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BENEFITS IMPROVEMENT AND PROTECTION ACT'S IMPACT ON TRANSPLANTATION RATES AMONG ELDERLY MEDICARE BENEFICIARIES WITH END-STAGE RENAL DISEASE

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Abstract

Background—The Benefits Improvement and Protection Act (BIPA) expanded Medicare coverage for post-transplant immunosuppressants for elderly patients and others eligible for Medicare beyond their ESRD status, yet retained the three year limit for patients eligible solely because of ESRD status. Our objective was to determine BIPA's impact on renal transplantation among elderly patients (age 65+) affected by BIPA.

Methods—Medicare claims and the United States Renal Data System Standard Analysis Files were used to analyze the likelihood of transplantation among elderly patients, all of whom were affected by BIPA, versus the non-elderly, many of whom were unaffected by BIPA. A difference-in-differences approach and generalized logistic regressions were used to estimate BIPA's impact.

Results—Analysis of data for 632,904 ESRD Medicare beneficiaries who met inclusion/exclusion criteria suggest that BIPA made elderly patients more likely (Relative Likelihood = 1.36 (95% CI: 1.32 – 1.41)) to have a transplant. The likelihood for non-elderly patients decreased following BIPA (Relative Likelihood = 0.93 (95% CI: 0.92 – 0.94)).

Conclusion—Transplantation rates increased among those elderly patients, all of whom were affected by BIPA by extending immunosuppressant coverage under BIPA. These results suggest

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that removing financial barriers to post-transplant care may positively impacts transplantation rates, yet raise questions regarding whether the law shifted transplants from younger to older patients.

Keywords

Medicare; ESRD; Policy

INTRODUCTION

Before the Benefits Improvements and Protection Act (BIPA) of 2000, Medicare coverage for post-transplant immunosuppressive therapy generally ended three years after a kidney transplant. However, the medical necessity for post-transplant care continues beyond three years and involves lifetime use of expensive immunosuppressive drugs.(1) If a transplant patient cannot afford immunosuppressive drugs and discontinues therapy, graft failure is almost inevitable,(2, 3) which will return the patient to dialysis and likely to the transplant wait list for a second transplantation.

BIPA 2000 eliminated the three-year coverage limit for immunosuppressive drugs for end-stage renal disease (ESRD) patients eligible for Medicare based on age or due to reasons other than ESRD status.(4) The BIPA 2000 provisions, however, maintained the three-year coverage limit for immunosuppressive drugs for non-elderly Medicare beneficiaries whose eligibility is based solely on ESRD status. Thus, all elderly Medicare beneficiaries with ESRD, but only some non-elderly Medicare ESRD beneficiaries qualify for an extension of benefits for post-transplant immunosuppressive therapy (See Figure 1).

Many factors influence the decision to undergo kidney transplantation. These include the availability of kidneys for transplant; medical screening procedures; income and educational levels; place of residence and overall health status of patients.(5, 6) The affordability of post-transplant care, including immunosuppressive therapy, may impact patients' decisions and may affect whether patients' nephrologists recommend transplantation.(1) The elimination of the three-year limit for post-transplant Medicare coverage should make transplantation a more viable option for those patients who are eligible for extended coverage.

In this population-based study, we hypothesized that policies extending the post-transplant coverage of immunosuppressive drugs would increase the transplant rates among elderly patients who benefited from the policies. We used BIPA 2000 to exemplify such policy and tested our hypothesis using data from the United States Renal Data System linked to Medicare claims.

RESULTS

After applying inclusion/exclusion criteria (see Figure 2), the study cohort represents 632,904 patients. Table 1 provides descriptive statistics of patient characteristics by period (pre- versus post-period) and age group, defined as elderly patients age 65+ and non-elderly, defined as those under age 65. The age difference between the two cohorts may explain why the non-elderly were more likely to be employed and have another primary insurance, and less likely to have HMO insurance. Age may also explain why the elderly had more comorbidities, were twice as likely to be unable to transport or ambulate (4% vs. 2%), and less likely to be on peritoneal dialysis (6–8% vs. 12–15%). The racial makeup of the two groups may also be age driven since African-Americans are more frequently diagnosed with ESRD at younger ages. Clinical measures such as cause of kidney disease, serum albumin level <3.5 g/dL, and hemoglobin level <11 g/dL were similar across the two cohorts.

