

Supplementary Appendix 1

Details on Methods

Details on data sources and linking strategy

Data for these analyses were assembled from two primary sources. First, we utilized the USRDS, a national system that collects data on virtually all patients undergoing chronic dialysis in the U.S. From the USRDS, we received standard patient records that included demographics, comorbidities, functional status, and dialysis modality (from the Medical Evidence Form, known as “CMS 2728”) at the time of dialysis commencement. The USRDS also incorporates data on inpatient and outpatient medical claims paid by Medicare, which provides insurance coverage for the vast majority of dialysis patients. The Medicare claims files contain International Classification of Diseases – 9th Revision (ICD-9) codes for each date of service.

To make possible the study of dually-eligible individuals, the USRDS performed a deterministic match of these Medicaid beneficiaries against the core USRDS files to identify dually-eligible individuals on chronic dialysis. This permitted us to link USRDS data with Centers for Medicare & Medicaid Services (CMS) Medicaid prescription drug billing claims, in the form of the Medicaid Analytic eXtract Personal Summary Files and the final action prescription drug claims files. These sources were linked using previously-described methodology to permit identification of dually-eligible dialysis patients in 2000-05.

Details on covariates and descriptive variables

Demographic and clinical variables, drawn from the CMS 2728 dialysis intake form, included age, sex, race by ethnicity, body mass index, employment status, smoking, substance

abuse (alcohol or illicit drugs), ability to ambulate and to transfer, cause of ESRD, and dialysis modality. Comorbidities consisted of diabetes, congestive heart failure, coronary artery disease, cerebrovascular disease, and peripheral vascular disease. Ethnicity was categorized into one of four mutually-exclusive groups: non-Hispanic Caucasians, non-Hispanic African-Americans, Hispanics, and Others. Body mass index (BMI) was classified into 4 categories: $< 20 \text{ kg/m}^2$, $20\text{-}24.99 \text{ kg/m}^2$, $25\text{-}29.99 \text{ kg/m}^2$, $\geq 30 \text{ kg/m}^2$. Cause of ESRD was categorized as diabetes, hypertension, glomerulonephritis, or other. Because the CMS 2728 form is structured such that diabetes and hypertension may be considered as both a cause of ESRD and/or a “freestanding” comorbidity, for the purposes of the present analysis, these two covariates were considered a comorbidity if they were listed as either the cause of ESRD or as a “freestanding” comorbidity on the CMS 2728 form. Dialysis modality at time of dialysis initiation was categorized as in-center hemodialysis or self-care dialysis (home hemodialysis or peritoneal dialysis). We used a modified form of the Liu Comorbidity Index. This index is a summary measure of disease burden which also includes cause of ESRD; therefore, cause of ESRD was not modeled separately. However, our form of this index used only 90 (rather than 180) days in which to acquire claims since we have previously found (data under peer review) little difference in indices generated using 90 or 180 days of claims data and because we had required that patients have Medicaid and Medicare coverage throughout the first 90 days.

Details on the determination of chronic atrial fibrillation

The ICD-9 code 427.31 was used to identify AF claims using a well-established algorithm designed to determine the presence of nontransient, nonvalvular AF. Individuals who had hyperthyroidism or thyrotoxicosis were eliminated, based on the presence of relevant ICD-9

and/or CPT (Common Procedural Technology) and/or HCPCS (Healthcare Common Procedure Coding System) codes, or by a prescription at any time for methimazole or propothiouracil. We next eliminated patients with evidence of valvular heart disease (using ICD-9 codes). Finally, to minimize potential misclassification from perioperative sources of AF (e.g., coronary artery bypass surgery), claims (rather than individuals) were eliminated unless there was a preexisting (> 30 d) AF claim. This resulted in the elimination of individuals in whom AF claims were only proximally related to cardiac surgery, but allowed inclusion of individuals in whom there was evidence of preexisting AF. To classify individuals as having chronic AF, we initially required a total of 2 (or more) AF claims, separated by ≥ 30 days, of which no more than 1 was an inpatient claim. Additionally, we expunged all outpatient AF claims within 7 days of a subsequent AF claim-containing admission and within 30 days after an AF claim-containing admission, retaining only the original inpatient claim. Patients were divided into AF-free time and, if they developed AF, AF-time.

