Supplemental Table 1. Definitions for diabetes, dialysis, kidney transplant, and cardiovascular endpoints

Diabetes mellitus	Definition
	We defined the diabetes recognition date as the earlier of one inpatient diagnosis (ICD-9-CM 250.x, 357.2, 366.41, 362.01-362.07, either primary or secondary) or any combination of two of the following events, using the date of the first event in the pair as the identification date: 1) HbA1c $\geq$ 6.5%; 2) fasting plasma glucose $\geq$ 126 mg/dl; 3) random plasma glucose $\geq$ 200 mg/dl; 4) outpatient diagnosis code (same codes as for inpatient); 5) any anti-hyperglycemic medication dispensing. When the two events were from the same source (e.g. two outpatient diagnoses or two elevated laboratory values), we required them to occur on separate days no more than two years apart. Dispensings of metformin or thiazolidinediones with no other indication of diabetes were not included because these agents could be used for diabetes prevention or to treat polycystic ovarian syndrome. Criteria ascertained during periods of pregnancy were excluded (1,2).

Dialysis		
Code Type	**Code**	**Description**
ICD-9 diagnosis codes	585.6	ESRD on dialysis
	458.21	Hypotension during dialysis
	V56, V56.x	Dialysis and dialysis care
	V45.1, V45.11	Dialysis status
ICD-9 procedure codes	39.95	Hemodialysis
	54.98	Peritoneal dialysis
CPT codes	90921, 90925, 90935-90999	Hemodialysis procedure, dialysis procedure, or dialysis training
Kidney transplant		
Code Type	**Code**	**Description**
ICD-9 diagnosis codes	V42.0	Kidney replaced by transplant
	996.81	Complications of transplanted kidney
ICD-9 procedure codes	55.6	Transplant of kidney
	55.61	Kidney autotransplantation
	55.69	Other kidney transplantation
CPT codes	50360	Kidney allotransplantation, implantation of grant; without recipient nephrectomy

	50365	Kidney allotransplantation, implantation of grant; with recipient nephrectomy
	50380	Kidney autotransplantation, reimplantation of kidney
Cardiovascular endpoints		
Code Type	**Code**	**Description**
ICD-9 diagnosis codes	410	Acute myocardial infarction
	430, 431, 433.x1, 434 [excluding 434.x0], 436	Stroke
	411.x, 414.x [accompanied by 411.x]	Acute coronary syndrome
	398.91, 402.01, 402.11, 402.91, 404.01, 404.03, 404.11, 404.13, 404.91, 404.93, 425.4, 425.5, 425.6, 425.7, 425.8, 425.9, 428	Congestive heart failure
ICD-9 procedure codes	36.01, 36.02, 36.03, 36.05, 36.06, 36.07, 36.10, 36.11, 36.12, 36.13, 36.14, 36.15, 36.16, 36.17, 36.19, 36.31, 36.32, 36.33, 36.34	Percutaneous coronary intervention / coronary artery bypass grafting

CPT codes	92982, 92984, 92995, 92996, 92980, 92981, 33510, 33511, 33512, 33513, 33514, 33516, 33517, 33518, 33519, 33521, 33522, 33523, 33530, 33533, 33534, 33535, 33536,93539, 93540	Percutaneous coronary intervention / coronary artery bypass grafting

Dialysis and kidney transplant required two codes within 365 days, on different dates. The date of the first code was used for analysis (3). Cardiovascular event codes were taken from principal diagnosis codes from inpatient encounters, or from procedure codes (4-7).

Supplemental Table 2. Baseline Quan comorbidity scale components for individuals with diabetes receiving four classes of antihypertensiveblood pressure medications added on to angiotensin-aldosterone system blockers, N=21,897

Variable, n (%)	Overall	Beta-blockers	Calcium channel blockers	Loop diuretics	Thiazide diuretics
N	21,897	7,343	2,705	2,081	9,768
Alcohol abuse	481 (2)	206 (3)	47 (2)	41 (2)	187 (2)
Chronic pulmonary disease	4234 (19)	1376 (19)	531 (20)	777 (37)	1550 (16)
Cardiac Arrhythmia (tachycardias)[a]	702 (3)	480 (7)	53 (2)	72 (3)	97 (1)
Cardiac Arrhythmia (atrial fibrillation)[a]	923 (4)	562 (8)	79 (3)	166 (8)	116 (1)
Cardiac Arrhythmia (AICD)[a]	299 (1)	156 (2)	41 (2)	57 (3)	45 (0.5)
Cardiac Arrhythmia (other)[a]	807 (4)	440 (6)	89 (3)	128 (6)	150 (2)
Coagulopathy	348 (2)	139 (2)	35 (1)	87 (4)	87 (0.9)
Congestive heart failure[a]	911 (4)	377 (5)	63 (2)	392 (19)	79 (0.8)
Deficiency anemia	646 (3)	256 (3)	67 (2)	121 (6)	202 (2)
Depression	3576 (16)	1330 (18)	376 (14)	501 (24)	1369 (14)
Diabetes, complicated[a]	10331 (47)	3600 (49)	1337 (49)	1228 (59)	4166 (43)