Unadjusted transplantation rates in the pre and post periods are reported by group in Figure 3. Approximately seven out of every 1,000 patients in the elderly group received a kidney transplant before BIPA 2000, which rose to about 11 per 1,000 in the post BIPA 2000 period – an increase of approximately 51% (relative likelihood of 1.51). In the younger, largely unaffected group, 65 per 1,000 patients received a kidney transplant in the pre-policy period; this number fell to 61 per 1,000 after the implementation of BIPA 2000. The unadjusted impact of the policy change on the increase in transplantation rates for the elderly group relative to the non-elderly group was, therefore, 1.60.

The adjusted transplantation rates are based on a logistic regression that controls for socioeconomic, demographic and clinical variables. Additionally the regression also controls for pre or post policy period, elderly and non-elderly group and an interaction between the period and age group variables. For logistic regression, the coefficient of the interaction term is *not* the estimator of the true interaction effect (18–20); therefore, the coefficients of these variables are not reported here. Table 2 shows the adjusted odds ratios of socioeconomic, demographic and clinical variables that influence transplantation rates. Relative to Caucasians, African-Americans (OR: 0.52; CI: 0.51–0.53) and other races (OR: 0.80; CI: 0.78–0.83) have lower likelihood of transplantation. Inability to transport/ambulate (OR: 0.26, CI: 0.24 – 0.30), hemodialysis within the year (OR: 0.38, CI: 0.36 – 0.39), and peritoneal dialysis within the year (OR: 0.51, CI: 0.49 – 0.53) decreased the likelihood of transplantation. Patients with CCI greater than three (OR: 0.49, CI: 0.48 – 0.51) were also less likely to receive a transplant. Patients whose cause of kidney disease was glomerulonephritis or cystic kidney disease had 1.53 (CI: 1.49 – 1.57) and 2.19 (CI: 2.11 – 2.27) times higher odds respectively, compared to diabetes. The results also show that being obese (OR: 0.75, CI: 0.74–0.77) as well as being underweight (OR: 0.69, CI: 0.67–0.72) reduced the likelihood of getting a transplant. Patients with serum albumin ≥ 3.5 g/dL (OR: 0.79, CI: 0.77 – 0.80) and hemoglobin ≥ 11 g/dL (OR: 0.88, CI: 0.86 – 0.89) had a lower chance of transplantation. Patients living in higher income areas (OR: 1.04, CI: 1.04–1.05) and those living in areas with a higher percentage of people completing high school (OR: 3.11, CI: 2.81 – 3.44) also had a higher likelihood of transplantation. Employment status in the year of ESRD diagnosis, as noted on the Medical Evidence Form (OR: 1.54, CI: 1.51 – 1.57) increases the likelihood of transplantation.

The main results are presented as relative likelihoods of transplantation for each group in the post versus pre policy change periods. The relative likelihood of the elderly group is 1.36 (CI: 1.32 – 1.41), whereas that of the non-elderly group is 0.93 (CI: 0.92 – 0.94). These results document that the implementation of BIPA 2000 was associated with an increased probability of receiving transplants in the elderly group, while it was associated with a reduced probability of transplantation among the non-elderly group. The ratio of relative likelihood calculated from the difference-in-differences estimate was 1.47 (CI: 1.41–1.52), indicating that the impact of BIPA 2000 on the elderly cohort was 1.47 times greater than that of the non-elderly cohort. The results were similar when controlling for a time trend across the years of analysis. Additionally, the odds ratio for the time trend was 0.995 and was statistically insignificant.

