Blood-Pressure in Young Adults with CKD and Associations with Cardiovascular Events and Decline in Kidney Function.

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Supplemental Appendix

Supplemental Material Table of Contents:

Supplemental Table 1: Incidence Rates (IR) for CKD progression, cardiovascular outcomes, and cardiovascular events stratified by baseline blood-pressure group.

	SBP <120 mmHg (n=175)		**SBP 120-129 mmHg (n=63)**		**SBP ≥130 mmHg (n=79)**	
	count	IR (95% CI)	count	IR (95% CI)	count	IR (95% CI)
HF	8	4.75 (2.24, 8.96)	5	7.68 (2.91\, 16.82)	18	28.18 (17.30, 43.59)
MI	2	1.17 (0.23, 3.74)	0	0 (0, 3.63)	5	6.91 (2.62, 15.14)
CVA	3	1.75 (0.48, 4.66)	4	6.01 (2.01, 14.29)	1	1.36 (0.12, 6.35)
Death	13	6.28 (3.52, 10.444)	9	12.03 (5.94, 21.96)	18	21.51 (13.20, 33.26)
CV Event	20	11.94 (7.53, 18.09)	13	20.31 (11.37, 33.74)	29	46.43 (31.75, 65.74)
CKD Progression	62	52.7 (40.78, 67.09)	42	103.13 (75.36, 137.99)	57	196.63 (150.42, 252.81)

All values represent events per 1000 person-years. 95%CI represented by lower and upper values. CHF: Congestive heart failure, MI: myocardial infarction, CVA: cerebrovascular accident, death: all-cause mortality, any cv event: any incidence of CHF, MI, CVA, or death; Renal event: 50% decline in eGFR or ESKD.

Supplemental Table 2: Association of baseline SBP with continuous eGFR slope using linear mixed models. eGFR slope represents yearly percent change in eGFR relative to baseline.

Per 10mmHg higher SBP	% difference in eGFR (95% CI)
Unadjusted	-0.8 (-1.0, -0.6)*
Model 1	-0.8 (-1.0, -0.6)*
Model 2	-0.9 (-1.1, -0.6)*

*p<0.0001
Model 1 adjusted for age and race/ethnicity. Model 2 adjusted for Model 1 + diabetes, urine albumin to creatinine ratio, history of cardiovascular disease including heart-failure, myocardial infarction, or stroke.

Supplemental Table 3: Association between time-updated blood pressure and cardiovascular events and CKD progression using cox proportional-hazards modeling and adjustment for time updated eGFR.

(cohort n=317)	Unadjusted	Model 1	Model 2
	HR (95%CI) for Cardiovascular Events		
Per +10mmhg in time-updated SBP	1.30 (1.18, 1.44)	1.24 (1.11, 1.38)	1.16 (1.03, 1.31)
	HR (95%CI) for CKD Progression		
Per +10mmhg in time-updated SBP	1.36 (1.27, 1.45)	1.21 (1.10, 1.33)	1.21 (1.10, 1.33)

Time-updated results used time-updated cox-proportional hazards modeling. Cardiovascular event defined by first incidence of myocardial infarction, congestive heart failure, stroke, or any-cause death.
Model 1 adjusted for age, race/ethnicity, and time-updated eGFR.
Model 2 adjusted for Model 1 + diabetes and history of cardiovascular disease (including heart-failure, myocardial infarction, or stroke), and urine albumin to creatinine ratio.

Supplemental Table 4: Sensitivity analysis adding number of anti-hypertensive medications at baseline to the fully adjusted models describing the Association between systolic blood pressure (SBP) and cardiovascular (CV) events (Cardiovascular event defined by first incidence of myocardial infarction, congestive heart failure, stroke, or any-cause death) and CKD progression (defined by 50% decline in eGFR or ESKD) using Cox proportional-hazards modeling.

