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Supplemental Materials

Supplemental Table 1. Baseline characteristics of incident patients aged ≥65 years registered in the United States Renal Data System by baseline pre-dialysis diastolic blood pressure*

Patient characteristics	<60 (N=870)	60 - <70 (N=6377)	70 - <80 (N=6564)	80 - <90 (N=2680)	>=90 (N=509)	Overall (N=17003)
Demographics						
Age, years, mean (SD)	79 (6)	78 (6)	76 (6)	75 (6)	73 (5)	76 (6)
Male sex	520 (60%)	3148 (49%)	3239 (49%)	1293 (48%)	235 (46%)	8436 (45%)
Race						
White	723 (83%)	4827 (76%)	4421 (67%)	1560 (58%)	273 (54%)	11806 (69%)
Black	115 (13%)	1252 (20%)	1834 (28%)	987 (37%)	215 (42%)	4404 (26%)
Asian	28 (3%)	231 (4%)	246 (4%)	101 (4%)	20 (4%)	626 (4%)
Hispanic ethnicity	47 (5%)	524 (8%)	522 (8%)	179 (7%)	40 (8%)	1312 (8%)
Medicare/Medicaid eligible	190 (22%)	1594 (25%)	1785 (27%)	783 (29%)	162 (32%)	4515 (27%)
CVC Vascular access	528 (61%)	3890 (61%)	4252 (65%)	1943 (73%)	419 (82%)	11033 (65%)
Census data, median (Q1-Q3)						
Unemployed	9 (7, 11)	9 (7, 12)	9 (7, 13)	10 (7, 13)	10 (7, 13)	9 (7, 12)
Below poverty	12 (7, 18)	13 (8, 20)	14 (8, 21)	15 (9, 23)	15 (9, 24)	14 (8, 21)
<High school education	12 (8, 20)	13 (9, 20)	14 (9, 21)	15 (9, 22)	15 (9, 22)	14 (9, 21)
Monthly rent, $	881 (686, 1106)	878 (699, 1097)	853 (688, 1070)	828 (677, 1025)	817 (670, 1006)	861 (688, 1072)
Annual household income, $	49912 (41214, 67151)	49212 (39728, 65243)	48063 (37866, 63713)	45989 (36405, 61019)	46198 (36356, 59967)	48239 (38571, 63965)
Comorbid Conditions						
Myocardial infarction	77 (9%)	463 (7%)	398 (6%)	167 (6%)	22 (4%)	1127 (7%)
Coronary Artery Disease	398 (46%)	2406 (38%)	2093 (32%)	781 (29%)	135 (27%)	5814 (34%)
Coronary revascularization	106 (12%)	630 (10%)	554 (8%)	186 (7%)	40 (8%)	935 (9%)
Unstable Angina	57 (7%)	361 (6%)	338 (5%)	123 (5%)	23 (5%)	902 (5%)
Heart Failure	458 (53%)	2901 (46%)	2568 (39%)	994 (37%)	189 (37%)	7110 (42%)

