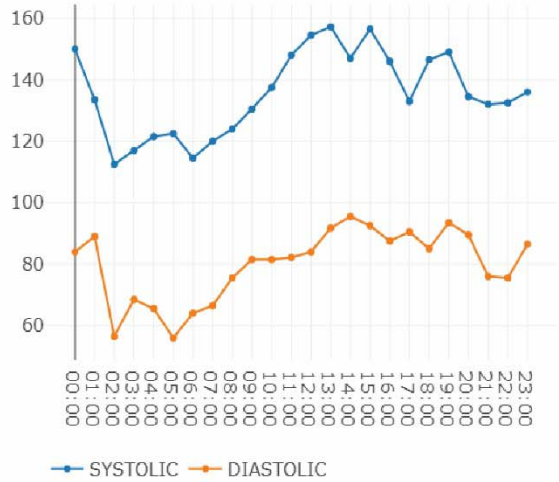
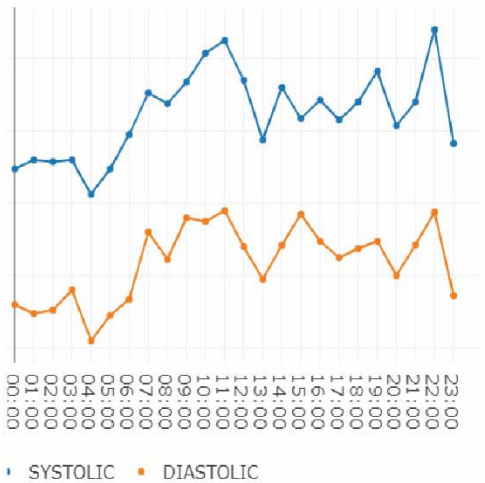
Supplementary Figures

A. Dipper, with Rhythmic Components



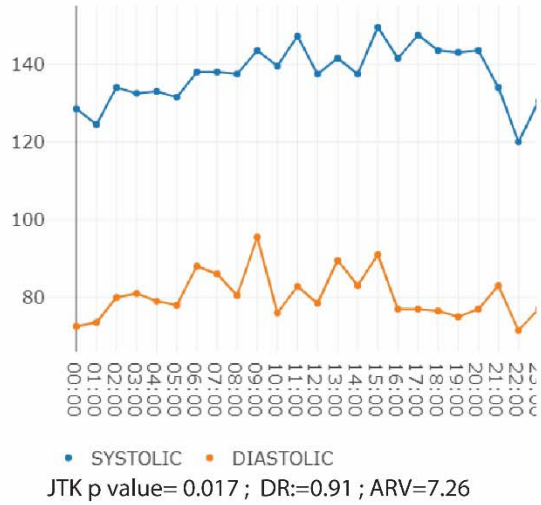
JTK p value= 0.001 ; DR:=0.83 ; ARV=9.91

B. Dipper, without Rhythmic Components



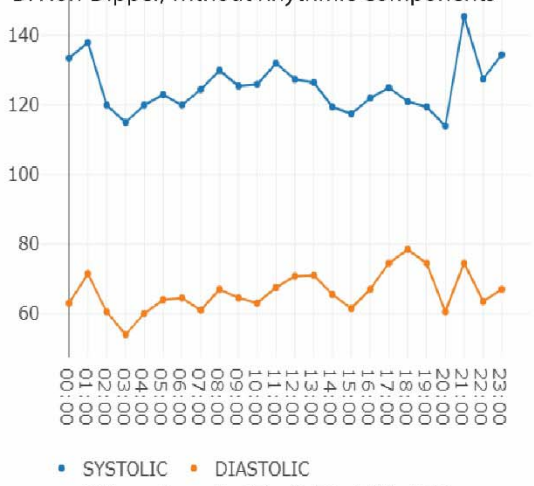
JTK p value= 0.36 ; DR:=0.84 ; ARV=10.02

C. Non-Dipper, with Rhythmic Components



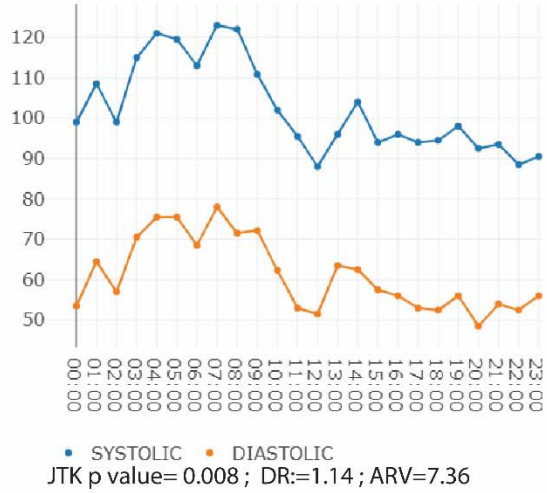
JTK p value= 0.017 ; DR:=0.91 ; ARV=7.26

