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Supplemental Table 1: Baseline characteristics comparing between participants with and without missing values

Characteristics	Missing values		No. of missing
	No (n= 9,047)	Yes (n= 409)	
Age, years mean (SD)	63 (5.6)	62 (5.9)	0
Female, No (%)	5,295 (59)	220 (54)	0
Black race, No (%)	1,942 (22)	177 (43)	0
Body mass index, kg/m ² mean (SD)	29 (5.5)	29 (6.0)	27
Ever smoke, No (%)	5125 (57)	189 (46)	78
Ever drink, No (%)	7,194 (80)	251 (61)	79
Received education 12 years or more, No (%)	7,453 (82)	319 (78)	9
Systolic blood pressure, mmHg mean (SD)	127 (19)	131 (23)	14
Diastolic blood pressure, mmHg mean (SD)	71 (10)	73 (12)	14
Antihypertensive drugs, No (%)	3,353 (37)	195 (48)	0
Diabetes, No (%)	1,295 (14)	70 (17)	117
eGFR, ml/min/1.73m ² mean (SD)	87 (16)	90 (16)	255
ACR, mg/g mean (SD)	19 (152)	27 (187)	126
CRP, mg/l mean (SD)	4.3 (6.2)	4.2 (5.6)	255
Total cholesterol, mg/dL mean (SD)	202 (36)	198 (37)	81
HDL-C, mg/dL mean (SD)	51 (17)	51 (17)	81
COPD, No (%)	223 (2.5)	14 (3.4)	0
Cancer, No (%)	514 (5.7)	28 (6.8)	0

Abbreviation: ESRD, end-stage renal disease; eGFR, estimated glomerular filtration rate; ACR, urinary albumin-to-creatinine ratio; CRP, C-reactive protein; HDL-C, high-density lipoprotein cholesterol; COPD, chronic obstructive pulmonary disease

Supplemental Table 2: Baseline characteristics by ESRD status at end of follow-up

Characteristics	ESRD status		P-value
	No (n=8,817)	Yes (n=210)	
Age, years mean (SD)	62 (5.6)	64 (5.6)	<0.001
Female, No (%)	5,183 (59)	112 (53)	0.12
Black race, No (%)	1,860 (21)	82 (39)	<0.001
Body mass index, kg/m ² mean (SD)	29 (5.5)	31 (6.2)	<0.001
Ever smoke, No (%)	4,997 (57)	128 (61)	0.20
Ever drink, No (%)	7,036 (80)	158 (75)	0.12
Received education 12 years or more, No (%)	7,299 (83)	154 (73)	<0.001
Systolic blood pressure, mmHg mean (SD)	127 (19)	138 (21)	<0.001
Diastolic blood pressure, mmHg mean (SD)	71 (10)	73 (11)	0.01
Antihypertensive drugs, No (%)	3,222 (37)	131 (62)	<0.001
Diabetes, No (%)	1,204 (14)	91 (43)	<0.001
Laboratory tests			
eGFR (ml/min/1.73m ²), No (%)			
≥ 90	3,938 (45)	52 (25)	<0.001
60-89	4460 (50)	101 (48)	
45-59	344 (4)	35 (17)	
30-44	95 (1)	22 (10)	
ACR (mg/g), No (%)			
< 10	7,326 (83)	107 (51)	<0.001
10-29	1007 (11)	28 (13)	
30-299	441 (5)	41 (20)	
≥ 300	63 (1)	34 (16)	
CRP, mg/l mean (SD)	4.2 (6.2)	6.2 (8.2)	<0.001
Total cholesterol, mg/dL mean (SD)	202 (36)	202 (42)	0.88
HDL-C, mg/dL mean (SD)	51 (17)	47 (16)	<0.001
Past medical history, No (%)			
COPD	212 (2.4)	11 (5.2)	0.009
Cancer	497 (5.6)	17 (8.1)	0.126

Abbreviation: ESRD, end-stage renal disease; eGFR, estimated glomerular filtration rate; ACR, urinary albumin-to-creatinine ratio; CRP, C-reactive protein; HDL-C, high-density lipoprotein cholesterol; COPD, chronic obstructive pulmonary disease

Supplemental Table 3: Hazard ratios of ESRD in Fine and Gray model treating death as a competing event