Hazard Ratio (95%CI) for Cardiovascular Events			
(cohort n=317)		Unadjusted	Adjusted
Baseline SBP	**Per +10mmhg in SBP**	1.21 (1.10, 1.33)	1.08 (0.93, 1.24)
	<120mmhg	1.0 ref	1.0 ref
	120-129mmhg	1.70 (0.85, 3.43)	1.42 (0.67, 2.99)
	≥130mmhg	3.90 (2.20, 6.90)	2.06 (1.02, 4.15)
Hazard Ratio (95%CI) for CKD Progression			
(cohort n=317)		Unadjusted	Adjusted
Baseline SBP	**Per +10mmhg in SBP**	1.36 (1.26, 1.46)	1.13 (1.02, 1.24)
	<120mmhg	1.0 ref	1.0 ref
	120-129mmhg	1.94 (1.31, 2.87)	1.20 (0.77, 1.85)
	≥130mmhg	3.68 (2.56, 5.29)	1.71 (1.11, 2.65)

Adjusted model includes: number of anti-hypertensive medications at baseline, adjusted for age, race/ethnicity, and eGFR diabetes, urine albumin to creatinine ratio, number of anti-hypertensive medications at baseline, and history of cardiovascular disease including heart-failure, myocardial infarction, or stroke.

Supplemental Table 5: Association between baseline SBP with CV events and CKD progression, excluding participants without anti-hypertensive medication use at baseline:

Hazard Ratio (95%CI) for Cardiovascular Events				
(cohort n=256)		Unadjusted	Model 1	Model 2
Baseline SBP	**Per +10mmhg in SBP**	1.21 (1.09, 1.34)	1.18 (1.06, 1.33)	1.10 (0.95, 1.26)
	<120mmhg	*1.0 ref*	*1.0 ref*	*1.0 ref*
	120-129mmhg	1.76 (0.81, 3.81)	1.61 (0.73, 3.52)	1.64 (0.72, 3.70)
	≥130mmhg	4.05 (2.12, 7.73)	3.64 (1.83, 7.22)	2.20 ‘(1.02, 4.72)
Hazard Ratio (95%CI) for CKD Progression				
(cohort n=256)		Unadjusted	Model 1	Model 2
Baseline SBP	**Per +10mmhg in SBP**	1.29 (1.18, 1.40)	1.24 (1.14, 1.36)	1.11 (1.00, 1.23)
	<120mmhg	*1.0 ref*	*1.0 ref*	*1.0 ref*
	120-129mmhg	1.55 (1.03, 2.34)	1.49 (0.98, 2.28)	1.12 (0.71, 1.76)
	≥130mmhg	2.93 (2.01, 4.29)	2.43 (1.64, 3.62)	1.61 (1.03, 2.51)

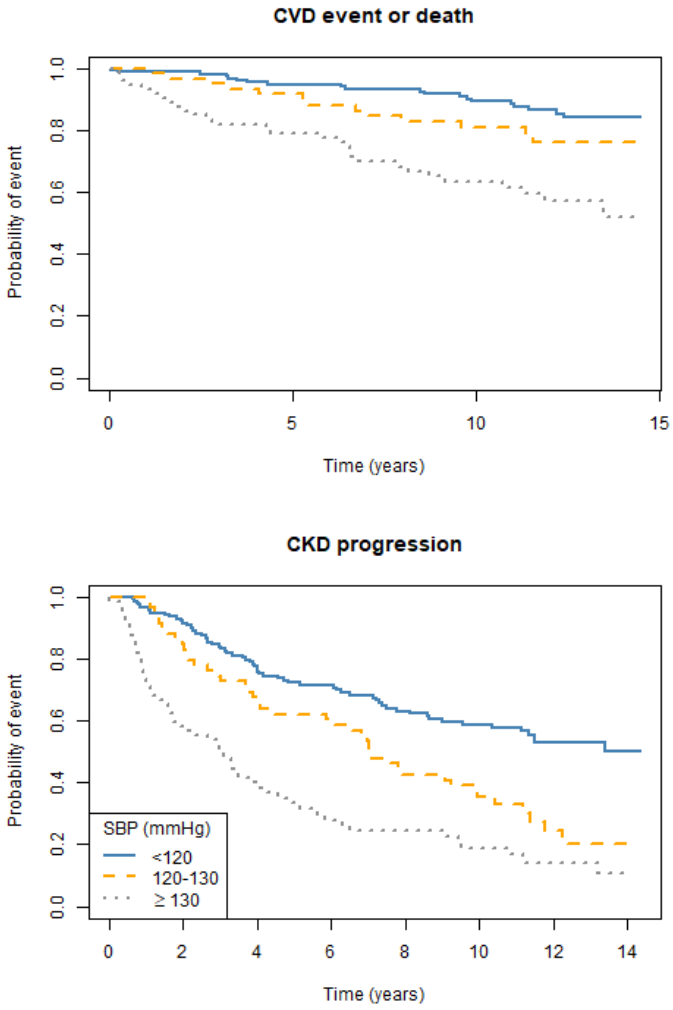
Model 1 adjusted for age, race/ethnicity, and eGFR. Model 2 adjusted for Model 1 + diabetes, urine albumin to creatinine ratio, and history of cardiovascular disease including heart-failure, myocardial infarction, or stroke.