D. Non-Dipper, without Rhythmic Components



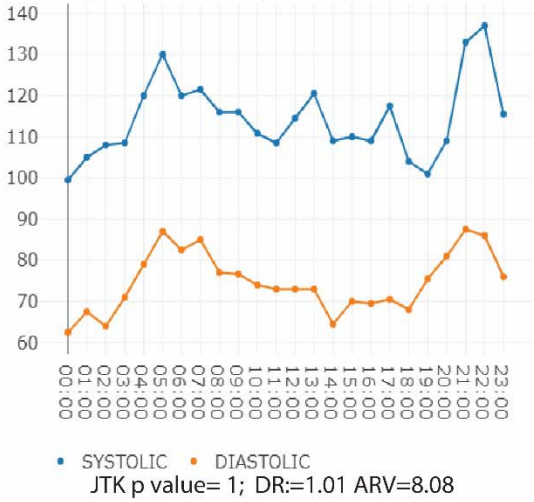
JTK p value= 1; DR:=0.99 ; ARV=7.28

E. Rev-Dipper, with Rhythmic Components



JTK p value= 0.008 ; DR:=1.14 ; ARV=7.36

F Rev-Dipper, without Rhythmic Components



JTK p value= 1; DR:=1.01 ARV=8.08

Figure S1. Juxtaposition of 24 hour blood pressure curves and blood pressure variability metrics from six CRIC participants to illustrate the discriminatory characteristics on the basis of the JTK_CYCLE analysis while **DR (**Dipping Ratio) and **ARV (**Average real variability) show similar values between pairs of dippers in A and B, non-dippers in C and D, and reverse dippers in E and F.