Valvular disease	114 (13%)	710 (11%)	647 (10%)	263 (10%)	50 (10%)	1784 (11%)
Ventricular fibrillation or other arrhythmia	65 (8%)	429 (7%)	366 (6%)	139 (5%)	26 (5%)	1028(6%)
Pacemaker	41 (5%)	213 (3%)	161 (2%)	39 (1%)	7 (1%)	461 (3%)
Hypertension	686 (79%)	5180 (81%)	5357 (82%)	2233 (83%)	444 (87%)	13903 (82%)
Stroke or Transient ischemic attack	73 (8%)	524 (8%)	552 (8%)	239 (9%)	43 (9%)	1434(8%)
Peripheral artery disease	180 (21%)	1068 (17%)	942 (14%)	372 (14%)	63 (12%)	2626 (15%)
Diabetes mellitus	502 (58%)	3843 (60%)	3694 (56%)	1357 (51%)	256 (50%)	9654 (57%)
Hyperlipidemia	242 (28%)	1801 (28%)	1792 (27%)	711 (27%)	126 (25%)	4673 (28%)
Lung disease	234 (27%)	1530 (24%)	1344 (21%)	576 (22%)	98 (19%)	3783(22%)
Liver disease	39 (5%)	196 (3%)	176 (3%)	82 (3%)	22 (4%)	515 (3%)
Depression	59 (7%)	502 (8%)	471 (7%)	167 (6%)	40 (8%)	1239 (7%)
Biometric Measurements, mean(SD)						
BMI at index date	28 (7)	28 (7)	28 (7)	27 (7)	27 (6)	28 (7)
Missing, N(%)	67 (8%)	506 (8%)	524 (8%)	195 (7%)	40 (8%)	1332 (8%)
Estimated glomerular filtration rate at dialysis initiation, mL/min per 1.73m^2	14.1 (5.7)	13.1 (5.1)	11.9 (4.8)	10.9 (4.7)	10.2 (4.6)	12.0 (5.0)
Missing, N (%)	87 (10.0%)	599 (9.4%)	546 (8.3%)	201 (7.5%)	43 (8.4%)	1476(8.7%)
Dialysis length, hrs	3.5 (0.4)	3.4 (0.4)	3.5 (0.4)	3.5 (0.4)	3.5 (0.4)	3.5 (0.4)
Serum albumin, g/dL	3.4 (0.4)	3.5 (0.4)	3.5 (0.4)	3.5 (0.4)	3.5 (0.4)	3.5 (0.4)
Pre-dialysis SBP, mean (SD)	123 (14)	137 (14)	149 (14)	161 (15)	172 (15)	146 (18)
Pre-dialysis DBP, mean (SD)	58 (2)	66 (3)	75 (3)	84 (3)	94 (4)	72 (9)
Dialysis sessions with intradialytic hypotension, %, mean (SD)	21.0% (22.8%)	13.5% (16.6%)	8.8% (11.6%)	6.6% (9.3%)	5.1% (7.7%)	10.7% (14.5%)

*****All values are N (%) unless otherwise stated. CVC – central venous catheter; IQR – interquartile range; SD – standard deviation; TIA – transitory ischemic attack.

*Note: Three patients were missing DBP at baseline and were excluded from this table. Overall, 144 patients reported Native American race and 23 patients reported other race. CVC Vascular access was missing in 69 (0.4%) patients. <1% of patients had data missing for serum albumin, dialysis length, Hispanic ethnicity, and each of the Census-based socioeconomic metrics. These variables cannot be tabulated owing to research regulations prohibiting the disclosure of cell sizes <10.

Supplemental Table 2. Baseline characteristics of incident patients aged ≥65 years registered in the United States Renal Data System by baseline frequency of intradialytic hypotension (defined as nadir systolic blood pressure < 90 mm Hg)*

Patient characteristics	0% (N=4777)	0 - <6% (N=4364)	6 - <14% (N=3499)	>=14% (N=4360)	Overall (N=17003)
Demographics					
Age, years, mean (SD)	76 (6)	76 (6)	77 (6)	77 (6)	76 (6)
Male sex	2488 (52%)	2109 (48%)	1690 (48%)	2148 (49%)	8436 (45%)
Race					
White	3166 (66%)	2975 (68%)	2456 (70%)	3207 (74%)	11806 (69%)
Black	1401 (29%)	1186 (27%)	871 (25%)	945 (22%)	4404 (26%)
Asian	176 (4%)	178 (4%)	130 (4%)	142 (3%)	626 (4%)
Hispanic ethnicity	380 (8%)	332 (8%)	253 (7%)	347 (8%)	1312 (8%)
Medicare/Medicaid eligible	1188 (25%)	1075 (25%)	957 (27%)	1294 (30%)	4515 (27%)
CVC Vascular access	2973 (62%)	2660 (61%)	2282 (65%)	3117 (72%)	11033 (65%)
Census data, median (Q1-Q3)					
Unemployed	9 (7, 13)	9 (7, 12)	9 (7, 12)	9 (7, 12)	9 (7, 12)
Below poverty	14 (8, 21)	14 (8, 20)	14 (8, 21)	14 (8, 20)	14 (8, 21)
<High school education	14 (9, 21)	14 (9, 21)	14 (9, 21)	14 (9, 21)	14 (9, 21)
Monthly rent, $	877 (704, 1097)	861 (691, 1073)	848 (682, 1059)	849 (676, 1055)	861 (688, 1072)
Annual household income, $	48100 (37959, 63982)	48539 (38700, 64425)	48151 (38506, 63022)	48325 (39129, 63896)	48239 (38571, 63965)
Comorbid Conditions					
Myocardial infarction	278 (6%)	261 (6%)	246 (7%)	342 (8%)	1127 (7%)
Coronary Artery Disease	1529 (32%)	1375 (32%)	1217 (35%)	1692 (39%)	5814 (34%)
Coronary revascularization	407 (9%)	351 (8%)	332 (10%)	426 (9%)	935 (9%)
Unstable Angina	264 (6%)	220 (5%)	178 (5%)	240 (6%)	902 (5%)
Heart Failure	1918 (40%)	1641 (37%)	1468 (42%)	2083 (48%)	7110 (42%)
Valvular disease	463 (10%)	385 (9%)	378 (11%)	558 (13%)	1784 (11%)
Ventricular fibrillation or other arrhythmia	276 (6%)	203 (5%)	218 (6%)	328 (8%)	1028(6%)