	CVD subtypes, hazard ratio (95%CI)			
	Heart failure	Atrial fibrillation	Coronary heart disease	Stroke
Model 1	16.15 (11.39-22.91)	3.69 (2.57-5.31)	4.22 (2.89-6.17)	1.75 (1.02-3.01)
Model 2	11.40 (8.38-15.50)	2.66 (1.87-3.79)	3.67 (2.53-5.33)	1.44 (0.85-2.44)
Model 3	7.13 (4.65-10.93)	1.15 (0.74-1.80)	1.60 (1.03-2.48)	0.90 (0.49-1.65)

Model 1 adjusted for age, sex, and race. Model 2 additionally adjusted for body mass index, ever smoking, ever drink, years of education, systolic blood pressure, antihypertensive drugs, diabetes, eGFR, ACR, CRP, total cholesterol, HDL-C, and history of COPD and cancer. Covariates were timely updated when available. Model 3 additionally adjusted for CVD subtypes (e.g., atrial fibrillation, coronary heart disease, and stroke for analysis of heart failure). ESRD indicates end-stage renal disease. HR indicates hazard ratio.

Supplemental Table 4: Adjusted hazard ratios of ESRD comparing the risk between the time-periods following CVD and free of CVD using the inverse probability weighting

	CVD subtypes, hazard ratio (95%CI)			
	Heart failure	Atrial fibrillation	Coronary heart disease	Stroke
Model 1	14.82 (10.27-21.39)	3.09 (2.10-4.56)	3.38 (2.25-5.08)	1.71 (0.97-3.03)
Model 2	9.96 (7.04-14.07)	2.68 (1.80-3.99)	3.27 (2.14-4.98)	1.53 (0.85-2.76)
Model 3	9.37 (6.37-13.79)	0.98 (0.63-1.53)	1.47 (0.91-2.36)	0.93 (0.51-1.70)

Model 1 adjusted for age, sex, and race. Model 2 additionally adjusted for body mass index, ever smoking, ever drink, years of education, systolic blood pressure, antihypertensive drugs, diabetes, eGFR, ACR, CRP, total cholesterol, HDL-C, and history of COPD and cancer. Covariates were timely updated when available. Model 3 additionally adjusted for CVD subtypes (e.g., atrial fibrillation, coronary heart disease, and stroke for analysis of heart failure). CVD indicates cardiovascular disease.

Supplemental Table 5: Adjusted hazard ratios of ESRD comparing the risk between the time-periods following CVD and free of CVD using the propensity score matched analysis