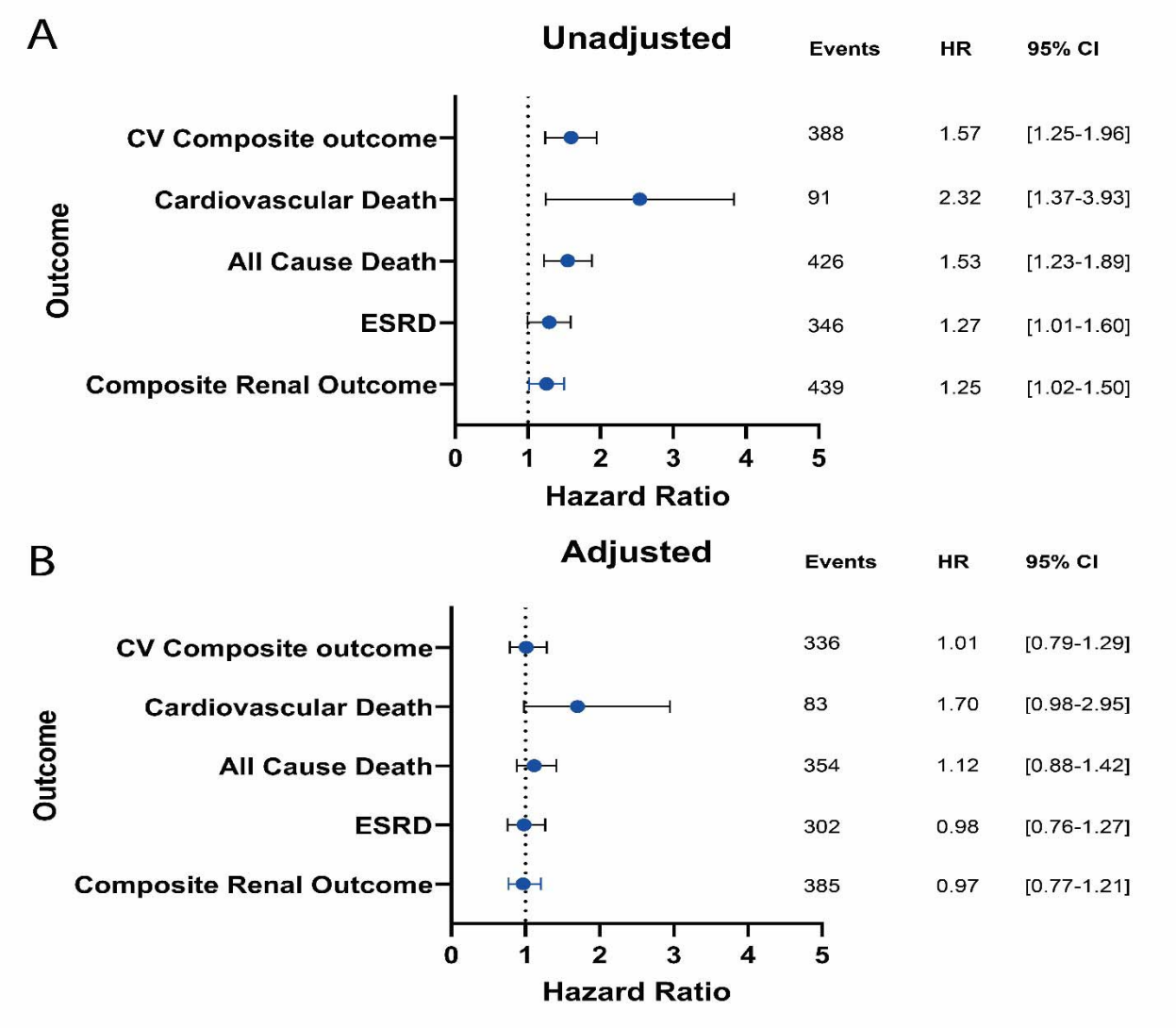


Figure S2. Hazard ratios for the absence of rhythmic components (JTK p value >0.05) and reaching different outcomes in the CRIC cohort as compared to the retention of rhythmic components (JTK p value ≤0.05). **A.** Unadjusted model **B.** Adjusted for Age, BMI, Sex, Diabetes, Race, eGFR, Urine Protein to Creatinine Ratio, Clinic SBP, Clinic DBP, Prior CVD.