Pacemaker	98 (2%)	112 (3%)	116 (3%)	135 (3%)	461 (3%)
Hypertension	3884 (81%)	3490 (80%)	2906 (83%)	3620 (83%)	13903 (82%)
Stroke or Transient ischemic attack	359 (8%)	296 (7%)	309 (9%)	467 (11%)	1434(8%)
Peripheral artery disease	669 (14%)	558 (13%)	567 (16%)	831 (19%)	2626(15%)
Diabetes mellitus	2695 (56%)	2419 (55.4%)	1993 (57%)	2545 (58%)	9654(57%)
Hyperlipidemia	1284 (27%)	1151 (26%)	997 (29%)	1240 (28%)	4673 (28%)
Lung disease	957 (20%)	866 (20%)	779 (22%)	1180 (27%)	3783(22%)
Liver disease	134 (3%)	100 (2%)	106 (3%)	175 (4%)	515 (3%)
Depression	289 (6%)	248 (6%)	266 (8%)	436 (10%)	1239 (7%)
Biometric Measurements, mean(SD)					
BMI at index date	28 (7)	28 (7)	28 (7)	28 (7)	28 (7)
Missing, N(%)	357 (8%)	308 (7%)	260 (7%)	407 (9%)	1332 (8%)
Estimated glomerular filtration rate at dialysis initiation, mL/min per 1.73m^2	11.0 (8.2, 14.5)	11.4 (8.6, 14.8)	11.7 (8.6, 15.2)	12.0 (9.0, 15.6)	12.0 (5.0)
Missing, N (%)	394 (8.2%)	343 (7.9%)	270 (7.7%)	469 (10.8%)	1476(8.7%)
Dialysis length, hrs	3.5 (0.4)	3.5 (0.4)	3.4 (0.4)	3.5 (0.4)	3.5 (0.4)
Serum albumin, g/dL	3.6 (0.4)	3.6 (0.4)	3.5 (0.4)	3.4 (0.5)	3.5 (0.4)
Pre-dialysis SBP, mean (SD)	153 (16)	150 (16)	145 (16)	135 (18)	146 (18)
Pre-dialysis DBP, mean (SD)	75 (9)	73 (8)	72 (8)	69 (8)	72 (9)
Dialysis sessions with intradialytic hypotension, %, mean (SD)	0% (0%)	3.8% (1.2%)	9.7% (1.2%)	30.1% (16.3%)	10.7% (14.5%)

*****All values are N (%) unless otherwise stated. CVC – central venous catheter; IQR – interquartile range; SD – standard deviation; TIA – transitory ischemic attack.

*Note: Three patients were missing IDH at baseline and were excluded from this table. Overall, 144 patients reported Native American race and 23 patients reported other race. CVC Vascular access was missing in 69 (0.4%) patients. <1% of patients had data missing for serum albumin, dialysis length, Hispanic ethnicity, and each of the Census-based socioeconomic metrics. These variables cannot be tabulated owing to research regulations prohibiting the disclosure of cell sizes <10.

Supplemental Table 3: Association of pre-dialysis systolic blood pressure, diastolic blood pressure and intradialytic hypotension as categorical variables with incident atrial fibrillation. Intradialytic hypotension defined as nadir intradialytic systolic blood pressure < 90 mm Hg. Model 0, adjusted for year of incident ESRD; Model 1 additionally adjusted for age, sex, race and Hispanic ethnicity; Model 2 additionally adjusted for census division, socioeconomic status variables, and Medicaid dual eligibility; Model 3 additionally adjusted for comorbidities and vascular access; and Model 4 additionally adjusted for albumin, eGFR, BMI, and mean dialysis treatment length.