Supplemental Table 6: Association between diastolic blood pressure with cardiovascular (CV) events (defined by first incidence of myocardial infarction, congestive heart failure, stroke, or any-cause death) and CKD progression (defined by 50% decline in eGFR or ESKD) using Cox proportional-hazards modeling.

Hazard Ratio (95%CI) for Cardiovascular Events				
(cohort n=317)		Unadjusted	Model 1	Model 2
Baseline DBP	**Per +10mmhg in DBP**	1.34 (1.11, 1.62)	1.24 (1.02, 1.51)	1.08 (0.85, 1.37)
	<90mmhg	*1.0 ref*	*1.0 ref*	*1.0 ref*
	≥90mmhg	1.92 (1.06, 3.49)	1.58 (0.85, 2.92)	0.97 (0.45, 2.09)
Hazard Ratio (95%CI) for CKD Progression				
(cohort n=317)		Unadjusted	Model 1	Model 2
Baseline DBP	**Per +10mmhg in DBP**	1.38 (1.22, 1.57)	1.23 (1.08, 1.39)	1.10 (0.94, 1.27)
	<90mmhg	*1.0 ref*	*1.0 ref*	*1.0 ref*
	≥90mmhg	2.16 (1.43, 3.25)	1.62 (1.06, 2.45)	1.07 (0.65, 1.74)

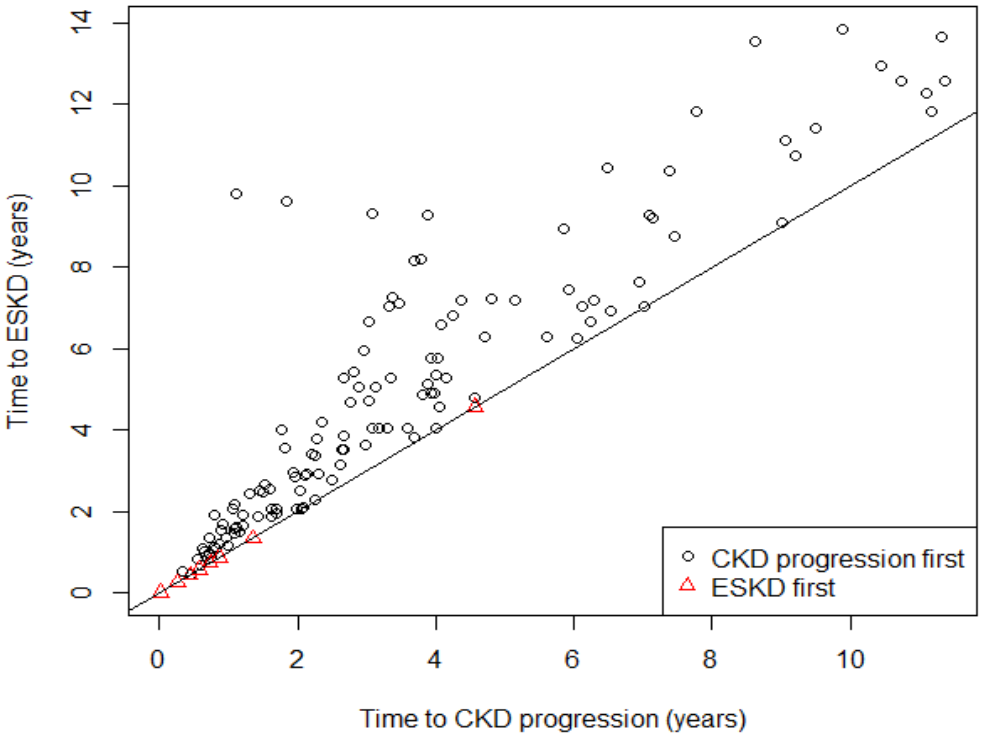
Model 1 adjusted for age, race/ethnicity, and eGFR. Model 2 adjusted for Model 1 + diabetes, urine albumin to creatinine ratio, and history of cardiovascular disease including heart-failure, myocardial infarction, or stroke.

