8)	2 (2-2)
Total	**84822**	**796**	**2 (3)**	**5 (5-9)**	**726692**	**1080**	**2 (3)**	**5 (5-5)**	**36459**	**31**	**2 (3)**	**4 (4-7)**

Supplemental Table 3. 3y baseline period characteristics

	Slope <-5ml/y				Slope ≥-5ml/y to ≤5ml/y				Slope >5ml/y			
Study	% N	Age	% Female	% Black	% N	Age	% Female	% Black	% N	Age	% Female	% Black
CKD cohorts												
AASK	14	55 (11)	43	100	82	58 (10)	38	100	4	55 (11)	43	100
BC CKD	13	65 (15)	40	0	84	73 (13)	47	0	3	67 (15)	52	0.5
CCF	10	73 (12)	54	18	85	75 (11)	54	12	6	72 (13)	65	14
CRIB												
Geisinger	12	72 (10)	59	2	77	73 (9)	60	1	11	70 (10)	61	1
GLOMMS 1	6	64 (18)	54	0	88	73 (12)	49	0	6	74 (9)	42	0
KPNW												
MASTERPLAN	8	59 (15)	30	0	90	64 (12)	31	0	1.5	54 (15)	50	0
MDRD	20	49 (12)	42	6	79	56 (12)	38	4	0.6	53 (23)	100	0
NephroTest	11	58 (16)	30	14	85	61 (14)	29	11	4	56 (15)	39	11
RENAAL	42	62 (7)	31	18	58	64 (7)	38	13	0.1	70 (.)	100	0
Sunnybrook	22	61 (17)	40	0	74	65 (17)	43	0	3	57 (19)	52	0
VA_CKD	12	74 (10)	2	15	81	76 (9)	2	9	8	74 (10)	4	11
Subtotal	12	73 (11)	10	14	81	76 (10)	10	9	7	73 (10)	11	10
Other cohorts												
ADVANCE	20	69 (6)	48	0.3	72	69 (6)	39	0.4	9	69 (6)	57	0.2
AKDN	11	59 (17)	65	0	84	60 (15)	59	0	4	56 (17)	61	0
ARIC	20	57 (6)	64	35	78	58 (6)	53	20	3	57 (6)	55	31
CHS	6	76 (6)	71	6	86	75 (5)	56	4	8	75 (5)	58	4
KP Hawaii	13	63 (13)	52	0	81	65 (13)	49	0	5	62 (14)	52	0
Maccabi	9	53 (17)	59	0	87	53 (16)	58	0	4	47 (17)	70	0
MRFIT	6	50 (6)	0	11	89	50 (6)	0	7	5	49 (6)	0	9
NZDCS	26	64 (13)	51	0	69	65 (13)	50	0.07	4	63 (14)	58	0
Pima	8	40 (14)	73	0	89	34 (13)	60	0	3	31 (12)	77	0
Subtotal	10	55 (17)	60	1	86	55 (16)	57	0	4	51 (17)	65	1

Total	10	60 (17)	48	4	85	59 (17)	47	2	5	58 (19)	48	4

Slope <-5ml/yr – declining eGFR group with an annualized eGFR slope of less than minus 5 ml/min/1.73m^2/year; Slope ≥-5ml/y to ≤5ml/y – stable eGFR group with an annualized eGFR greater than or equal to minus 5 and less than or equal to plus 5 ml/min/1.73m^2/year; Slope >5ml/yr – increasing eGFR group with an annualized eGFR slope of greater than plus 5 ml/min/1.73m^2/year

Blank lines for cohorts indicate that the cohorts that did not have enough information in the specified baseline period to contribute to analyses, but are included in the other baseline period analyses.

Supplemental Table 4. 2y baseline period characteristics

	Slope <-5ml/y									Slope ≥-5ml/y to ≤5ml/y									Slope >5ml/y								
Study	% N	Age	% Female	% Black	% DM	% CVD	eGFR First	eGFR Last	% Alb *	% N	Age	% Female	% Black	% DM	% CV D	eGFR First	eGFR Last	% Alb *	% N	Age	% Female	% Blac k	% D M	% CV D	eGFR First	eGFR Last	% Alb *
CKD cohorts																											
AASK	19	55 (12)	33	100	0	54	46 (15)	29 (15)	79	70	57 (10)	39	100	0	50	46 (14)	45 (16)	65	11	57 (11)	45	100	0	57	51 (14)	67 (14)	59
BC CKD	19	66 (14)	42	1	65	13	46 (20)	28 (17)	82	74	72 (13)	47	0	50	15	34 (14)	32 (15)	69	7	68 (14)	53	0.5	51	18	38 (16)	52 (19)	60
CCF	16	74 (12)	55	16	37	30	49 (9)	35 (11)	41	71	75 (11)	54	11	30	28	47 (10)	47 (12)	27	13	72 (12)	60	13	32	27	47 (10)	65 (13)	27
CRIB	11	60 (15)	24	10	19	52	32 (10)	20 (9)		87	63 (15)	36	5	16	43	27 (9)	25 (10)		2	74 (4)	0	0	0	67	29 (12)	80 (77)	
Geisinger	16	72 (10)	58	2	50	38	53 (7)	42 (12)	62	65	72 (9)	59	1	35	24	52 (7)	54 (10)	44	19	70 (10)	62	1	39	28	50 (9)	68 (12)	46
GLOMMS 1	12	66 (17)	48	0	69	47	38 (11)	22 (9)	92	79	73 (11)	48	0	63	49	33 (8)	34 (11)	69	10	73 (12)	54	0	51	52	33 (7)	49 (10)	52
KPNW	34	70 (10)	55	4	53	54	68 (16)	46 (13)	6	54	72 (10)	48	2	45	52	52 (14)	50 (12)	9	13	68 (9)	52	3	46	45	48 (12)	58 (13)	7
MASTERPLAN	14	58 (14)	28	0	33	32	43 (18)	29 (17)	54	83	63 (12)	31	0	26	29	39 (15)	37 (16)	39	3.5	61 (14)	35	0	20	40	45 (16)	58 (15)	12
MDRD	31	50 (12)	37	9	6	12	38 (13)	24 (12)	89	67	55 (12)	40	5	3	12	36 (13)	33 (14)	80	2.1	60 (8)	46	15	0	15	41 (9)	55 (11)	69
NephroTest	19	58 (15)	40	11	29	20	52 (22)	36 (22)	95	73	61 (15)	30	11	24	17	40 (17)	38 (18)	97	8	61 (15)	36	11	13	17	46 (16)	61 (18)	91
RENAAL	49	62 (7)	33	17	100	44	44 (13)	26 (13)	99	50	63 (7)	39	13	100	45	41 (13)	37 (14)	97	1.4	59 (6)	24	29	100	41	49 (16)	58 (19)	93
Sunnybrook	29	62 (17)	42	0	47	49	69 (29)	50 (28)	82	62	65 (17)	42	0	39	51	58 (31)	57 (31)	79	9	59 (19)	52	0	37	49	57 (28)	75 (28)	73
VA_CKD	18	74 (10)	3	12	56	45	61 (17)	46 (17)	66	69	76 (9)	2	8	44	42	53 (15)	53 (15)	57	14	74 (10)	3	9	42	42	54 (12)	69 (14)	51
Subtotal	18	74 (11)	9	12	55	43	60 (17)	45 (17)	65	69	75 (10)	9	8	43	40	52 (15)	52 (16)	56	14	74 (10)	10	9	41	40	53 (12)	68 (14)	50
Other cohorts																											
ADVANCE	26	68 (6)	46	0.2	100	29	83 (16)	63 (16)	31	60	68 (6)	39	0.3	100	27	78 (17)	77 (17)	30	13	68 (6)	50	0.7	100	26	68 (14)	87 (13)	30
AKDN	18	57 (17)	63	0	10	7	90 (20)	73 (20)		71	59 (15)	58	0	8	5	84 (20)	83 (20)		11	56 (16)	60	0	8	6	74 (18)	91 (18)	
ARIC																											
CHS																											