	Model 0	Model 1	Model 2	Model 3	Model 4
Exposure	**HRs (95% CI)**	**HRs (95% CI)**	**HRs (95% CI)**	**HRs (95% CI)**	**HRs (95% CI)**
Pre-dialysis systolic blood pressure (mm Hg)					
<120	2.2 (2.0-2.3)	1.9 (1.6-2.1)	1.9 (1.6-2.1)	1.7 (1.3-1.9)	1.5 (1.1-1.8)
120 to <140	1.5 (1.4-1.6)	1.4 (1.3-1.5)	1.3 (1.0-1.5)	1.2 (1.0-1.3)	1.1 (0.9-1.3)
140 to <160	Ref	Ref	Ref	ref	ref
≥160	0.9 (0.8-1.0)	0.9 (0.8-1.0)	0.9 (0.8-1.0)	1.0 (0.8-1.1)	1.0 (0.8-1.2)
Pre-dialysis diastolic blood pressure (mm Hg)					
<60	1.6 (1.5-1.7)	1.5 (1.2-1.8)	1.5 (1.2-1.8)	1.3 (1.0-1.6)	1.2 (0.9-1.6)
60 to <70	1.4 (1.3-1.5)	1.1 (1.0-1.3)	1.1 (0.9-1.3)	1.1 (0.9-1.2)	1.0 (0.9-1.2)
70 to <80	1.1 (1.0-1.2)	1.0 (0.9-1.1)	1.0 (0.8-1.1)	1.0 (0.9-1.1)	1.0 (0.9-1.2)
80 to <90	Ref	Ref	Ref	Ref	Ref
≥90	1.0 (0.9-1.3)	1.2 (1.0-1.4)	1.1 (0.9-1.3)	1.1 (0.9-1.2)	1.1 (0.9-1.3)
Intradialytic hypotension (%)					
0	Ref	Ref	Ref	Ref	Ref
>0 to <6	1.02 (0.93-1.11)	1.10 (0.88-1.32)	1.06 (0.84-1.28)	1.04 (0.86-1.22)	1.04 (0.86-1.22)
6 to 14	1.13 (1.04-1.23)	1.11 (1.01-1.21)	1.04 (0.82-1.26)	1.08 (0.93-1.23)	1.07 (0.92-1.22)
>14	1.31 (1.23-1.40)	1.25 (1.17-1.34)	1.14 (0.87-1.41)	1.12 (0.97-1.27)	1.11 (0.96-1.25)

Supplemental Full Methods

Source Population

We used data from the United States Renal Data System (USRDS), the national registry for patients with ESKD,[1] and data from the electronic health records of a large dialysis provider in the U.S. (DaVita, Inc., Denver, CO) covering years 2006 to 2011. The databases were merged on the individual patient level using a HIPAA-compliant approach approved by the National Institutes of Diabetes and Digestive and Kidney Disease (NIDDK). The USRDS contains baseline demographic and limited comorbidity data for almost all U.S. patients with incident ESKD (form CMS-2728), as well as data from final-action Medicare claims (Parts A, B, D) for eligible patients, and reported cause of death from the ESKD Death Notification (form CMS-2746). The dialysis provider database provides highly granular and longitudinal data on hemodynamic parameters, laboratory values measured in a central laboratory, and hemodialysis-related parameters measured at the point of care.

We identified from the USRDS patients with incident ESKD older than 67 years who initiated chronic dialysis between January 1, 2006 and October 1, 2011 in the 50 U.S. states and the District of Columbia (**Figure 1**). We restricted the cohort to patients with uninterrupted (no coverage gaps of ≤3 days) Medicare Part A&B coverage for the 2 years leading up to the date of the first dialysis for incident ESKD. We ascertained minimum active Medicare system use by requiring at least one billing claim to Medicare in the 730-366 days and 365-0 days preceding incident ESKD. We selected all patients who initiated ESKD treatment with in-center hemodialysis in a DaVita unit and continued on hemodialysis at day 91 after incident ESKD, which we defined as our index date. Patients who died, received a kidney transplant, recovered kidney function, received any peritoneal dialysis treatment, lost Medicare Part A&B coverage or who did not have evidence of ≥ 1 dialysis session in a DaVita unit prior to the index date were excluded. We identified eligible subjects for incident atrial fibrillation by excluding all patients with

any billing claims containing an International Classification of Diseases, 9th Revision (ICD-9) diagnosis code of 427.3x between 730 days prior to ESKD and the index date.[2]