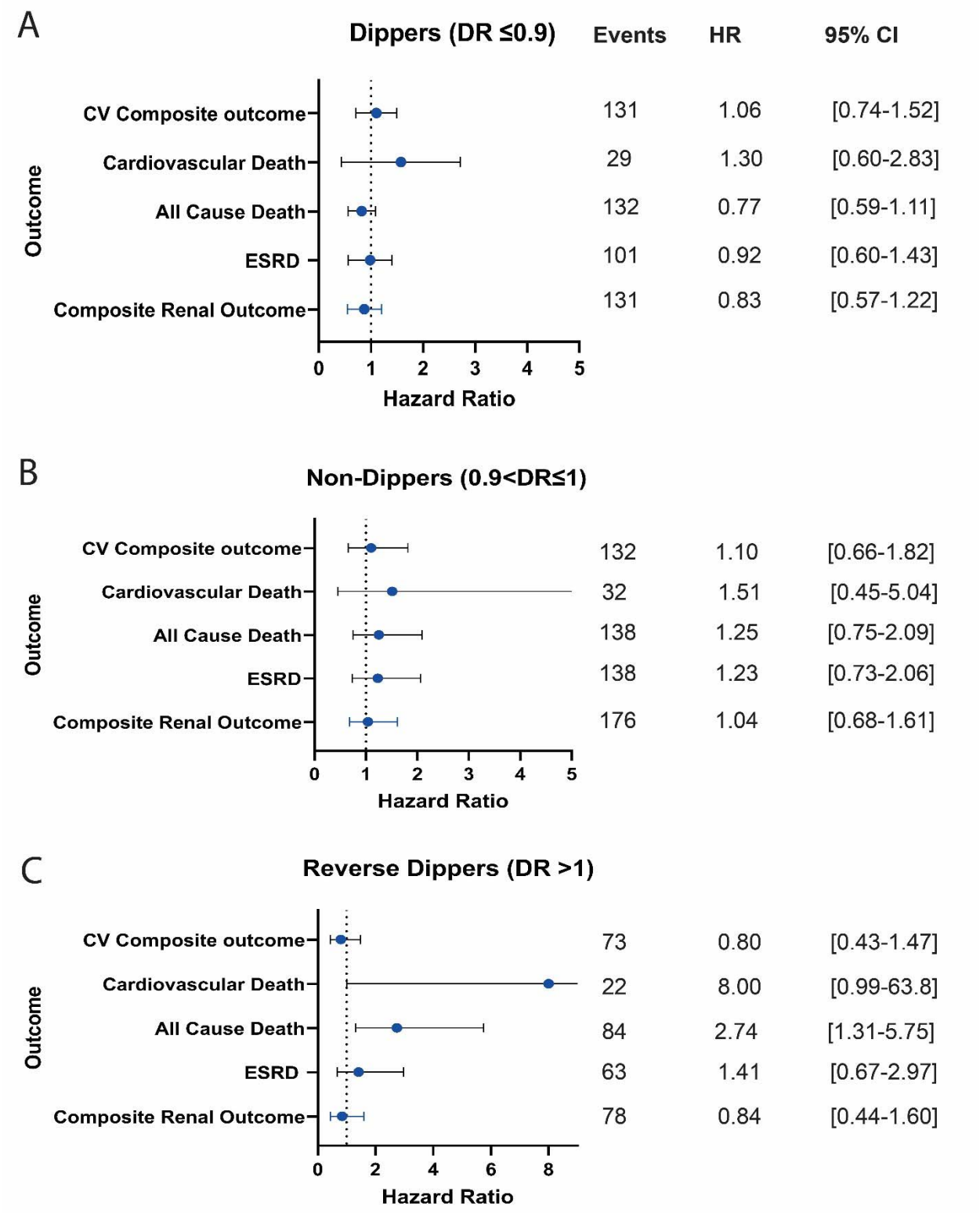


Figure S3: Hazard ratios for the absence of rhythmic components (JTK p value >0.05) and reaching different outcomes as compared to the retention of rhythmic components (JTK p value

≤0.05) from the CRIC cohort. Adjusted for Age, BMI, Sex, Diabetes, Race, eGFR, Urine Protein to Creatinine Ratio, Clinic SBP, Clinic DBP, Prior CVD. **A.** Analysis performed only in dippers. **B.** Analysis performed only in non-dippers. **C.** Analysis performed only in reverse dippers. DR: Dipping ratio, CV: Cardiovascular, CVD: Cardiovascular disease, ESRD: End stage renal disease.

Supplemental Tables

Table S1 Blood pressure profiles of participants in both cohorts. Blood pressure parameters were computed from 24 Hour ABPM (the first 24 Hour ABPM in AASK).

	CRIC	**AASK**
	N(%)	**N(%)**
Rhythmic Components present (JTK p ≤0.05)	514 (34%)	169 (26%)
Rhythmic Components absent (JTK p >0.05)	988 (66%)	474 (74%)
Dipper (DR ≤0.9)	678 (45%)	127 (20%)
Dipper w/ rhythmic components (DR ≤0.9& JTK<0.05)	376 (25%)	54 (8%)
Non-Dipper (0.9<DR≤1)	572 (38%)	266 (41%)
Non-Dipper w/ rhythmic components (0.9<DR≤1& JTK<0.05)	92 (6%)	38 (6%)
Reverse Dipper (DR>1)	252 (17%)	250 (39%)
Reverse Dipper w/ rhythmic components (DR>1 & JTK<0.05)	46 (3%)	77 (12%)
Controlled BP (24 Hr Mean<125/75)	549 (37%)	100 (16%)

Uncontrolled BP (24 Hr Mean ≥125/75)	953 (63%)	543 (85%)

Table S2. Multivariate logistic regression for non-dipping status (dipping ratio >0.9) among CRIC cohort participants. All variables in the table were included as covariates in the model. eGFR: estimated glomerular filtration rate by the CRIC cohort equation. BP: blood pressure. PCR: urine protein to creatinine ratio.

Covariate	Odds Ratio	95%CI Lower	95%CI Upper	P-value
Age <45	Reference			
Age From 45 to <65	1.32	0.8	2.18	0.276
Age 65+	1.17	1.01	2.78	0.047
BMI <25	Reference			
BMI 25 to <30	1.07	0.74	1.55	0.705
BMI ≥30	1.27	0.89	1.8	0.182
eGFR >60 ml/min/1.73m^2	Reference			
eGFR: 30 to <60 ml/min/1.73m^2	1.11	0.82	1.51	0.483
eGFR<30 ml/min/1.73m^2	1.46	0.99	2.15	0.059
Proteinuria (PCR <150mg/g)	Reference			
Proteinuria (PCR: 150-500 mg/g)	1.08	0.8	1.46	0.623
Proteinuria (PCR>500 mg/g)	1.56	1.12	2.17	0.009
Controlled BP	Reference			
Un-Controlled BP (Mean 24 Hr BP ≥ 125/75mmHg)	1.64	1.27	2.12	<0.001
Male Sex	Reference			
Female Sex	0.85	0.67	1.09	0.195
Non-Diabetic	Reference			
Diabetic	1.23	0.96	1.67	0.1
Race: White	Reference			
Race: Black	1.55	1.2	2.01	0.001