Drug abuse	533 (2)	205 (3)	62 (2)	64 (3)	202 (2)
Fluid and electrolyte disorders	1460 (7)	619 (8)	196 (7)	250 (12)	395 (4)
Hypertension, complicated[a]	1161 (5)	471 (6)	211 (8)	221 (11)	258 (3)
Hypothyroidism	2555 (12)	926 (13)	312 (12)	368 (18)	949 (10)
Liver disease	949 (4)	396 (5)	119 (4)	102 (5)	332 (3)
Metastatic cancer	242 (1)	110 (1)	25 (0.9)	54 (3)	53 (0.5)
Obesity	5766 (26)	1895 (26)	586 (22)	842 (40)	2443 (25)
Other neurological disorders	528 (2)	218 (3)	56 (2)	97 (5)	157 (2)
Peripheral vascular disorders	1514 (7)	671 (9)	197 (7)	270 (13)	376 (4)
Psychoses	282 (1)	120 (2)	27 (1)	44 (2)	91 (0.9)
Pulmonary circulation disorders	301 (1)	98 (1)	28 (1)	124 (6)	51 (0.5)
Kidney failure	3259 (15)	1161 (16)	591 (22)	501 (24)	1006 (10)
Rheumatoid arthritis and collagen vascular diseases	731 (3)	293 (4)	97 (4)	120 (6)	221 (2)
Solid tumor without metastasis	1230 (6)	560 (8)	147 (5)	182 (9)	341 (3)
Valvular disease	681 (3)	309 (4)	80 (3)	169 (8)	123 (1)
Weight loss	293 (1)	124 (2)	35 (1)	49 (2)	85 (0.9)

Quan comorbidity components were defined using the presence of at least one ICD-9 code in the year prior to the index date (5). Comorbidity components with a prevalence of less than 2% in all groups were not considered (anemia due to blood loss, HIV/AIDS, lymphoma, paralysis, and peptic ulcer disease). Cardiac arrhythmias were divided into 4 groups: tachycardias (427.0, 427.1, 427.2, 785.0, 427.6), atrial fibrillation/flutter (427.3), pacemaker/AICD (996.01, 966.04, V45.0, V53.3), and other (426.0, 426.10, 426.12, 426.13, 426.7, 426.9, 427.4, 427.8, 427.9).

[a] Variables with absolute standardized differences after propensity score weighting of $\geq$ 0.1.

Supplemental Table 3. Hazard ratios (95% confidence interval) for kidney events, mortality, and cardiovascular events, by class of antihypertensivee medication added on to angiotensin-aldosterone system blockers, compared to thiazide diuretics, allowing for effect modification by baseline eGFR

	Full cohort	**Baseline eGFR < 60 mL/min/1.73m^2**	**Baseline eGFR ≥ 60 mL/min/1.73m^2**	**Interaction P-value**
Significant kidney events				
Beta-blockers	0.81 (0.74-0.89)	0.89 (0.72-1.09)	0.78 (0.70-0.87)	0.29
Calcium channel blockers	0.67 (0.58-0.78)	0.75 (0.56-1.01)	0.64 (0.53-0.76)	0.36
Loop diuretics	1.19 (1.00-1.41)	1.51 (1.11-2.04)	1.07 (0.86-1.34)	0.09
Thiazide diuretics	Referent	Referent	Referent	
Mortality				
Beta-blockers	1.19 (0.97-1.44)	1.11 (0.77-1.59)	1.22 (0.96-1.56)	0.67
Calcium channel blockers	0.73 (0.52-1.03)	0.64 (0.34-1.20)	0.79 (0.52-1.18)	0.59
Loop diuretics	1.67 (1.31-2.13)	1.54 (1.02-2.35)	1.74 (1.28-2.39)	0.66
Thiazide diuretics	Referent	Referent	Referent	
Cardiovascular events[a]				

Beta-blockers	1.65 (1.39-1.96)	1.14 (0.76-1.69)	1.84 (1.51-2.23)	0.04
Calcium channel blockers	1.05 (0.80-1.39	1.73 (1.01-2.96)	0.86 (0.63-1.16)	0.02
Loop diuretics	1.55 (1.05-2.27)	1.16 (0.63-2.12)	1.69 (1.07-2.69)	0.33
Thiazide diuretics	Referent	Referent	Referent	

Reference group is thiazide diuretics. Significant kidney events were $\geq$ 30% eGFR decline from baseline and eGFR < 60), initiation of dialysis, or kidney transplant (see Supplemental Table 1). Cardiovascular events were acute myocardial infarctions or stroke (see Supplemental Table 1). All models included inverse propensity of treatment weighting. Outcome models included study site, age, gender, race, and variables with absolute standardized differences after propensity score weighting of $\geq$ 0.1. Models for baseline eGFR < 60 mL/min/1.73m^2 and $\geq$ 60 mL/min/1.73m^2 include an interaction term for baseline eGFR (<60 or $\geq$ 60).