Supplementary Table 1. Ischemic strokes per 1000 patient-years, by year examined.

Year	Ischemic Stroke Rate ¹
2000	32.4
2001	33.4
2002	36.0
2003	34.5
2004	33.1
2005	29.8

¹Events per 1000 patient-years

Supplementary Table 2. Unadjusted ischemic stroke rates, per 1000 patient-years, and observed:expected adjusted rate ratios, with 99% confidence intervals, by state.

State	Ischemic Stroke Rate ¹	Observed-to-Expected Adjusted Rate Ratios (99% Confidence Intervals)				
		Unadjusted	Age	Age, Sex	Age, Sex, Race	Full ²
AL	36.0	1.21 (1.05 – 1.39)	1.27 (1.11 – 1.47)	1.25 (1.09 – 1.44)	1.16 (1.02 – 1.32)	1.12 (0.99 – 1.26)
AK	20.9	0.90 (0.64 – 1.26)	0.89 (0.61 – 1.30)	0.90 (0.63 – 1.28)	0.95 (0.72 – 1.25)	0.96 (0.77 – 1.21)
AZ	25.9	0.89 (0.75 – 1.06)	0.90 (0.76 – 1.08)	0.91 (0.77 – 1.09)	0.94 (0.80 – 1.11)	0.97 (0.84 – 1.12)
AR	37.1	1.12 (0.94 – 1.33)	1.16 (0.97 – 1.39)	1.15 (0.96 – 1.37)	1.09 (0.92 – 1.28)	1.04 (0.90 – 1.21)
CA	28.1	0.92 (0.84 – 1.01)	0.95 (0.86 – 1.05)	0.95 (0.87 – 1.05)	0.94 (0.86 – 1.03)	0.96 (0.88 – 1.04)
CO	24.8	0.90 (0.72 – 1.13)	0.93 (0.73 – 1.17)	0.93 (0.74 – 1.17)	0.95 (0.77 – 1.16)	0.96 (0.80 – 1.15)
CT	31.3	0.99 (0.82 – 1.19)	0.95 (0.78 – 1.15)	0.95 (0.79 – 1.15)	0.96 (0.81 – 1.14)	0.95 (0.81 – 1.11)
DE	42.0	1.14 (0.88 – 1.46)	1.15 (0.88 – 1.50)	1.15 (0.89 – 1.49)	1.09 (0.87 – 1.36)	1.07 (0.88 – 1.31)
DC	36.5	1.09 (0.85 – 1.40)	1.13 (0.86 – 1.47)	1.11 (0.86 – 1.43)	0.99 (0.80 – 1.23)	1.02 (0.84 – 1.24)
FL	32.7	1.00 (0.90 – 1.11)	1.00 (0.90 – 1.12)	1.02 (0.92 – 1.13)	0.99 (0.90 – 1.09)	0.99 (0.90 – 1.09)