KP Hawaii	21	62 (14)	52	0	75	22	81 (22)	64 (23)	57	65	64 (13)	49	0	62	20	75 (23)	75 (23)	46	14	62 (13)	54	0	49	20	69 (18)	84 (18)	40
Maccabi	16	50 (17)	58	0	13	3	101 (21)	85 (21)	25	73	52 (16)	58	0	14	2	97 (20)	96 (20)	18	12	49 (17)	65	0	12	3	86 (18)	101 (18)	17
MRFIT	17	49 (6)	0	9	7	4	95 (11)	81 (12)	5	73	50 (6)	0	6	8	3	88 (13)	88 (13)	4	9	49 (6)	0	10	10	3	79 (11)	95 (12)	4
NZDCS	32	63 (13)	53	0	100	10	84 (21)	62 (23)	13	58	64 (13)	49	0.10	100	9	76 (21)	74 (21)	8	10	62 (14)	56	0	100	8	68 (19)	86 (21)	7
Pima	13	36 (15)	60	0	42	0	122 (23)	104 (30)	36	81	34 (14)	63	0	29	0	122 (15)	121 (15)	18	6	35 (15)	61	0	37	0	111 (20)	126 (20)	27
Subtotal	17	53 (17)	59	0	17	5	96 (21)	79 (22)	26	72	54 (16)	57	0	14	4	92 (21)	91 (21)	19	11	52 (17)	62	0	13	4	82 (19)	97 (19)	18
Total	17	59 (18)	43	4	28	17	85 (26)	69 (26)	42	71	60 (17)	43	2	22	14	81 (26)	80 (26)	32	12	59 (18)	45	3	23	16	72 (22)	88 (22)	31

Slope <-5ml/yr – declining eGFR group with an annualized eGFR slope of less than minus 5 ml/min/1.73m^2/year; Slope ≥-5ml/y to ≤5ml/y – stable eGFR group with an annualized eGFR greater than or equal to minus 5 and less than or equal to plus 5 ml/min/1.73m^2/year; Slope >5ml/yr – increasing eGFR group with an annualized eGFR slope of greater than plus 5 ml/min/1.73m^2/year

DM: diabetes mellitus; CVD: cardiovascular disease; eGFR: estimated glomerular filtration rate; alb: albuminuria

*Proportion of participants with urine albumin-to-creatinine ratio ≥30 mg/g or urine protein-to-creatinine ratio ≥50 mg/g or dipstick protein ≥1+

Blank lines for cohorts indicate that the cohorts that did not have enough information in the specified baseline period to contribute to analyses, but are included in the other baseline period analyses.

Supplemental Table 5. 1y baseline period characteristics

	Slope <-5ml/y									Slope ≥-5ml/y to ≤5ml/y									Slope >5ml/y								
Study	% N	Age	% Female	% Black	% DM	% CVD	eGFR First	eGFR Last	% Alb *	% N	Age	% Female	% Black	% DM	% CVD	eGFR First	eGFR Last	% Alb *	% N	Age	% Female	% Black	% DM	% CVD	eGFR First	eGFR Last	% Alb *
CKD cohorts																											
AASK	26	56 (11)	35	100	0	50	44 (15)	34 (16)	74	52	56 (11)	40	100	0	50	46 (15)	45 (15)	65	23	56 (10)	41	100	0	54	48 (13)	59 (14)	63
BC CKD	30	68 (14)	43	0	57	12	41 (19)	30 (17)	76	54	72 (13)	45	0	48	12	33 (14)	32 (14)	69	17	69 (13)	50	0.3	47	14	36 (15)	47 (17)	62
CCF	26	74 (12)	55	14	31	25	49 (10)	39 (11)	38	43	74 (11)	53	11	27	25	46 (11)	47 (11)	28	31	72 (12)	57	12	27	25	48 (10)	60 (13)	25
CRIB																											
Geisinger	23	71 (10)	58	1	42	29	53 (7)	44 (10)	58	40	71 (10)	58	1	33	20	52 (8)	54 (9)	45	36	70 (10)	60	1	37	22	50 (9)	64 (11)	46
GLOMMS 1	25	69 (15)	44	0	66	48	36 (11)	26 (11)	83	56	73 (12)	49	0	62	49	32 (8)	32 (9)	67	18	72 (13)	49	0	56	52	34 (8)	45 (10)	56
KPNW	36	71 (10)	59	3	44	49	60 (17)	46 (15)	6	37	72 (10)	53	2	37	39	46 (15)	46 (15)	11	27	70 (9)	56	4	41	45	48 (14)	59 (16)	8
MASTERPLAN	29	61 (13)	27	0	30	29	43 (17)	34 (16)	47	61	62 (12)	32	0	26	30	37 (14)	36 (15)	40	10.0	62 (13)	33	0	30	31	42 (15)	50 (14)	35
MDRD	44	51 (12)	38	10	7	12	36 (13)	27 (13)	88	50	54 (12)	40	4	4	13	35 (12)	33 (13)	80	6.7	56 (12)	36	12	4	16	40 (12)	49 (13)	58
NephroTest	28	57 (15)	30	12	27	17	44 (20)	33 (17)	96	58	62 (14)	28	9	26	23	39 (17)	38 (18)	96	13	61 (15)	24	12	29	12	42 (18)	52 (19)	95
RENAAL	55	60 (8)	38	16	100	46	41 (13)	29 (13)	99	38	62 (7)	38	12	100	44	40 (12)	39 (13)	99	6.8	61 (8)	21	19	100	43	48 (14)	56 (15)	98
Sunnybrook	37	62 (18)	44	0	40	46	67 (31)	54 (30)	80	41	65 (17)	43	0	38	46	60 (32)	59 (32)	77	22	62 (18)	45	0	34	45	57 (27)	70 (28)	74
VA_CKD	29	75 (10)	2	10	49	44	59 (16)	49 (15)	62	45	76 (9)	2	8	43	43	52 (15)	52 (15)	56	27	74 (10)	3	9	43	42	53 (13)	64 (14)	53
Subtotal	29	74 (10)	8	10	48	42	58 (16)	48 (16)	61	45	75 (10)	8	8	42	40	51 (15)	51 (15)	55	27	74 (10)	10	9	41	40	52 (13)	64 (14)	51
Other cohorts																											
ADVANCE	38	67 (6)	43	0.3	100	26	83 (16)	68 (16)	32	38	68 (6)	39	0.3	100	26	78 (17)	78 (17)	28	25	67 (6)	45	0.4	100	26	70 (15)	84 (15)	31
AKDN	31	57 (16)	60	0	9	6	88 (20)	76 (20)	8	46	58 (16)	58	0	8	5	85 (21)	84 (21)	6	23	56 (16)	60	0	8	6	77 (19)	89 (19)	7
ARIC																											
CHS																											

KP Hawaii	31	62 (14)	49	0	63	21	81 (23)	68 (22)	45	40	63 (14)	51	0	56	20	76 (24)	76 (24)	41	29	61 (14)	52	0	48	18	71 (19)	83 (19)	37
Maccabi	35	51 (17)	58	0	14	3	100 (20)	87 (21)	21	40	50 (16)	57	0	13	2	98 (20)	98 (20)	19	25	49 (17)	61	0	11	2	91 (19)	103 (19)	17
MRFIT	29	48 (6)	0	7	6	2	93 (13)	81 (13)	4	42	48 (6)	0	7	7	2	90 (13)	89 (13)	3	29	48 (6)	0	7	8	2	82 (11)	92 (12)	3
NZDCS	36	62 (13)	49	0	100	8	82 (22)	65 (24)	11	42	63 (13)	50	0.10	100	5	76 (22)	76 (22)	8	21	62 (14)	53	0	100	5	69 (19)	83 (20)	7
Pima																											
Subtotal	33	53 (17)	58	0	16	5	95 (21)	83 (22)	18	42	53 (16)	57	0	14	4	92 (22)	92 (21)	15	25	52 (17)	59	0	13	4	85 (20)	98 (20)	15
Total	32	59 (18)	43	3	26	16	84 (26)	72 (26)	31	43	61 (18)	40	3	24	17	78 (28)	78 (28)	29	25	60 (18)	42	3	23	17	74 (24)	85 (25)	28

Slope <-5ml/yr – declining eGFR group with an annualized eGFR slope of less than minus 5 ml/min/1.73m^2/year; Slope ≥-5ml/y to ≤5ml/y – stable eGFR group with an annualized eGFR greater than or equal to minus 5 and less than or equal to plus 5 ml/min/1.73m^2/year; Slope >5ml/yr – increasing eGFR group with an annualized eGFR slope of greater than plus 5 ml/min/1.73m^2/year

DM: diabetes mellitus; CVD: cardiovascular disease; eGFR: estimated glomerular filtration rate; alb: albuminuria

*Proportion of participants with urine albumin-to-creatinine ratio ≥30 mg/g or urine protein-to-creatinine ratio ≥50 mg/g or dipstick protein ≥1+

Blank lines for cohorts indicate that the cohorts that did not have enough information in the specified baseline period to contribute to analyses, but are included in the other baseline period analyses.