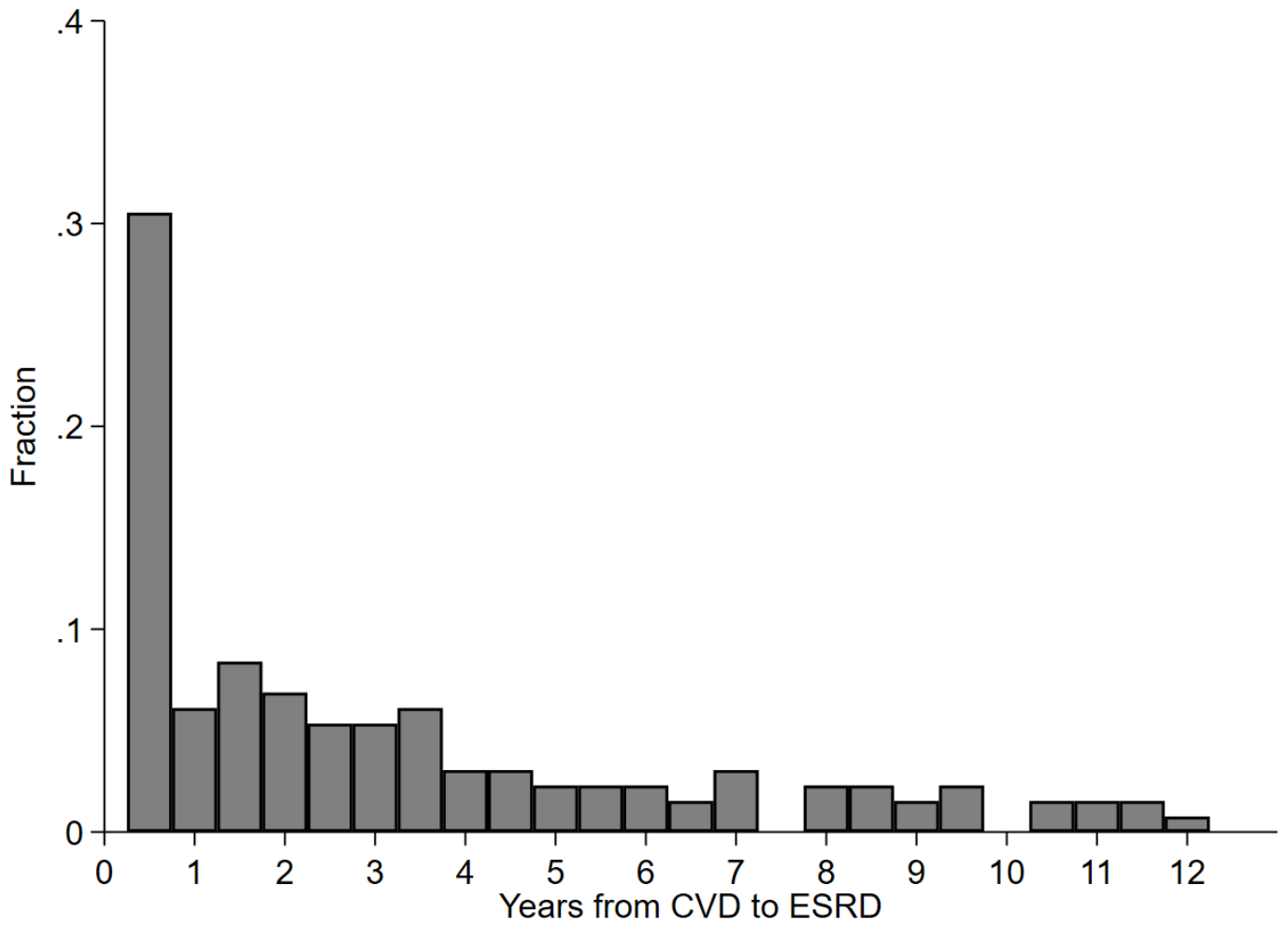
	CVD subtypes, hazard ratio (95%CI)			
	Heart failure	Atrial fibrillation	Coronary heart disease	Stroke
Model 1	21.28 (14.32-31.62)	3.28 (2.26-4.78)	3.69 (2.49-5.49)	1.76 (1.02-3.06)
Model 2	12.36 (8.12-18.83)	2.52 (1.69-3.78)	3.58 (2.35-5.46)	1.26 (0.68-2.35)
Model 3	10.58 (6.79-16.48)	1.19 (0.77-1.83)	1.86 (1.17-2.96)	1.11 (0.60-2.04)

Model 1 adjusted for age, sex, and race. Model 2 additionally adjusted for body mass index, ever smoking, ever drink, years of education, systolic blood pressure, antihypertensive drugs, diabetes, eGFR, ACR, CRP, total cholesterol, HDL-C, and history of COPD and cancer. Covariates were timely updated when available. Model 3 additionally adjusted for CVD subtypes (e.g., atrial fibrillation, coronary heart disease, and stroke for analysis of heart failure). CVD indicates cardiovascular disease.

Supplemental Figure 1: Hypothetical examples of how participants contributed person-time to CVD status. Each participant contributed to person-time for CVD status “0” when free of each cardiovascular phenotype (for simplicity, this figure shows only coronary heart disease and heart failure). Once a cardiovascular subtype occurred, the participant contributed to person-time for that relevant cardiovascular phenotype. For example, participant A developed coronary heart disease in 2004 but did not develop ESRD. Participant B developed coronary heart disease in 2000, heart failure in 2004, and then ESRD in 2008. This ESRD was linked to both coronary disease and heart failure. Participant C developed heart failure in 2004 and then ESRD in 2012, without developing coronary heart disease. This ESRD was linked to heart failure but not to coronary heart disease. Participant D did not develop any CVD until exiting the cohort because of death in 2012. CVD indicates cardiovascular disease. ESRD indicates end-stage renal disease.

Year	Visit 4						End of follow-up				
	1996	2000	2004	2008	2012	2015					
Participant A											
Coronary heart disease	0	0	0	0	1	1	1	1	1	1	1
Heart failure	0	0	0	0	0	0	0	0	0	0	0
Participant B											
Coronary heart disease	0	0	1	1	1	1	ESRD				
Heart failure	0	0	0	0	1	1	ESRD				
Participant C											
Coronary heart disease	0	0	0	0	0	0	0	0	ESRD		
Heart failure	0	0	0	0	1	1	1	1	ESRD		
Participant D											
Coronary heart disease	0	0	0	0	0	0	0	0	Died		
Heart failure	0	0	0	0	0	0	0	0	Died		

Supplemental Figure 2: Histograms for years from CVD to ESRD



CVD indicates cardiovascular disease. ESRD indicates end-stage renal disease.