Supplemental Figure 1: Kaplan-Meier Plots stratified by baseline systolic blood pressure (SBP) category for cardiovascular events*, (A) and CKD progression* (B).

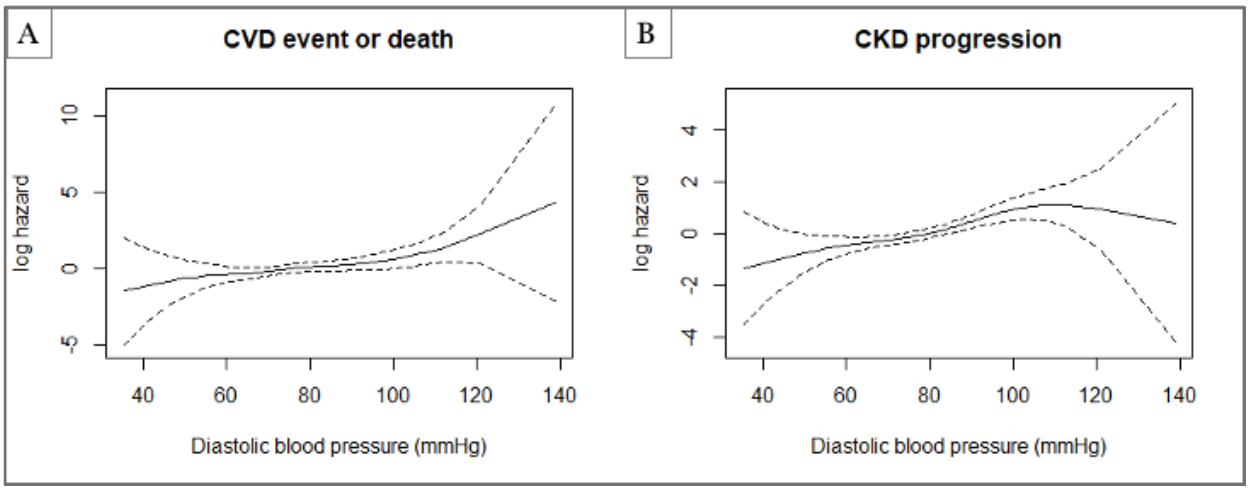


* Cardiovascular event defined by first incidence of myocardial infarction, congestive heart failure, stroke, or any-cause death. CKD progression defined by 50% decline in eGFR or ESKD.

Supplemental Figure 2: Time to CKD progression (50% decline in GFR) and ESKD for participants observed to have both during follow-up period (n=134).



Supplemental Figure 3: Unadjusted log hazard spline by continuous baseline systolic blood pressure (DBP) values. Cardiovascular events (A) defined by first incidence of myocardial infarction, congestive heart failure, stroke, or any-cause death. CKD Progression (B) defined by 50% decline in eGFR or ESKD.



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