Supplemental Table 6. Events by baseline period

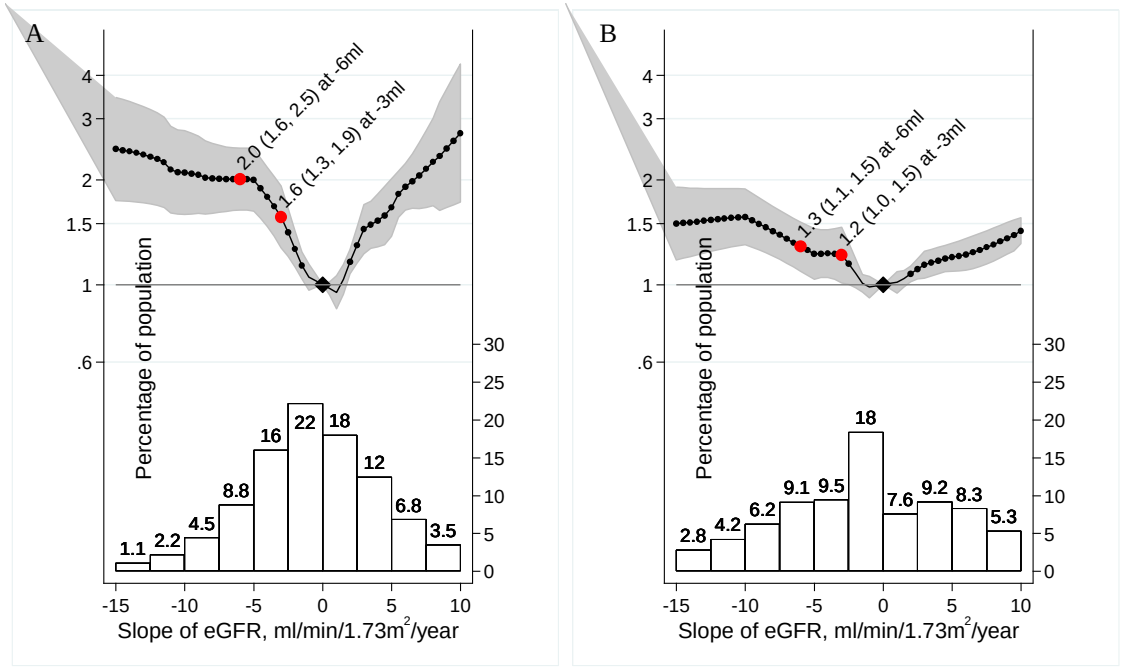
	1y Baseline Period				2y Baseline Period				3y Baseline Period			
Cohorts (n=22)	**N**	**ESRD events**	**Mean (SD) Follow-up**	**Median # Scre (IQR)**	**N**	**ESRD events**	**Mean (SD) Follow-up**	**Median # Scre (IQR)**	**N**	**ESRD events**	**Mean (SD) Follow-up**	**Median # Scre (IQR)**
CKD cohorts												
AASK	1005	296	7 (3)	5 (4-5)	913	251	6 (3)	7 (6-7)	831	206	6 (3)	9 (9-8)
BC CKD	10442	1637	3 (1)	6 (4-8)	8642	1231	2 (1)	10 (8-14)	6274	839	2 (1)	15 (11-20)
CCF	25159	520	2 (1)	3 (2-5)	17133	291	1 (1)	6 (4-9)	10563	111	1 (0.4)	8 (6-12)
CRIB	n/a	n/a	n/a	n/a	190	63	4 (2)	2 (2-2)	n/a	n/a	n/a	n/a
Geisinger	18317	338	4 (2)	4 (3-5)	14870	257	3 (2)	6 (4-9)	11587	179	3 (2)	9 (6-13)
GLOMMS 1	780	80	3 (2)	5 (3-7)	665	57	3 (1)	8 (6-12)	572	42	2 (1)	12 (8-17)
KPNW	1192	89	5 (2)	4 (3-7)	522	31	4 (2)	7 (4-12)	n/a	n/a	n/a	n/a
MASTERPLAN	607	121	4 (1)	5 (4-5)	579	114	4 (1)	8 (7-9)	546	94	3 (1)	11 (9-12)
MDRD	750	546	7 (5)	5 (5-5)	618	444	7 (5)	8 (7-8)	316	236	6 (5)	11 (10-11)
NephroTest	580	124	4 (2)	2 (2-2)	553	95	3 (2)	3 (2-3)	414	67	3 (2)	4 (3-4)
RENAAL	1425	325	2 (1)	6 (6-6)	1201	200	1 (1)	10 (9-10)	885	89	0.4 (0.3)	14 (13-14)
Sunnybrook	3846	248	3 (2)	4 (3-6)	2656	186	3 (2)	7 (5-11)	1888	115	3 (2)	10 (7-15)
VA_CKD	449848	5513	4 (2)	3 (2-4)	342068	3323	3 (1)	5 (4-7)	198374	1278	3 (1)	7 (5-11)
Sub-total	**513951**	**9837**	**2 (1)**	**3 (3-3)**	**390610**	**6543**	**2 (1)**	**5 (5-5)**	**232250**	**3256**	**1 (1)**	**7 (7-7)**
Other cohorts												
ADVANCE	10361	45	4 (1)	3 (3-3)	9999	37	3 (0.5)	4 (4-4)	9402	24	2 (0.4)	5 (5-5)
AKDN	309341	454	2 (1)	2 (2-3)	293214	269	2 (1)	3 (3-4)	230470	137	1 (0.5)	4 (3-6)
ARIC	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	13833	408	16 (4)	2 (2-2)
CHS	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	4012	60	9 (3)	2 (2-2)
KP Hawaii	27561	204	2 (1)	3 (2- 4)	20608	153	1 (0.7)	5 (4, 8)	13350	83	0.7 (0.4)	8 (6, 11)
Maccabi	641986	1023	4 (1)	2 (2-3)	604640	901	3 (1)	3 (3-5)	560426	757	2 (1)	5 (3-7)
MRFIT	11757	277	22 (6)	2 (2-2)	11527	269	21 (6)	3 (3-3)	11306	271	20 (6)	4 (4-4)
NZDCS	15748	518	6 (2)	2 (2-3)	9006	252	6 (2)	3 (3-5)	4388	122	6 (2)	4 (3-7)
Pima	n/a	n/a	n/a	n/a	1606	107	12 (8)	2 (2-2)	786	45	11 (7)	2 (2-2)
Sub-total	**1016754**	**2521**	**4 (3)**	**2 (2-2)**	**950600**	**1988**	**3 (3)**	**3 (3-3)**	**847973**	**1907**	**2 (3)**	**5 (4-5)**
Total	**1530705**	**12358**	**3.1 (2.3)**	**2 (2-3)**	**1341210**	**8531**	**2.4 (2.2)**	**3 (3-5)**	**1080223**	**5163**	**2.0 (2.9)**	**5 (5-5)**

N/A for cohorts indicate that the cohorts that did not have enough information in the specified baseline period to contribute to analyses, but are included in the other baseline period analyses.

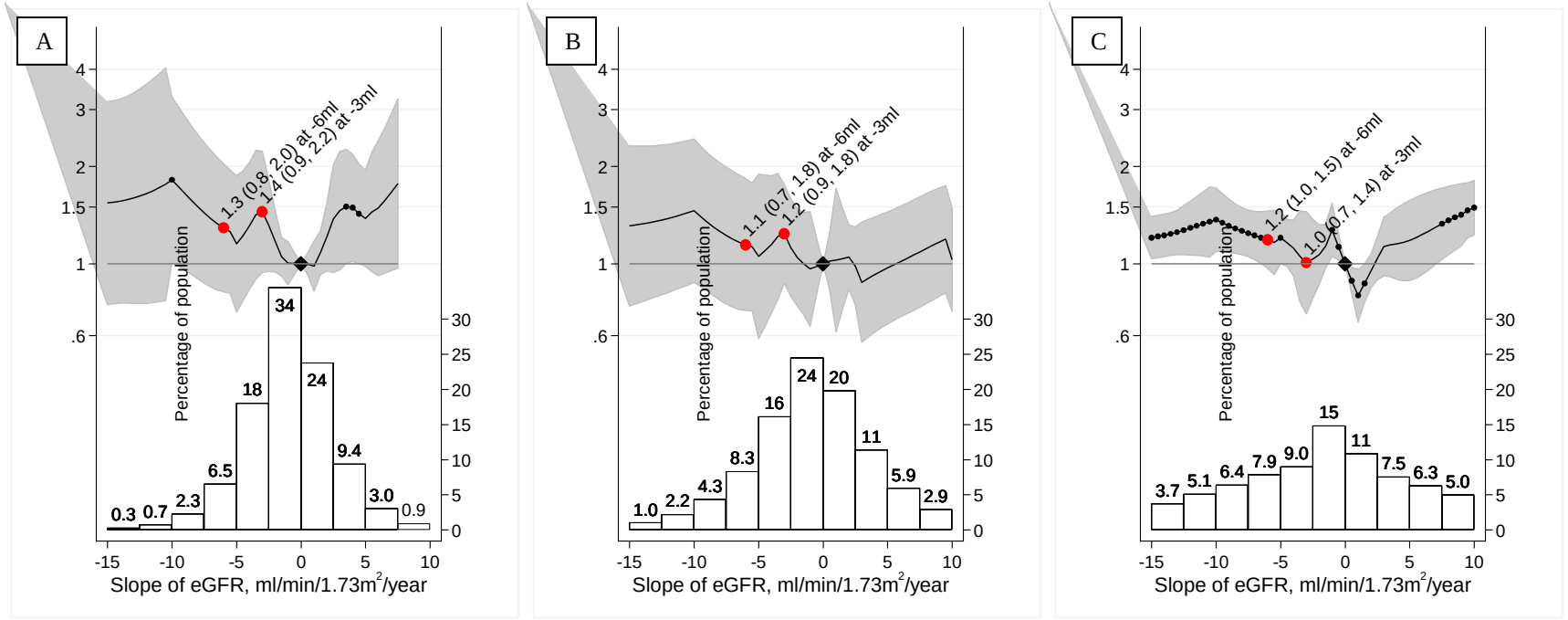
Supplemental Table 7. 1, 3, 5 and 10-year absolute risks of end-stage renal disease associated with slope of eGFR and different levels of last eGFR during a 3-year baseline period.