DISCUSSION

BIPA 2000 removed a financial barrier for certain Medicare beneficiaries, some of whom otherwise may have delayed or avoided transplantation solely due to financial considerations. Gordon conducted an ethnographic study examining ESRD patients' decision-making for transplantation versus dialysis in the period just prior to BIPA 2000.⁽⁷⁾ Gordon's results document that most ESRD patients select dialysis either because they are already on dialysis and doing well or because of fears surrounding transplantation; however,

nearly one in five respondents reported being “concerned about the costs” as a reason for opting for dialysis. Ability to pay for transplant-related drugs and services was a critical factor for some ESRD patients before BIPA 2000 and remains a concern for many ESRD patients in 2011. Transplant coordinators and social workers discuss general Medicare coverage issues and “post-transplant drug coverage” in particular with patients, many of whom worry about their ability to afford drugs and services.

BIPA 2000 did not extend immunosuppressive drug coverage for all ESRD-related Medicare beneficiaries. The extended benefit applied only to those who qualified based upon “age and ESRD” or “disability and ESRD” status; ESRD patients who qualified for Medicare solely on ESRD status could not receive extended immunosuppressive drug coverage. Thus, the law may have caused an unintended shift in the types of individuals who received transplant; in particular, given the fixed supply of kidneys at a point in time, there may have been a transfer between younger and older patients, as suggested by our results. For the elderly ESRD patients, BIPA 2000 created a policy scenario that could be expected from Medicare Prescription Drug Plan (also known as Part D), which was implemented in 2005. However, because BIPA 2000 predates Medicare Part D, it becomes impossible to estimate the impact of Part D on the transplant rates among Medicare-eligible elderly ESRD patients, since the potential benefits associated with extending the coverage of post-transplant immunosuppressive drugs would have been achieved under BIPA 2000. Therefore, our study of BIPA 2000 informs policy makers of the sustained effect on renal transplant from Medicare Part D.

Our objective was to estimate the impact of BIPA 2000 on transplantation rates. Merely comparing the unadjusted transplantation rates before and after the policy change for elderly patients would not accurately estimate the effect of BIPA 2000 because changes in the transplant rates may be due to time trends or changes in other factors that are not linked to BIPA 2000. Therefore, the difference-in-differences approach was applied to isolate the effect of BIPA 2000 from other factors. Our findings suggest that BIPA 2000 favorably impacted the likelihood of kidney transplantation for those 65 years and older. In contrast, a slight decrease in the rate of transplantation was observed in the younger group without extended benefits. Other factors, such as the seminal paper by Wolfe and colleagues, may have impacted transplantation rates among elderly ESRD patients.⁽⁸⁾ Nevertheless, our findings are consistent with our hypotheses that BIPA 2000 significantly removed the financial constraints for the elderly cohort and hence encouraged kidney transplantation for those not constrained by the cost of life-long immunosuppressive drug use. This analysis provides a rationale for extending the coverage for the whole ESRD population because it increased the rate of transplantation, which has repeatedly been shown to be more cost-effective than dialysis. ^(9–12) Of course, the supply constraint must be addressed through increased living donor transplantation.

The United States Renal Data System (USRDS) data reflect a majority of the United States ESRD population due to Medicare’s coverage eligibility for ESRD. The administrative claims information is supplemented with longitudinal information on dialysis treatment, transplantation, clinical laboratory values and the standard Medical Evidence Form completed by a clinician at the onset of the disease. This provides extensive information, a large sample size and broad generalizability. Nonetheless, this study has some limitations due to the nature of the USRDS dataset. Although the Medical Evidence Form provides some clinical values, they are only captured at baseline and have a relatively large proportion of missing values. For the laboratory values we could ascertain, we grouped the missing values with the “healthy” range. We assumed that when the value was not reported, the patient’s level was in the valid range and not a concern for the clinician. We relied on administrative claims to assess comorbid disease burden. Since Medicare coverage begins

around 90 days after the completion of the Medical Evidence Form indicating the person has ESRD, we measured the CCI after onset of ESRD. This is not the customary way of implementing the CCI, but is a restriction due to how the data are captured. Additionally, the approach avoids the problem of multicollinearity.