Race: Other	0.92	0.63	1.32	0.64
Prior CVD: No	Reference			
Prior CVD: Yes	1.58	1.23	2.03	<0.001

Table S3. Mixed effects logistic regression for non-dipping status (dipping ratio >0.9 among AASK cohort participants. All variables in the table were included as covariates in the model. eGFR: estimated glomerular filtration rate by the 2021 CKD-EPI equation. PCR: urine protein to creatinine ratio. BP: blood pressure. ACE I: angiotensin converting enzyme inhibitor. CCB: calcium channel blocker.

Covariate	Odds Ratio	95%CI Lower	95%CI Upper	P-value
Age <45	Reference			
Age From 45 to <65	1.4	0.5	0.39	0.52
Age 65+	1.62	0.57	4.6	0.368
BMI <25	Reference			
BMI 25 to <30	0.78	0.41	1.48	0.446
BMI ≥30	1.25	0.66	2.38	0.491
eGFR >60 ml/min/1.73m^2	Reference			
eGFR: 30 to <60 ml/min/1.73m^2	1.94	0.68	5.59	0.218
eGFR<30 ml/min/1.73m^2	1.88	0.63	5.63	0.256
Proteinuria (PCR <150mg/g)	Reference			
Proteinuria (PCR: 150-500 mg/g)	1.16	0.64	2.09	0.626
Proteinuria (PCR>500 mg/g)	1.08	0.6	1.93	0.803
Controlled BP	Reference			
Un-Controlled BP (Mean 24 Hr BP ≥ 125/75mmHg)	2.02	1.23	3.31	0.006
Male Sex	Reference			
Female Sex	0.7	0.44	1.12	0.14
Non-Diabetic	Reference			
Diabetic	0.53	0.28	0.99	0.048
Prior CVD: No	Reference			
Prior CVD: Yes	1.19	0.74	1.91	0.467
Drug Randomization Group: ACE I	Reference			
Drug Randomization Group: Beta	1.86	1.12	3.1	0.016

Blocker				
Drug Randomization Group: CCB	0.96	0.51	1.83	0.91
BP Target Randomization Group: Lower Target (MAP <92)	Reference			
BP Target Randomization Group: Usual Target (MAP 102-107)	1.29	0.82	2.03	0.269
Time from initial ABPM (years)	0.996	0.89	1.12	0.96

Table S4. Cross Tabulation of dipping status and the presence or absence of rhythmic components in ABPM among participants with prior cardiovascular disease who died due to cardiovascular causes.

	Rhythmic Components Present	**Rhythmic Components Absent**	**Total**
Dipper	6	14	20
Non-Dipper	0	24	24
Reverse-Dipper	0	21	21
Total	*6*	*59*	*65*

Table S5. Hazard ratios for the different dipping categories and reaching different outcomes from the CRIC cohort. Adjusted for Age, BMI, Sex, Diabetes, Race, eGFR, Urine Protein to Creatinine Ratio, Clinic SBP, Clinic DBP, Prior CVD. DR: Dipping ratio, CV: Cardiovascular, CVD: Cardiovascular disease, ESRD: End stage renal disease.

		Unadjusted Model			Adjusted Model		
Outcome	**Dipping Category**	**Hazard Ratio**	**95% CI**	**p-value**	**Hazard Ratio**	**95% CI**	**p-value**
Composite Renal Outcome	Dipper	Reference					
	Non-Dipper	1.81	1.47-2.23	<0.001	1.27	1.01-1.61	0.04
	Reverse Dipper	2.99	1.53-2.60	<0.001	1.40	1.05-1.90	0.021
ESRD	Dipper	Reference					
	Non-Dipper	1.8	1.42-2.28	<0.001	1.07	0.82-1.41	0.617
	Reverse Dipper	1.97	1.47-2.66	<0.001	1.37	0.98-1.91	0.064
All Cause Death	Dipper	Reference					
	Non-Dipper	1.4	1.12-1.74	0.003	0.93	0.73-1.18	0.549
	Reverse Dipper	2.44	1.91-3.12	<0.001	1.14	0.85-1.53	0.373
Cardiovascular Death	Dipper	Reference					
	Non-Dipper	1.3	0.80-2.12	0.297	0.98	0.59-1.63	0.931
	Reverse Dipper	2.55	1.52-4.28	<0.001	1.12	0.61-2.04	0.717