We selected patients with 10-16 DaVita hemodialysis sessions in the 30 days prior to the index date, to exclude patients who may have been on only twice weekly dialysis and patients requiring more frequent dialysis (4-5 times weekly) sessions. To account for hospitalized days, we credited patients 3/7 of a hemodialysis session for each day spent in a hospital during the 30 days prior to the index date. For example, a patient hospitalized for 28 / 30 days would be credited with 3/7 * 28 = 12 hemodialysis sessions and thus remain in the cohort. Finally, we excluded any patients without any laboratory results recorded in DaVita prior to the index date.

Outcome: Incident Atrial Fibrillation

We identified incident atrial fibrillation from any inpatient claim with ICD-9 diagnosis code of 427.3x, or from any outpatient claim with ICD-9 diagnosis code of 427.3x, provided that there was a second, subsequent inpatient or outpatient code, in any position, separated by any number of days. Of note, >85% of incident atrial fibrillation in patients on hemodialysis is first recorded in inpatient claims[3].

Exposures: Blood Pressure Parameters

We divided follow-up time after the index date into 90-day quarters. We averaged pre-dialysis seated systolic blood pressure (SBP) and diastolic blood pressure (DBP) using all available values for a given quarter. Using the %SPECI SAS Macro[4], we determined that modeling SBP and DBP as a

squared term provided the best combination of model fit (lowest AIC and best predicted fit) and clinical applicability. We defined intradialytic hypotension as any session with a nadir SBP <90 mm Hg[5] and calculated the proportion of sessions with intradialytic hypotension in a given quarter. Using a similar approach as for SBP and DBP, we determined that intradialytic hypotension was best modeled as a linear term.

Covariates

We collected baseline information at time of incident ESKD from the Medical Evidence Report (form CMS-2728) in the USRDS: age, sex, Medicaid dual eligibility status, incident ESKD year, reported race (white, black, Asian, Native American, Pacific Islander, and other) and Hispanic ethnicity, body mass index (BMI), and estimated glomerular filtration rate (eGFR). We obtained area-level socioeconomic data from the U.S. Census Bureau American Community Survey using ZIP code as the area of analysis in order to match the smallest indicator of geography available in the registry data.[6] Neighborhood-level socioeconomic variables at the zip code level included median rent, median household income, percentage living below the federal poverty line, percentage unemployed, and percentage with less than a high-school education.

Comorbidities were obtained from USRDS claims using the ICD-9 diagnosis and procedure codes from at least one inpatient or two or more outpatient encounters separated by at least 1 day[7]. We ascertained baseline comorbidities using all available claims from 730 days prior to the index date. We also updated comorbidities for each patient for each subsequent 90-day quarter. From the DaVita database, information on serum albumin and dialysis session length of time (in minutes) was averaged and also updated for each subsequent 90-day quarter. We ascertained whether a central venous catheter was used for vascular access during each quarter. All continuous variables were treated as spline terms with 3 knots.

Statistical Analysis

We compared patients' baseline characteristics across four different levels of baseline SBP, DBP, and intradialytic hypotension using counts and proportions for categorical variables, and mean (standard deviation) or median (interquartile ranges) for continuous variables.

We followed the patients from the index date until they developed incident atrial fibrillation. We related the development of incident atrial fibrillation during quarter Q_i with the blood pressure parameters ascertained during quarter Q_{i-1}, where i represents the quarter indicator. We censored follow-up at the earliest among end of the study period (Dec 31, 2011), when patients stopped in-center hemodialysis treatment, lost Medicare Parts A & B coverage, died, underwent kidney transplant or discontinued receiving dialysis within the DaVita network. We considered a patient as having left DaVita if 1) there were 90-180 days between two hemodialysis treatment sessions without any evidence of hospitalization during that time; or 2) if there were more than 180 days between two hemodialysis treatment sessions. In these cases, the follow-up time is censored at the end of the quarter following the first of the two hemodialysis session.