METHODS

Data

Medicare claims and the USRDS Standard Analysis Files, which include data on the majority of United States ESRD patients, are used for the analysis. These data include patient demographic characteristics, diagnosis data, treatment history, dialysis claims, physician/supplier services, and hospitalization events(13) and are available from the National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK) through the USRDS Coordinating Center under data use agreements for research studies. The study was approved by the University of Maryland IRB (Protocol # HP-00040787).

Inclusion and exclusion criterion—Adult Medicare beneficiaries treated for ESRD between January 1, 1998 and October 1, 2004 are included. Patients are excluded if they did not have a Medical Evidence Form, version 1995 or received a transplant prior to January 1, 1998. The unit of analysis is a person-year and only those observations with at least partial Medicare coverage are included.

Statistical Methods

The analysis estimates the impact of BIPA 2000 on transplantation rates of elderly Medicare ESRD patients with extended post-transplant coverage *relative to* younger patients, many of whom do not have extended coverage. Because BIPA 2000 removed the financial barrier for only one sub-population of ESRD patients, the policy change gives rise to a “natural experiment” whereby one can estimate the hypothesized difference in transplantation rates between those who are eligible for extended coverage and those with no change in post-transplant coverage. The use of a difference-in-differences analytic approach allows us to test the hypothesis that there were differential increases in the rate of kidney transplantation among those Medicare eligible who qualified for the extended coverage, while controlling for other temporal changes that may have impacted the rate of kidney transplantation during the study period. Younger patients with non-ESRD disabilities (i.e. younger patients who qualify for extended benefits) cannot be identified due to limitations within USRDS. The difference-in-differences approach has been used extensively in the health economics literature to estimate the impact of changes in health insurance coverage (14), (15) and health policy(16), (17).

Outcome Measure—The dependent variable, TX_{jt} , is a binary variable indicating whether a patient j receives a renal transplant at time t ($t=1998-2005$). Patients are followed until the earliest of renal transplantation, death or end of study period.

Covariates—The analysis controls for the primary cause of renal failure, as reported on the Medical Evidence Form, demographic variables (gender, age at index, race and ethnicity), clinical variables (serum albumin level, hemoglobin level, BMI), the Charlson comorbidity index (CCI), an indicator for inability to transfer or ambulate, and working status. It also adjusts for yearly health insurance variables, time since ESRD diagnosis, prior dialysis type, and census-reported socioeconomic factors for the patient’s zip code.

The CCI is calculated after removing the kidney disease component. The primary cause of ESRD is also included in the regression since researchers have suggested that when the

comorbidity index excludes the primary cause of ESRD, it should be included as a covariate. (18) The 2000 Census data at the zip-code level for the median household income and the proportion of the population 25 years or older who completed high school were used to measure patients' neighborhood socioeconomic status.

The periods for this analysis are defined as pre- and post-policy change; the pre-policy period covers transplantations between 1998 and 2000 (POST=0) whereas the post-policy period is the duration between 2002 and 2005 (POST=1). Finally, for the difference-in-differences estimation, an interaction term of POST and "affected" is also included. This term allows the estimation of the average differences between the elderly and non-elderly cohorts before and after BIPA 2000.

Analysis—The analysis examines the rate of transplant for the elderly versus the non-elderly sub-populations in the pre-BIPA 2000 (1998–2000) versus post-BIPA 2000 (2002–2005) periods. Under the difference-in-difference approach, the inclusion of data from the pre-BIPA period is important because patients who opted for transplantation during the years 1998–2000 made their decision without the knowledge of the possibility of lifetime coverage; thus, making it possible for individuals in the elderly group to act as their own control in the period before the policy change, while individuals in the non-elderly group to act as a control that captures the trend before and after the policy change but independent of the change in policy. This modeling approach reduces the problem of unobserved confounding characteristics, thereby allowing a more rigorous test of the hypothesis that BIPA 2000 changed the likelihood of receiving a renal transplant. To avoid the problem of multicollinearity, the variable "year" was not included in the regression analysis.