[a] Excludes individuals with prevalent coronary artery disease, stroke, cardiac arrhythmias, or congestive heart failure at baseline.

Supplemental Table 4. Hazard ratios (95% confidence interval) for significant kidney events, requiring a sustained decline in eGFR, by class of antihypertensive medication added on to angiotensin-aldosterone system blockers, compared to thiazide diuretics, N=21,897

	Beta-blockers	**Calcium Channel Blockers**	**Loop Diuretics**
Significant kidney events			
Number of events Total = 2,198	672	238	304
Crude	0.94 (0.85-1.03)	0.90 (0.78-1.04)	1.79 (1.57-2.03)
Propensity score analysis	0.82 (0.71-0.94)	0.68 (0.54-0.85)	1.43 (1.12-1.82)
Propensity score analysis adjusting for current blood pressure	0.82 (0.72-0.96)	0.65 (0.51-0.82)	1.50 (1.17-1.92)
Propensity score analysis adjusting for cumulative blood pressure	0.76 (0.66-0.89)	0.60 (0.48-0.76)	1.49 (1.17-1.91)

Reference group is thiazide diuretics. Significant kidney events were $\geq$ 30% eGFR decline from baseline and eGFR < 60) with another eGFR 90-365 days later that also had a similar decline from baseline, initiation of dialysis, or kidney transplant (see Supplemental Table 1). Propensity score analyses were weighted using generalized

stabilized inverse probability weights, with outcomes models including study site, age, gender, race and variables with absolute standardized differences after propensity score weighting of $\geq$ 0.1. For the current blood pressure adjustment, we adjusted for the mean blood pressure each month as a time-varying covariate, in order to capture any short-term blood pressure effects. For the cumulative blood pressure adjustment, we adjusted for the average of the monthly blood pressures over all preceding months, in order to capture any long-term blood pressure effects.

Supplemental Table 5. Hazard ratios (95% confidence interval) for significant kidney events, by class of antihypertensive medication added on to angiotensin-aldosterone system blockers, compared to thiazide diuretics, using eGFRs obtained three to twelve months after medication initiation as the baseline eGFR for calculation of the percent decline in eGFR

	Beta-blockers	**Calcium Channel Blockers**	**Loop Diuretics**
Number Total = 17,178	5.848	2,158	1,714
Number of events Total = 2836	960	362	394
Crude	1.15 (1.05-1.25)	1.20 (1.06-1.35)	1.92 (1.71-2.16)
Propensity score analysis	0.86 (0.76-0.97)	0.77 (0.63-0.93)	1.24 (1.01-1.54)
Propensity score analysis adjusting for current blood pressure	0.83 (0.71-0.96)	0.73 (0.59-0.91)	1.23 (0.97-1.56)
Propensity score analysis adjusting for cumulative blood pressure	0.79 (0.68-0.91)	0.69 (0.56-0.86)	1.27 (1.00-1.60)

Reference group is thiazide diuretics. Significant kidney events were $\geq$ 30% eGFR decline from baseline and eGFR < 60), initiation of dialysis, or kidney transplant (see Supplemental Table 1). All models included inverse propensity of treatment weighting. Outcome models included study site, age, gender, race, and variables with absolute standardized differences after propensity score weighting of $\geq$ 0.1.

Supplemental Table 6. Hazard ratios (95% confidence interval) for cardiovascular events (acute myocardial infarction and stroke), by class of antihypertensive medication added on to angiotensin-aldosterone system blockers, compared to thiazide diuretics

	Beta-blockers	**Calcium Channel Blockers**	**Loop Diuretics**
Number Total = 17,271	4,593	2,320	1,374
Number of events Total = 383	121	63	36
Crude	1.46 (1.15-1.85)	1.54 (1.16-2.07)	1.64 (1.14-2.35)
Propensity score analysis	1.22 (0.95-1.59)	1.02 (0.73-1.43)	1.03 (0.54-1.95)
Propensity score analysis adjusting for current blood pressure	1.25 (0.97-1.62)	1.05 (0.75-1.46)	1.08 (0.58-2.00)
Propensity score analysis adjusting for cumulative blood pressure	1.15 (0.88-1.51)	0.98 (0.70-1.37)	1.03 (0.56-1.89)

Reference group is thiazide diuretics. Cardiovascular events were acute myocardial infarctions or stroke (see Supplemental Table 1). Propensity score analyses were weighted using generalized stabilized inverse probability weights, with outcomes models including study site, age, gender, race and variables with absolute standardized differences after propensity score weighting of $\geq$ 0.1. For the current blood pressure adjustment, we adjusted for the mean blood pressure each month as a time-varying covariate, in order to capture any short-term blood pressure effects. For the cumulative blood pressure adjustment, we adjusted for the average of

the monthly blood pressures over all preceding months, in order to capture any long-term blood pressure effects. Excludes individuals with prevalent coronary artery disease, stroke, cardiac arrhythmias, or congestive heart failure at baseline.

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