Follow up time	Last eGFR	6ml decline	4ml decline	2ml decline	Stable	2ml increase	4ml increase	6ml increase
	CKD cohorts							
1 year	20	16%	15%	11%	7.3%			
	35	2.1%	2.0%	1.4%	1.0%	0.89%		
	50	0.28%	0.25%	0.18%	0.13%	0.14%	0.18%	0.20%
3 year	20	45%	42%	32%	22%			
	35	6.9%	6.4%	4.6%	3.2%	2.9%		
	50	0.93%	0.84%	0.59%	0.42%	0.45%	0.58%	0.66%
5 year	20	64%	61%	49%	35%			
	35	12%	11%	7.9%	5.5%	5.0%		
	50	1.6%	1.5%	1.0%	0.73%	0.79%	1.0%	1.1%
10 year	20	90%	88%	79%	63%			
	35	25%	23%	17%	12%	11%		
	50	3.6%	3.3%	2.3%	1.6%	1.8%	2.3%	2.6%
	Other cohorts							
1 year	65	0.010%	0.010%	0.010%	0.006%	0.011%		
	80	0.0057%	0.0055%	0.0056%	0.0058%	0.0063%	0.0061%	0.0057%
3 year	65	0.055%	0.051%	0.053%	0.0343%	0.061%		
	80	0.030%	0.029%	0.030%	0.031%	0.033%	0.033%	0.031%
5 year	65	0.16%	0.15%	0.16%	0.10%	0.18%		
	80	0.091%	0.088%	0.089%	0.094%	0.10%	0.098%	0.092%
10 year	65	0.52%	0.49%	0.51%	0.33%	0.59%		
	80	0.29%	0.28%	0.29%	0.30%	0.32%	0.31%	0.29%

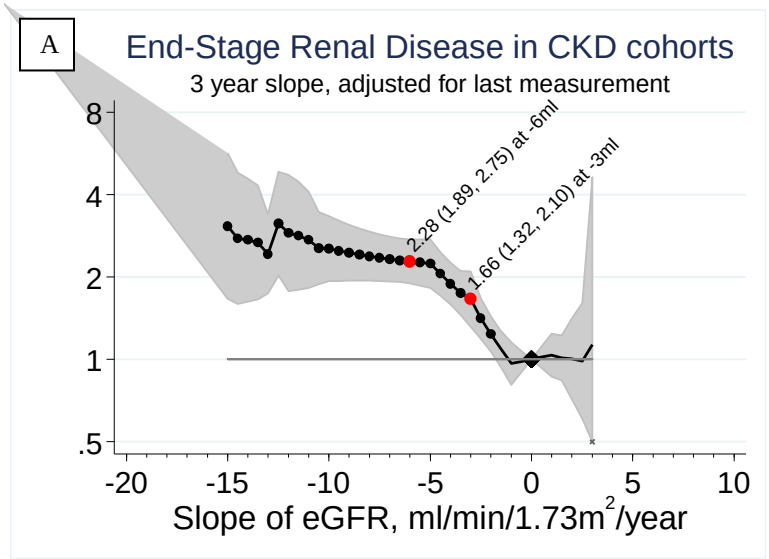
Supplemental Figure 1. Adjusted hazard ratio of end-stage renal disease associated with slope of eGFR during a 2-year (A) and 1-year (B) baseline period, and a histogram of the slope of eGFR in CKD cohorts. Values trimmed at -15ml slope (1.1%, 5.9% of the study population in 2-year, 1-year respectively) and 10ml slope (3.7%, 13.8% of the population 2-year, 1-year respectively). Black dots indicate statistical significance compared with the reference (diamond) slope of eGFR 0 ml/min/1.73m^2/year. Red dots show slope of eGFR -6 ml/min/1.73m^2/year and -3 ml/min/1.73m^2/year.

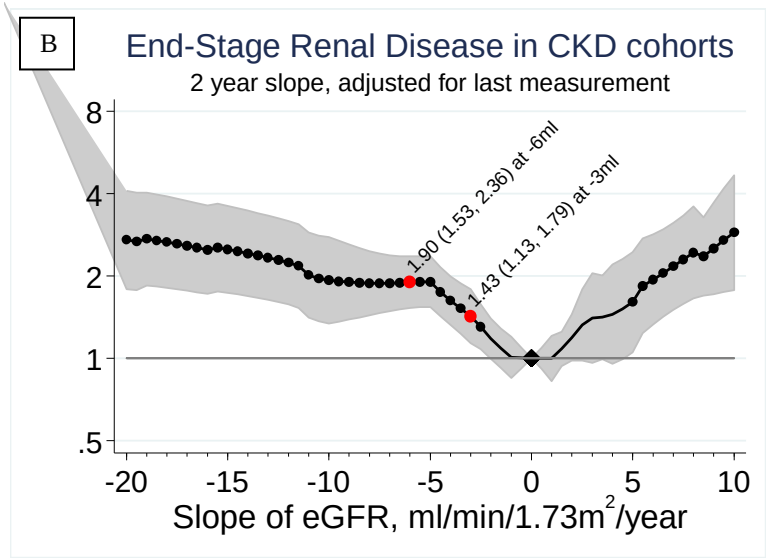


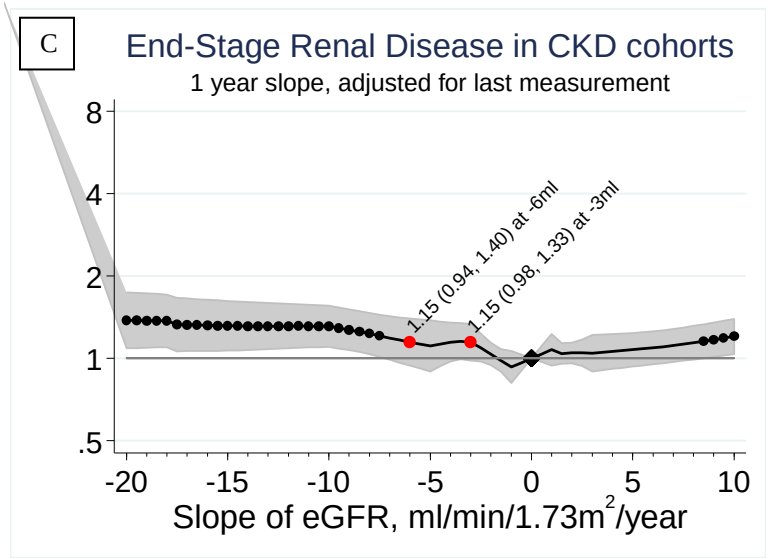
Supplemental Figure 2. Distribution and associated subsequent adjusted hazard ratio of end-stage renal disease by slope of eGFR during a 3-year baseline period (A), 2-year baseline period (B) and 1-year baseline period (C), in other cohorts