We applied the difference-in-differences approach to logistic regressions (19–21) and presented the impact of BIPA 2000 on renal transplantation as relative likelihoods separately for the elderly "affected" and non-elderly "unaffected" groups. Specifically, we first calculated the impact of BIPA for the "affected" and "unaffected" groups as follows:

$$\begin{aligned} \text{Impact of BIPA on Elderly} &= \frac{\text{Probability of renal TX for Elderly in POST period}}{\text{Probability of renal TX for Elderly in PRE period}} \\ \text{Impact of BIPA on Non-elderly} &= \frac{\text{Probability of renal TX for Non-elderly in POST period}}{\text{Probability of renal TX for Non-elderly in PRE period}} \end{aligned}$$

We then capture the policy impact using the *ratio of relative likelihoods*:

$$\text{Impact of the policy change} = \frac{\text{Impact of BIPA on Elderly}}{\text{Impact of BIPA on Non-elderly}}$$

A ratio greater than one (less than one) would imply that the impact of the policy on the elderly group is greater (less) than the impact on the non-elderly group. We also present the differences in the rates of kidney transplantation for the elderly and non-elderly in the pre and post periods. The standard deviation and confidence intervals of these ratios and the differences in difference are computed using a bootstrap method.

Since this analysis uses repeated measures on the same patient across time, patients can move from non-elderly to elderly groups so that with each occurrence the observations may be correlated. Hence, the Generalized Estimating Equations (GEE) and the robust variance estimator of Liang and Zeger (22) is used. To account for the GEE framework, quasi-likelihood under the independence model information criterion (QIC) is used to choose the correlation matrix. (23, 24) The quasi-likelihood criterion (QICu) selects the final subset of covariates to obtain the best-fitting model. (24)

CONCLUSIONS

Medicare patients with ESRD have been receiving kidney transplantations for years, even before the extension of coverage for immunosuppressive drugs under BIPA 2000. Our research shows that in the years since BIPA 2000, elderly patients with extended coverage were more likely to receive a transplant, while at the same time there was not an increase among their non-elderly Medicare counterparts. The differences in rates are more dramatic than one might expect, given that transplantation has such an important beneficial effect on both quality of life and longevity. Most health care providers who recognize these benefits may recommend transplantation regardless of the reimbursement consequences in the future. These results demonstrate the influence of BIPA 2000 on transplantation referrals, potentially mediated via knowledgeable transplant coordinators and social workers and on patient's choice. In light of recent health care reform discussions surrounding changes to Medicare reimbursement, our findings provide another reminder that Medicare coverage influences decision making and treatment for ESRD patients. The results simultaneously suggest that extended coverage can positively impact transplantation rates, yet serve as evidence that differential coverage may shift transplants from younger to older patients.

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Figure 1.

Medicare Coverage for Immunosuppressive Drugs Before and After BIPA 2000

* Qualifying Conditions for Immunosuppressive Coverage

Figure 2.
Inclusion and Exclusion Criteria for the USRDS Study Population
None

Rate Elderly in Post-period	= 1.10%	Ratio of Rates Elderly	= 1.51		
Rate Elderly in Pre-period	= 0.73%	Difference in Rates Elderly	= 0.37%	IMPACT RRR [*]	= 1.6 (Unadjusted)
Rate Non-elderly in Post-period	= 6.08%	Ratio of Rates Non-Elderly	= 0.94	Elderly vs. Non-elderly	1.47 (Adjusted, 95% CI: 1.41 - 1.52)
Rate Non-Elderly in Pre-period	= 6.47%	Difference in Rates Non-Elderly	= -0.39%	IMPACT DiD [♦]	= 0.76% (Unadjusted)
				Elderly vs. Non-elderly	0.55% (Adjusted, 95% CI: 0.50 - 0.60)

Figure 3.