We applied a Cox model as a function of a time-varying exposure (extended Cox) to compute adjusted hazard ratios (HRs) for the association with atrial fibrillation of each exposure (SBP, DBP, and intradialytic hypotension) in separate analyses. Hazard ratios were adjusted in five nested models: Model 0, adjusted for year of incident ESKD; Model 1 additionally adjusted for age, sex, race and Hispanic ethnicity; Model 2 additionally adjusted for census division, socioeconomic status variables, and Medicaid dual eligibility; Model 3 additionally adjusted for comorbidities and vascular access; and Model 4 additionally adjusted for albumin, eGFR, BMI, number of dialysis sessions and mean dialysis length.

To aid the interpretation of results when modeling the exposure with a quadratic effect, we generated two separate plots. Both plots compare the hazard for atrial fibrillation between two hypothetical patients that are similar for all covariates at a time *t* but differ in their average blood

pressure measurements. In the first plot (A), pre-dialysis blood pressure anywhere in the possible range of (SBP 110 to 190 mm Hg for SBP, 60 to 100 mm Hg for DBP) is compared to a fixed pre-dialysis blood pressure (140 mm Hg for SBP, 80 mm Hg for DBP). The second plot (B) shows the HRs reflecting a 10 mm Hg reduction in pre-dialysis SBP of or a 5 mm Hg reduction in pre-dialysis DBP across the possible ranges of SBP and DBP levels, respectively. The latter analysis corresponds to a clinical scenario where a physician may consider the potential reductions in atrial fibrillation risk from a blood pressure lowering therapy.

Missing Data

In our cohort of 17,000 patients, 2675 had at least 1 variable missing for every quarter the patient remained in the analytical cohort. In terms of records, out of 103,464 quarterly records, 11,789 (11.4%) had missing data. The percentage of missing for a given non time-varying variable ranged between 0% and 7.7% (baseline estimated glomerular filtration rate). We required patients to have at least one lab value at baseline and allowed follow-up values to be missing for any variable. 0.34% of patients had at least 1 pre-sitting SBP record missing with the number of pre-siting SBP records missing ranging between 0.02% and 0.59%. 0.34% of patients had at least 1 pre-sitting DBP record missing with the number of pre-siting DBP records missing ranging between 0.02% and 0.60%. 0.34% of patients had at least 1 IDH record missing with the number of percent of IDH records missing ranging between 0.02% and 0.59%. For serum albumin and dialysis-related information (dialysis session length and vascular catheter access) we allowed any record to be missing (including baseline) and the percentage of records with missing values varied between 0.06% (albumin) and 2.36% (dialysis length).

Missing data were handled using Multiple Imputation by Chained Equations (MICE) approach as implemented in R, and twelve imputed datasets were obtained for each outcome.[8,9] We assumed that the data were missing at random, conditional on observed variables. This is a reasonable assumption given the baseline and intermittent values of the missing variables. In addition to the exposure and all covariates included in the analysis model, the imputation model also included the event indicator and the Nelson–Aalen estimator of the cumulative marginal hazard H(T), where T is the time to event or censoring.[10] Given that patients are more likely to be missing time-varying observations if they spend time in the hospital, we added as an auxiliary variable BMI, pre-dialysis nephrology care, and the total number of days the patient spent in the hospital and the number of non-nephrology outpatient visits in the same quarter when the exposure and other covariates were measured. Other auxiliary variables included were: height and weight from the Medical Evidence Form to help with imputation of BMI; any pre-dialysis nephrology care and the number of non-nephrology visits to help with imputation of BMI, eGFR and indicator of patients listed for kidney transplantation. Some of the variables included in the analysis model can also be viewed as auxiliary variables: for example, serum albumin is expected to be useful for imputation of BMI and eGFR, and the number dialysis sessions, similar to hospitalized days, are likely to be related to the reason why certain missing data are missing. The inclusion of auxiliary variables has been shown to improve the imputation model.[11] We combined the estimates and standard errors obtained from the model applied to each imputed dataset using Rubin's rules.

The study was approved by institutional review boards at Stanford University (protocol #IRB-17904) and Baylor College of Medicine (protocol #H-36408), and active Data Use Agreements with the NIDDK were in place. All statistical analyses were performed using SAS, version 9.4 (SAS Institute, Inc, Cary, NC) and R version 3.1.2.

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