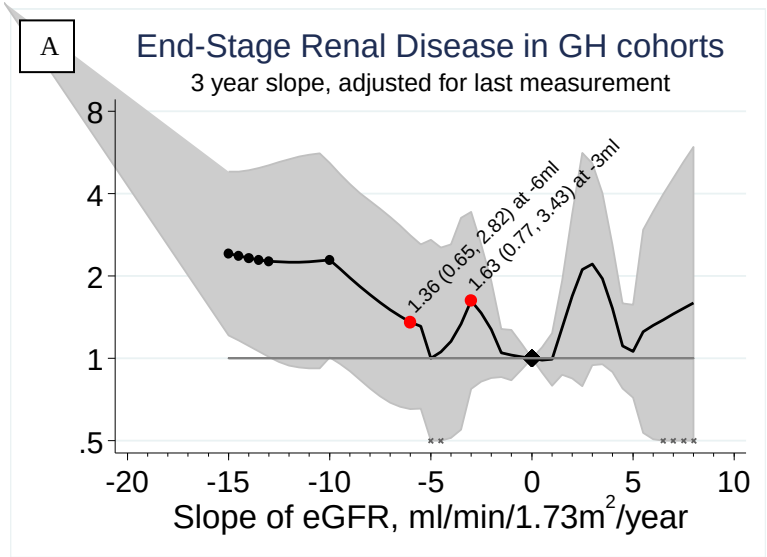
Supplemental Figure 3. Adjusted hazard ratio of end-stage renal disease by slope of eGFR during a 3-year baseline period (A) 2-year baseline period (B) and 1-year baseline period (C), further adjusted for albuminuria in CKD cohorts

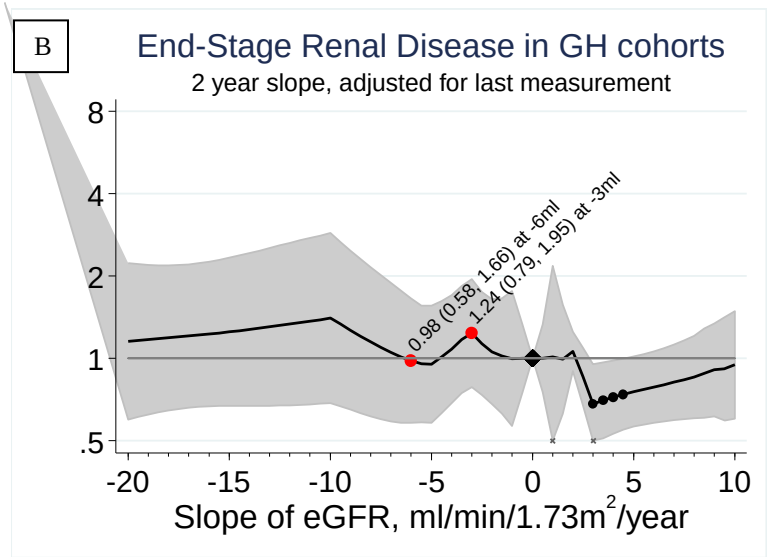


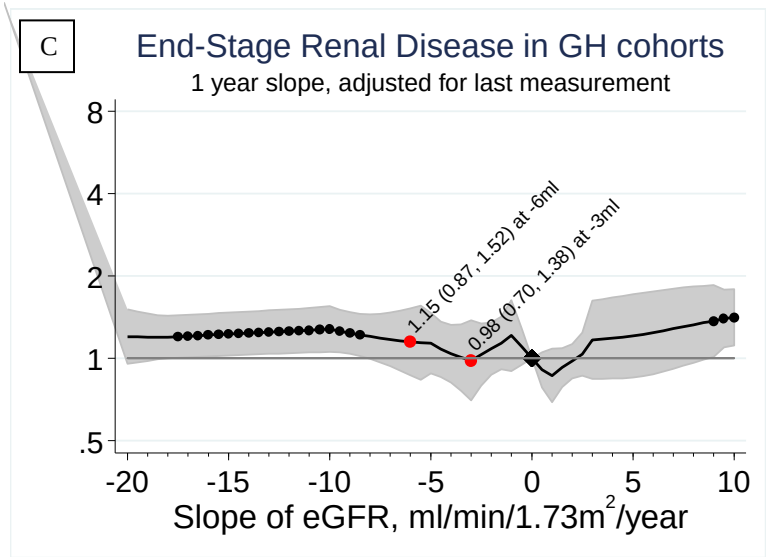




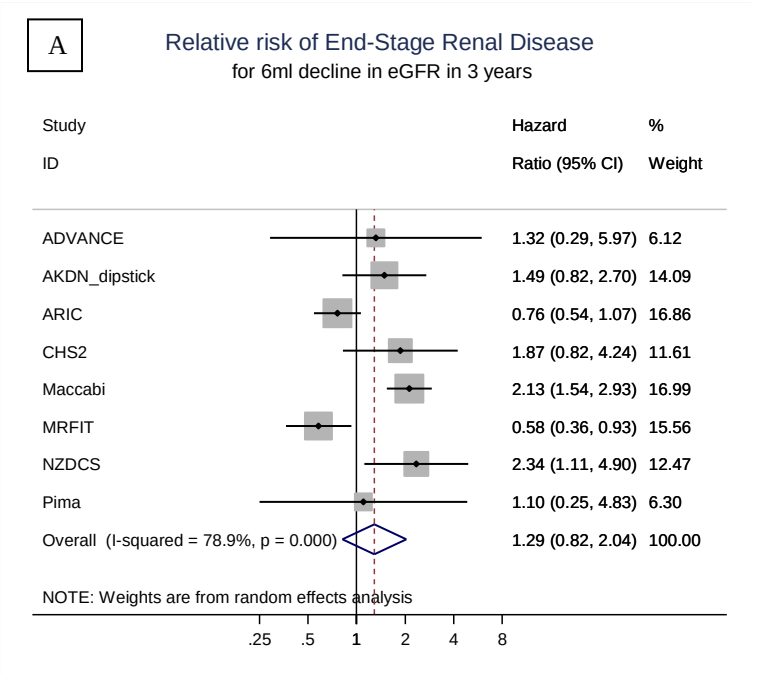
Supplemental Figure 4. Adjusted hazard ratio of end-stage renal disease by slope of eGFR during a 3-year baseline period (A) 2-year baseline period (B) and 1-year baseline period (C), further adjusted for albuminuria in other cohorts