GA	32.6	1.14 (1.01 – 1.27)	1.20 (1.06 – 1.35)	1.17 (1.04 – 1.32)	1.07 (0.96 – 1.20)	1.04 (0.94 – 1.15)
HI	25.5	0.90 (0.70 – 1.17)	0.91 (0.69 – 1.20)	0.91 (0.69 – 1.19)	0.99 (0.78 – 1.25)	0.97 (0.79 – 1.19)
ID	20.0	0.84 (0.64 – 1.12)	0.82 (0.60 – 1.12)	0.85 (0.63 – 1.14)	0.91 (0.71 – 1.16)	0.94 (0.76 – 1.16)
IL	35.4	1.05 (0.94 – 1.17)	1.03 (0.92 – 1.15)	1.03 (0.92 – 1.15)	1.01 (0.91 – 1.11)	1.01 (0.92 – 1.12)
IN ³	37.3	1.16 (1.02 – 1.33)	1.15 (1.00 – 1.32)	1.14 (1.00 – 1.31)	1.14 (1.00 – 1.29)	1.11 (0.99 – 1.25)
IA	29.9	0.94 (0.77 – 1.15)	0.89 (0.72 – 1.10)	0.89 (0.73 – 1.10)	0.93 (0.77 – 1.12)	0.95 (0.80 – 1.12)
KS	26.4	0.87 (0.70 – 1.09)	0.85 (0.68 – 1.07)	0.86 (0.69 – 1.07)	0.88 (0.73 – 1.07)	0.91 (0.76 – 1.09)
KY	30.3	0.95 (0.80 – 1.12)	0.96 (0.81 – 1.14)	0.96 (0.81 – 1.13)	0.98 (0.84 – 1.14)	0.97 (0.84 – 1.12)
LA	36.3	1.15 (1.01 – 1.31)	1.20 (1.05 – 1.38)	1.18 (1.03 – 1.35)	1.09 (0.96 – 1.23)	1.07 (0.95 – 1.20)
ME	28.5	0.95 (0.73 – 1.23)	0.91 (0.69 – 1.20)	0.93 (0.71 – 1.21)	0.97 (0.77 – 1.22)	0.97 (0.80 – 1.19)
MD	36.7	1.14 (0.99 – 1.31)	1.15 (0.99 – 1.32)	1.13 (0.98 – 1.30)	1.05 (0.92 – 1.20)	1.07 (0.94 – 1.20)
MA	34.5	0.94 (0.80 – 1.10)	0.89 (0.75 – 1.05)	0.90 (0.76 – 1.06)	0.93 (0.80 – 1.08)	0.95 (0.82 – 1.09)
MI	36.1	1.11 (0.99 – 1.25)	1.10 (0.98 – 1.24)	1.10 (0.98 – 1.23)	1.06 (0.96 – 1.18)	1.04 (0.94 – 1.15)
MN	28.6	0.92 (0.76 – 1.11)	0.88 (0.72 – 1.07)	0.89 (0.74 – 1.08)	0.93 (0.79 – 1.11)	0.93 (0.80 – 1.09)
MS	37.5	1.27 (1.09 – 1.47)	1.36 (1.17 – 1.59)	1.32 (1.14 – 1.54)	1.19 (1.03 – 1.37)	1.18 (1.03 – 1.34)