	Dipper	Reference					
CV Composite	Non-Dipper	1.35	1.07-1.69	0.01	0.92	0.72-1.18	0.501
outcome	Reverse Dipper	2.09	1.61-2.72	<0.001	1.01	0.75-1.36	0.951

Table S6.

Hazard ratios for the different dipping categories and reaching different outcomes from the AASK cohort. Adjusted for Age, BMI, Sex, Diabetes, eGFR, Urine Protein to Creatinine Ratio, Clinic SBP, Clinic DBP, Prior CVD Drug and blood pressure target groups randomized to in the prior trial. DR: Dipping ratio, CV: Cardiovascular, CVD: Cardiovascular disease, ESRD: End stage renal disease.

		Unadjusted Model			Adjusted Model		
Outcome	**Dipping Category**	**Hazard Ratio**	**95% CI**	**p-value**	**Hazard Ratio**	**95% CI**	**p-value**
Composite Renal Outcome	Dipper	Reference					
	Non-Dipper	1.05	0.69-1.61	0.816	0.80	0.43-1.46	0.462
	Reverse Dipper	1.10	0.72-1.70	0.652	1.26	0.70-2.28	0.440
ESRD	Dipper	Reference					
	Non-Dipper	0.94	0.57-1.58	0.827	0.76	0.36-1.60	0.469
	Reverse Dipper	0.98	0.58-1.64	0.930	1.42	0.68-2.97	0.350
All Cause Death	Dipper	Reference					
	Non-Dipper	0.94	0.52-1.72	0.851	0.83	0.40-1.75	0.549
	Reverse Dipper	1.70	0.97-2.98	0.065	1.33	0.68-2.62	0.406
Cardiovascular Death	Dipper	Reference					
	Non-Dipper	1.06	0.32-3.45	0.956	1.68	0.44-6.46	0.447

	Reverse Dipper	2.39	0.81-7.06	0.133	2.04	0.57-7.46	0.282
CV Composite outcome:	Dipper	Reference					
	Non-Dipper	1.41	0.80-2.49	0.236	1.57	0.81-3.08	0.180
	Reverse Dipper	1.79	1.02-3.14	0.043	1.59	0.82-3.09	0.172

Table S7. Hazard ratios for the different average real variability (ARV) tertials and reaching different outcomes from the CRIC cohort. Adjusted for Age, BMI, Sex, Diabetes, Race, eGFR, Urine Protein to Creatinine Ratio, Clinic SBP, Clinic DBP, Prior CVD. CV: Cardiovascular, CVD: Cardiovascular disease, ESRD: End stage renal disease.

		Unadjusted Model			**Adjusted Model**		
Outcome	**ARV Category**	**Hazard Ratio**	**95% CI**	**p-value**	**Hazard Ratio**	**95% CI**	**p-value**
Composite Renal Outcome	≤9	Reference					
	>9, ≤11	1.18	0.93-1.49	0.165	1.02	0.79-1.32	0.884
	>11	1.47	1.17-1.85	0.001	0.95	0.72-1.24	0.688
ESRD	≤9	Reference					
	>9, ≤11	1.11	0.85-1.45	0.44	1.04	0.77-1.39	0.82
	>11	1.49	1.16-1.93	0.002	0.97	0.71-1.33	0.862
All Cause Death	≤9	Reference					
	>9, ≤11	1.43	1.12-1.84	0.004	1.12	0.85-1.47	0.437
	>11	1.8	1.42-2.29	<0.001	1.14	0.87-1.50	0.338
Cardiovascular Death	≤9	Reference					
	>9, ≤11	1.23	0.72-2.10	0.451	0.91	0.52-1.60	0.742
	>11	1.64	0.99-2.72	0.057	0.91	0.53-1.57	0.732
CV Composite outcome:	≤9	Reference					
	>9, ≤11	1.45	1.12-1.89	0.006	1.22	0.92-1.63	0.165

>11	2.05	1.60-2.64	<0.001	1.27	0.96-1.67	0.093