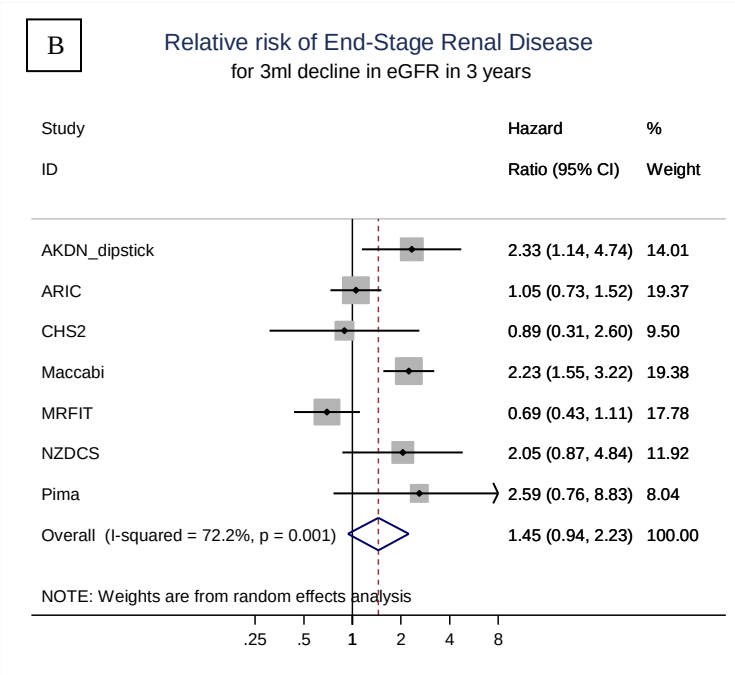




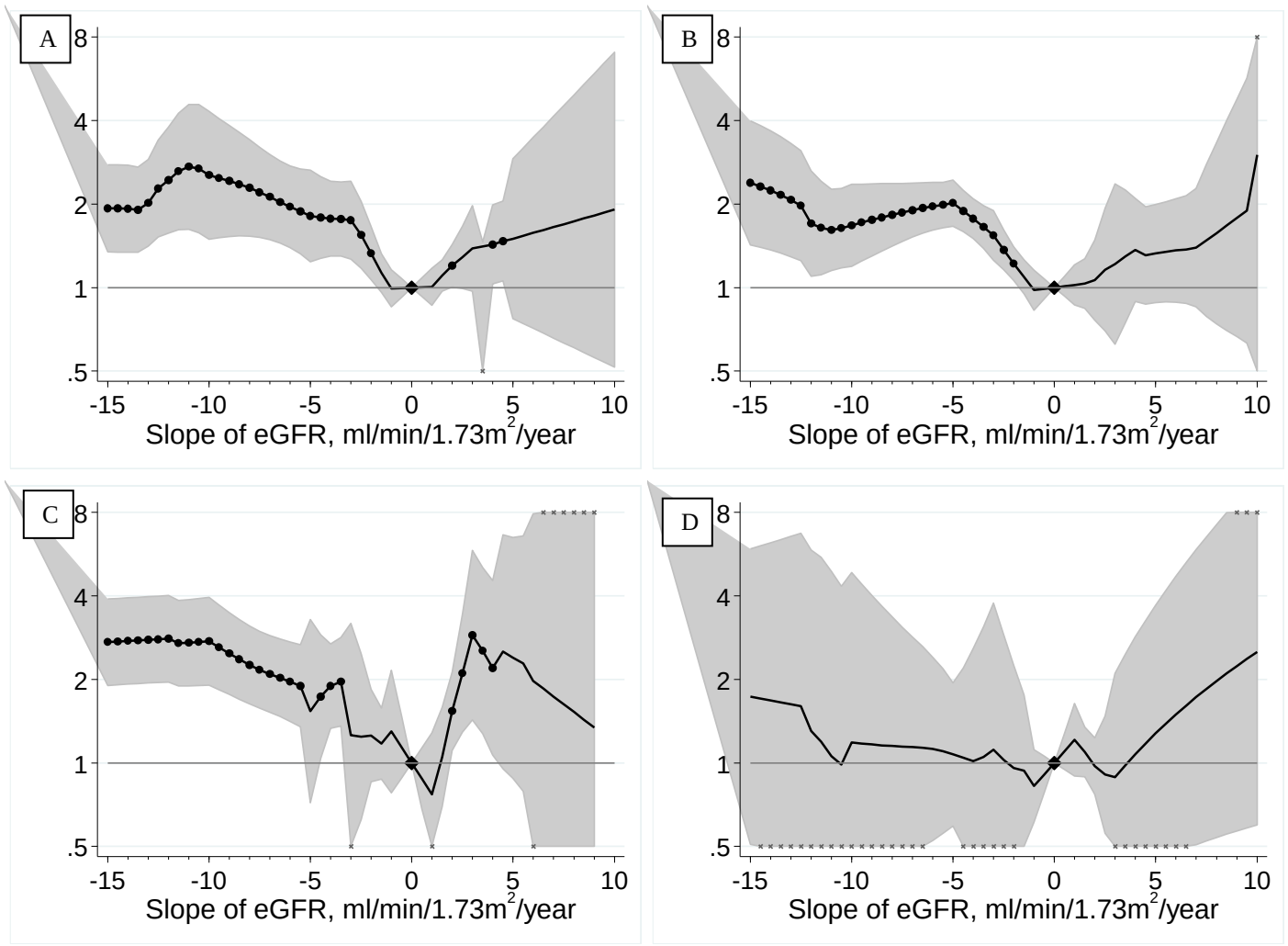


Supplemental Figure 5. Adjusted relative hazard of end-stage renal disease for 6ml (A) and 3ml (B) decline in eGFR in 3 years in other cohorts

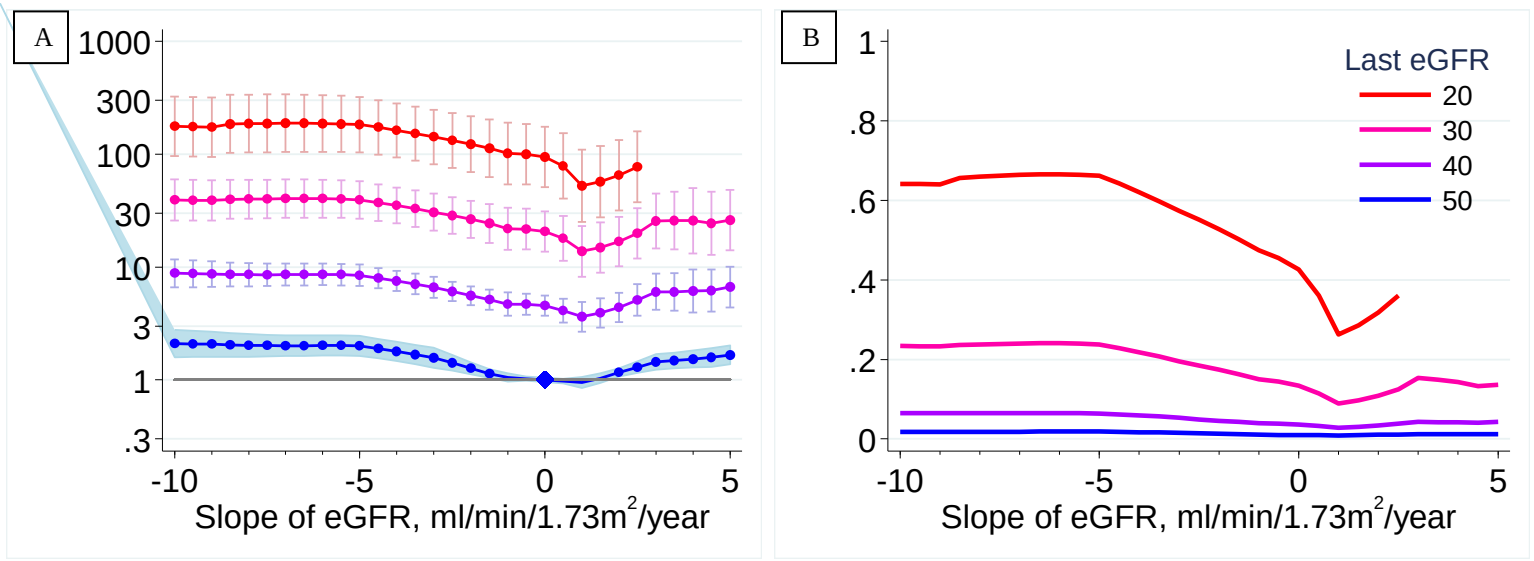




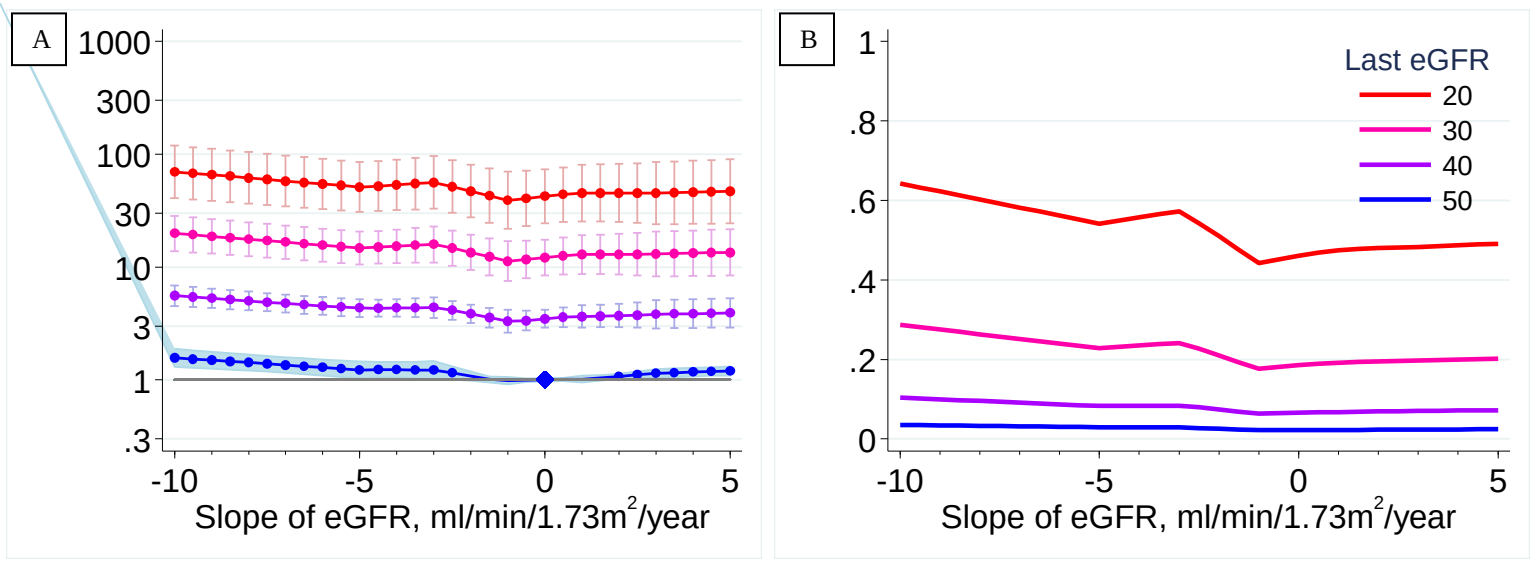
Supplemental Figure 6. Adjusted hazard ratio of end-stage renal disease by slope of eGFR during a 3-year baseline period in patients exposed to renin-angiotensin-aldosterone system inhibitor medications (A and C) and in those not exposed to such agents (B and D), in CKD (A and B) and in other cohorts (C and D).