MO	37.0	1.13 (0.98 – 1.30)	1.14 (0.98 – 1.32)	1.13 (0.98 – 1.30)	1.10 (0.96 – 1.25)	1.07 (0.94 – 1.21)
MT	27.8	0.98 (0.74 – 1.31)	0.98 (0.72 – 1.34)	0.99 (0.73 – 1.33)	1.01 (0.79 – 1.30)	1.02 (0.82 – 1.27)
NE	24.8	0.82 (0.65 – 1.05)	0.79 (0.61 – 1.02)	0.80 (0.62 – 1.03)	0.85 (0.69 – 1.06)	0.90 (0.74 – 1.09)
NV	30.9	0.96 (0.75 – 1.22)	0.98 (0.76 – 1.26)	0.98 (0.77 – 1.26)	0.99 (0.80 – 1.23)	0.99 (0.82 – 1.19)
NH	29.1	0.91 (0.69 – 1.20)	0.87 (0.65 – 1.17)	0.89 (0.67 – 1.18)	0.94 (0.74 – 1.19)	0.95 (0.78 – 1.17)
NJ	41.5	1.09 (0.96 – 1.23)	1.06 (0.93 – 1.20)	1.07 (0.94 – 1.21)	1.03 (0.92 – 1.16)	1.04 (0.93 – 1.16)
NM	16.0	0.74 (0.58 – 0.95)	0.76 (0.59 – 0.99)	0.77 (0.60 – 0.99)	0.82 (0.66 – 1.01)	0.86 (0.71 – 1.04)
NY	30.3	0.90 (0.81 – 1.01)	0.89 (0.80 – 1.00)	0.89 (0.80 – 1.00)	0.87 (0.79 – 0.96)	0.90 (0.82 – 0.98)
NC	36.9	1.28 (1.14 – 1.43)	1.35 (1.20 – 1.51)	1.32 (1.18 – 1.47)	1.22 (1.10 – 1.35)	1.15 (1.04 – 1.27)
ND	21.9	0.85 (0.63 – 1.15)	0.80 (0.57 – 1.11)	0.82 (0.60 – 1.12)	0.89 (0.69 – 1.15)	0.93 (0.75 – 1.16)
OH	39.0	1.11 (1.00 – 1.24)	1.09 (0.97 – 1.22)	1.08 (0.97 – 1.21)	1.07 (0.97 – 1.19)	1.03 (0.94 – 1.14)
OK	38.1	1.18 (1.01 – 1.38)	1.22 (1.03 – 1.45)	1.20 (1.02 – 1.42)	1.21 (1.04 – 1.41)	1.16 (1.01 – 1.34)
OR	27.0	0.94 (0.76 – 1.18)	0.96 (0.76 – 1.21)	0.96 (0.77 – 1.21)	1.00 (0.82 – 1.22)	0.99 (0.83 – 1.19)
PA	35.0	1.00 (0.89 – 1.13)	0.98 (0.87 – 1.11)	0.98 (0.87 – 1.10)	0.98 (0.88 – 1.09)	0.98 (0.88 – 1.09)
RI	21.8	0.82 (0.61 – 1.11)	0.78 (0.56 – 1.07)	0.80 (0.59 – 1.08)	0.86 (0.67 – 1.11)	0.91 (0.73 – 1.13)
SC	37.5	1.24 (1.09 – 1.41)	1.31 (1.14 – 1.50)	1.27 (1.11 – 1.46)	1.15 (1.01 – 1.30)	1.10 (0.98 – 1.24)
SD	19.4	0.87 (0.65 – 1.16)	0.83 (0.61 – 1.14)	0.85 (0.63 – 1.14)	0.92 (0.72 – 1.17)	0.94 (0.76 – 1.16)
TN	34.7	1.11 (0.97 – 1.27)	1.15 (1.00 – 1.32)	1.13 (0.99 – 1.30)	1.09 (0.96 – 1.24)	1.06 (0.94 – 1.19)
TX	30.0	1.03 (0.94 – 1.12)	1.10 (1.00 – 1.21)	1.08 (0.98 – 1.19)	1.01 (0.93 – 1.10)	0.99 (0.91 – 1.07)
UT	28.8	0.93 (0.71 – 1.22)	0.94 (0.71 – 1.26)	0.95 (0.72 – 1.26)	0.99 (0.78 – 1.25)	1.00 (0.82 – 1.23)
VT	23.1	0.95 (0.70 – 1.29)	0.93 (0.66 – 1.29)	0.93 (0.68 – 1.28)	0.97 (0.75 – 1.25)	0.98 (0.79 – 1.23)
VA	35.6	1.11 (0.98 – 1.26)	1.13 (0.99 – 1.29)	1.12 (0.99 – 1.27)	1.05 (0.93 – 1.18)	1.04 (0.93 – 1.17)
WA	28.1	0.91 (0.77 – 1.09)	0.91 (0.76 – 1.09)	0.92 (0.77 – 1.10)	0.96 (0.81 – 1.12)	0.95 (0.82 – 1.11)
WV	41.0	1.19 (0.98 – 1.45)	1.20 (0.98 – 1.47)	1.18 (0.97 – 1.44)	1.18 (0.99 – 1.42)	1.13 (0.95 – 1.33)
WI	31.4	0.95 (0.81 – 1.11)	0.91 (0.78 – 1.08)	0.92 (0.79 – 1.08)	0.95 (0.82 – 1.10)	0.93 (0.81 – 1.06)
WY	18.5	0.90 (0.64 – 1.27)	0.89 (0.61 – 1.30)	0.90 (0.63 – 1.29)	0.94 (0.72 – 1.25)	0.96 (0.76 – 1.21)

¹Unadjusted rate, per 1000 patient-years.

²Adjusted for age, sex, and race, as well as for the comorbidity and other factors shown in Table 2.

³The 99% confidence intervals exceed unity at the thousandths place for the Age- and the Age,Sex,Race-adjusted models.