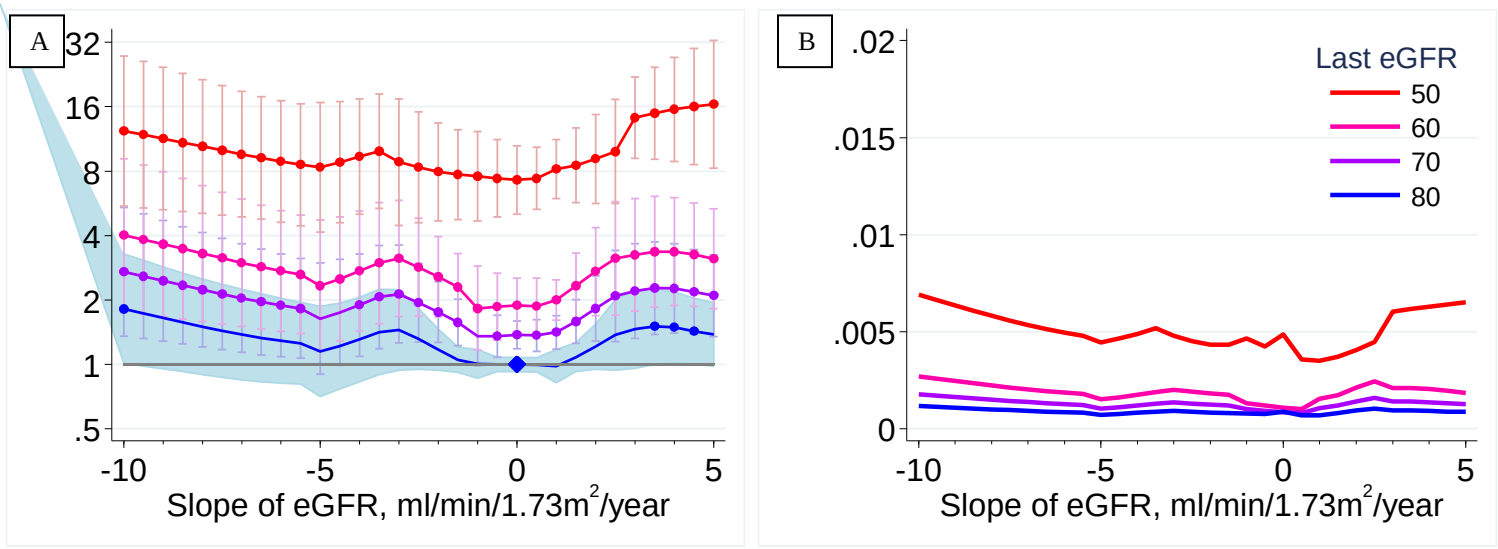
Supplemental Figure 7. Adjusted hazard ratio and absolute risk of end-stage renal disease, vs. slope of eGFR during a 2-year baseline period in CKD cohorts



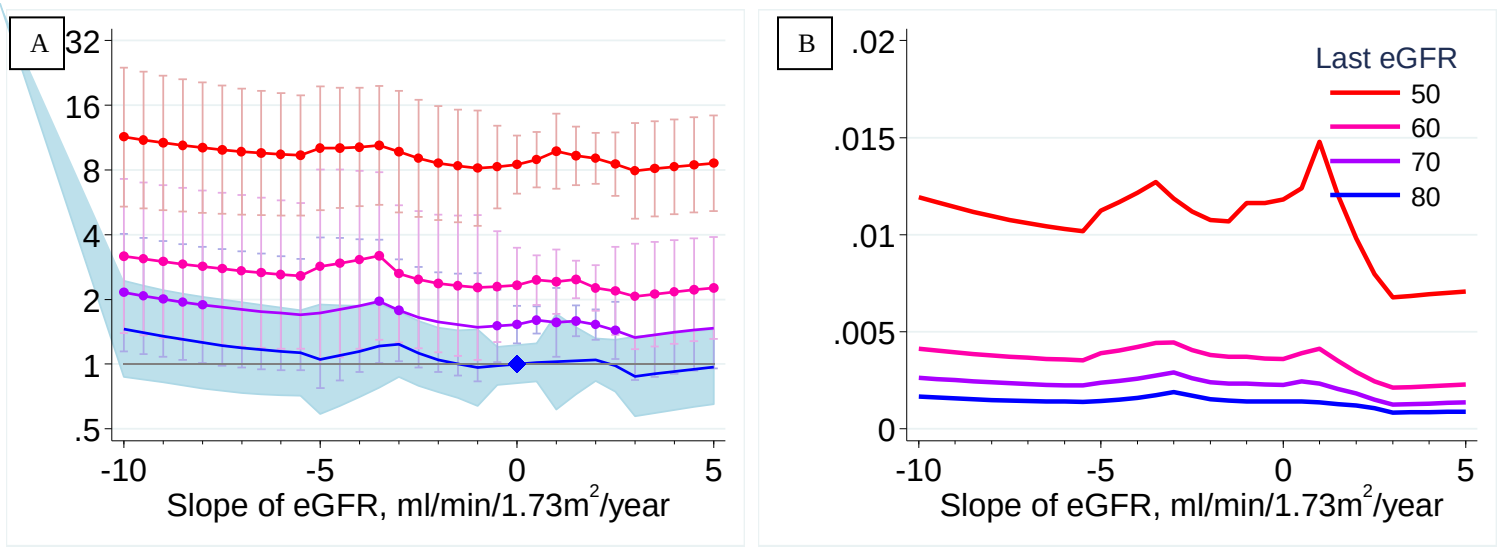
Supplemental Figure 8. Adjusted hazard ratio and absolute risk of end-stage renal disease, vs. slope of eGFR during a 1-year baseline period in CKD cohorts



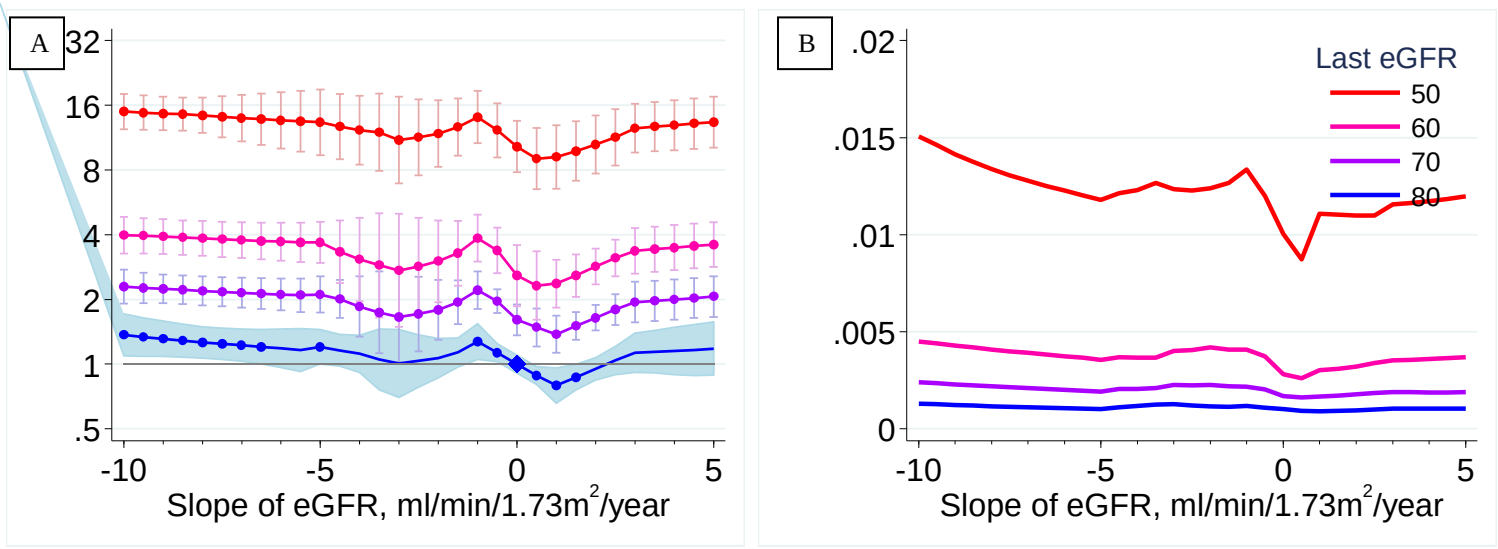
Supplemental Figure 9. Adjusted hazard ratio and absolute risk of end-stage renal disease, vs. slope of eGFR during a 3-year baseline period in other cohort



Supplemental Figure 10. Adjusted hazard ratio and absolute risk of end-stage renal disease, vs. slope of eGFR during a 2-year baseline period in other cohorts



Supplemental Figure 11. Adjusted hazard ratio and absolute risk of end-stage renal disease, vs. slope of eGFR during a 1-year baseline period in other cohorts



References

1. Wright, JT, Jr., Bakris, G, Greene, T, Agodoa, LY, Appel, LJ, Charleston, J, Cheek, D, Douglas-Baltimore, JG, Gassman, J, Glassock, R, Hebert, L, Jamerson, K, Lewis, J, Phillips, RA, Toto, RD, Middleton, JP, Rostand, SG: Effect of blood pressure lowering and antihypertensive drug class on progression of hypertensive kidney disease: results from the AASK trial. *JAMA,* 288**:** 2421-2431, 2002.
2. Patel, A, MacMahon, S, Chalmers, J, Neal, B, Woodward, M, Billot, L, Harrap, S, Poulter, N, Marre, M, Cooper, M, Glasziou, P, Grobbee, DE, Hamet, P, Heller, S, Liu, LS, Mancia, G, Mogensen, CE, Pan, CY, Rodgers, A, Williams, B: Effects of a fixed combination of perindopril and indapamide on macrovascular and microvascular outcomes in patients with type 2 diabetes mellitus (the ADVANCE trial): a randomised controlled trial. *Lancet,* 370**:** 829-840, 2007.
3. Hemmelgarn, BR, Clement, F, Manns, BJ, Klarenbach, S, James, MT, Ravani, P, Pannu, N, Ahmed, SB, MacRae, J, Scott-Douglas, N, Jindal, K, Quinn, R, Culleton, BF, Wiebe, N, Krause, R, Thorlacius, L, Tonelli, M: Overview of the Alberta Kidney Disease Network. *BMC Nephrol,* 10**:** 30, 2009.
4. Matsushita, K, Selvin, E, Bash, LD, Franceschini, N, Astor, BC, Coresh, J: Change in estimated GFR associates with coronary heart disease and mortality. *J Am Soc Nephrol,* 20**:** 2617-2624, 2009.
5. Levin, A, Djurdjev, O, Beaulieu, M, Er, L: Variability and risk factors for kidney disease progression and death following attainment of stage 4 CKD in a referred cohort. *Am J Kidney Dis,* 52**:** 661-671, 2008.
6. Schold, JD, Navaneethan, SD, Jolly, SE, Poggio, ED, Arrigain, S, Saupe, W, Jain, A, Sharp, JW, Simon, JF, Schreiber, MJ, Jr., Nally, JV, Jr.: Implications of the CKD-EPI GFR estimation equation in clinical practice. *Clin J Am Soc Nephrol,* 6**:** 497-504, 2011.
7. Shlipak, MG, Katz, R, Kestenbaum, B, Fried, LF, Newman, AB, Siscovick, DS, Stevens, L, Sarnak, MJ: Rate of kidney function decline in older adults: a comparison using creatinine and cystatin C. *Am J Nephrol,* 30**:** 171-178, 2009.
8. Landray, MJ, Thambyrajah, J, McGlynn, FJ, Jones, HJ, Baigent, C, Kendall, MJ, Townend, JN, Wheeler, DC: Epidemiological evaluation of known and suspected cardiovascular risk factors in chronic renal impairment. *Am J Kidney Dis,* 38**:** 537-546, 2001.
9. Perkins, RM, Bucaloiu, ID, Kirchner, HL, Ashouian, N, Hartle, JE, Yahya, T: GFR decline and mortality risk among patients with chronic kidney disease. *Clin J Am Soc Nephrol,* 6**:** 1879-1886, 2011.
10. Marks, A, Black, C, Fluck, N, Smith, WC, Prescott, GJ, Clark, LE, Ali, TZ, Simpson, WG, MacLeod, AM: Translating chronic kidney disease epidemiology into patient care--the individual/public health risk paradox. *Nephrol Dial Transplant,* 27 Suppl 3**:** iii65-72, 2012.
11. Lee, BJ, Forbes, K: The role of specialists in managing the health of populations with chronic illness: the example of chronic kidney disease. *BMJ,* 339**:** b2395, 2009.
12. Keith, DS, Nichols, GA, Gullion, CM, Brown, JB, Smith, DH: Longitudinal follow-up and outcomes among a population with chronic kidney disease in a large managed care organization. *Arch Intern Med,* 164**:** 659-663, 2004.
13. Shalev, V, Chodick, G, Goren, I, Silber, H, Kokia, E, Heymann, AD: The use of an automated patient registry to manage and monitor cardiovascular conditions and related outcomes in a large health organization. *Int J Cardiol,* 152**:** 345-349, 2011.

14. van Zuilen, AD, Bots, ML, Dulger, A, van der Tweel, I, van Buren, M, Ten Dam, MA, Kaasjager, KA, Ligtenberg, G, Sijpkens, YW, Sluiter, HE, van de Ven, PJ, Vervoort, G, Vleming, LJ, Blankestijn, PJ, Wetzels, JF: Multifactorial intervention with nurse practitioners does not change cardiovascular outcomes in patients with chronic kidney disease. *Kidney Int,* 82**:** 710-717, 2012.
15. Klahr, S, Levey, AS, Beck, GJ, Caggiula, AW, Hunsicker, L, Kusek, JW, Striker, G: The effects of dietary protein restriction and blood-pressure control on the progression of chronic renal disease. Modification of Diet in Renal Disease Study Group. *N Engl J Med,* 330**:** 877-884, 1994.
16. Ishani, A, Grandits, GA, Grimm, RH, Svendsen, KH, Collins, AJ, Prineas, RJ, Neaton, JD: Association of single measurements of dipstick proteinuria, estimated glomerular filtration rate, and hematocrit with 25-year incidence of end-stage renal disease in the multiple risk factor intervention trial. *J Am Soc Nephrol,* 17**:** 1444-1452, 2006.
17. Moranne, O, Froissart, M, Rossert, J, Gauci, C, Boffa, JJ, Haymann, JP, M'Rad M, B, Jacquot, C, Houillier, P, Stengel, B, Fouqueray, B: Timing of onset of CKD-related metabolic complications. *J Am Soc Nephrol,* 20**:** 164-171, 2009.
18. Elley, CR, Kenealy, T, Robinson, E, Drury, PL: Glycated haemoglobin and cardiovascular outcomes in people with Type 2 diabetes: a large prospective cohort study. *Diabet Med,* 25**:** 1295-1301, 2008.
19. Pavkov, ME, Knowler, WC, Hanson, RL, Bennett, PH, Nelson, RG: Predictive power of sequential measures of albuminuria for progression to ESRD or death in Pima Indians with type 2 diabetes. *Am J Kidney Dis,* 51**:** 759-766, 2008.
20. Brenner, BM, Cooper, ME, de Zeeuw, D, Keane, WF, Mitch, WE, Parving, HH, Remuzzi, G, Snapinn, SM, Zhang, Z, Shahinfar, S: Effects of losartan on renal and cardiovascular outcomes in patients with type 2 diabetes and nephropathy. *N Engl J Med,* 345**:** 861-869, 2001.
21. Tangri, N, Stevens, LA, Griffith, J, Tighiouart, H, Djurdjev, O, Naimark, D, Levin, A, Levey, AS: A predictive model for progression of chronic kidney disease to kidney failure. *JAMA,* 305**:** 1553-1559, 2011.
22. Kovesdy, CP, Lott, EH, Lu, JL, Malakauskas, SM, Ma, JZ, Molnar, MZ, Kalantar-Zadeh, K: Hyponatremia, hypernatremia, and mortality in patients with chronic kidney disease with and without congestive heart failure. *Circulation,* 125**:** 677-684, 2012.
23. Matsushita, K, van der Velde, M, Astor, BC, Woodward, M, Levey, AS, de Jong, PE, Coresh, J, Gansevoort, RT: Association of estimated glomerular filtration rate and albuminuria with all-cause and cardiovascular mortality in general population cohorts: a collaborative meta-analysis. *Lancet,* 375**:** 2073-2081, 2010.
24. Matsushita, K, Mahmoodi, BK, Woodward, M, Emberson, JR, Jafar, TH, Jee, SH, Polkinghorne, KR, Shankar, A, Smith, DH, Tonelli, M, Warnock, DG, Wen, CP, Coresh, J, Gansevoort, RT, Hemmelgarn, BR, Levey, AS: Comparison of risk prediction using the CKD-EPI equation and the MDRD study equation for estimated glomerular filtration rate. *JAMA,* 307**:** 1941-1951, 2012.
25. S201 sex and age by ethnic group, all people, geographic level: Health board - Grampian 2001 census [Internet]. General Register Office for Scotland, 2009.