Impact of BIPA 2000 on Kidney Transplant Rates: Unadjusted and Adjusted*

*IMPACT_{RRR} = Ratio of Relative Rates♦IMPACT_{DiD} = Difference in Differences in Rates

*Adjusted for Variables as Presented in Table 2

Table 1
Characteristics of BIPA 2000 elderly (Age 65+) and non-elderly ESRD Patients by Period

	Pre-period (1998–2000)				Post-period (2002–2005)			
	Elderly (Age ≥ 65)		Non-elderly (Age < 65)		Elderly (Age ≥ 65)		Non-elderly (Age < 65)	
	N	%	N	%	N	%	N	%
Race								
Caucasian	212,909	67.55	183,859	50.93	332,815	65.01	302,528	48.90
African-American	78,979	25.06	143,031	39.62	138,896	27.13	258,853	41.84
Other/Unknown	23,298	7.39	34,095	9.44	40,222	7.86	57,243	9.25
Ethnicity								
Non-Hispanic	275,942	87.55	302,904	83.91	447,888	87.49	521,270	84.26
Hispanic	31,913	10.13	48,205	13.35	59,922	11.71	91,654	14.82
Male gender	160,325	50.87	202,433	56.08	261,060	50.99	354,087	57.24
Employed in the year of ESRD Medical Evidence form submission	8,672	2.75	64,971	18.00	19,624	3.83	122,184	19.75
Charlson Comorbidity Index (CCI)								
CCI=0/Unknown	140,555	44.59	194,126	53.78	229,679	44.87	346,416	56.00
CCI=1	39,669	12.59	39,486	10.94	68,423	13.37	69,549	11.24
CCI=2	47,857	15.18	52,962	14.67	80,112	15.65	86,086	13.92
CCI=3+	87,105	27.64	74,411	20.61	133,719	26.12	116,573	18.84
Hemodialysis within the year	278,278	88.29	309,830	85.83	458,767	89.61	544,952	88.09
Peritoneal dialysis within the year	26,187	8.31	54,245	15.03	33,636	6.57	72,227	11.68
Inability to transport/ambulate	12,455	3.95	8,602	2.38	17,381	3.40	13,310	2.15
BMI^a								
Below normal i.e. BMI < 18.5	21,612	6.86	25,020	6.93	23,056	4.50	26,798	4.33
Normal/overweight i.e. 18.5 ≤ BMI < 30.0	199,273	63.22	194,853	53.98	335,704	65.58	346,416	56.00
Obese i.e. BMI ≥ 30.0	55,964	17.76	95,075	26.34	135,507	26.47	219,158	35.43
Other/Unknown	38,337	12.16	46,037	12.75	17,666	3.45	26,252	4.24
Serum albumin ≤ 3.5 g/dL [#]	155,759	49.42	178,328	49.40	256,472	50.10	314,739	50.88
Hemoglobin ≤ 11 g/dL ^{&}	209,718	66.54	244,965	67.86	343,208	67.04	429,961	69.50

	Pre-period (1998–2000)						Post-period (2002–2005)					
	Elderly (Age >= 65)			Non-elderly (Age < 65)			Elderly (Age >= 65)			Non-elderly (Age < 65)		
	N	%		N	%		N	%		N	%	
Cause of kidney disease												
Diabetes	146,675	46.54		170,834	47.32		250,110	48.86		285,231	46.11	
Hypertension	96,965	30.76		77,267	21.40		151,824	29.66		142,214	22.99	
Glomerulonephritis	25,137	7.98		47,499	13.16		35,421	6.92		76,981	12.44	
Cystic Kidney Disease	5,256	1.67		12,065	3.34		8,474	1.66		20,094	3.25	
Other urologic cause	8,991	2.85		8,329	2.31		14,115	2.76		14,364	2.32	
Other cause	21,475	6.81		34,787	9.64		35,090	6.85		60,367	9.76	
Unknown/Missing cause	10,687	3.39		10,204	2.83		16,899	3.30		19,373	3.13	
Medicare as a second payer in the year	17,485	5.55		93,367	25.86		30,419	5.94		133,518	21.58	
Group health organization in the year	45,630	14.48		14,572	4.04		59,755	11.67		18,209	2.94	
Medicare and Medicaid dual eligible in the year	77,564	24.61		143,515	39.76		145,377	28.40		272,076	43.98	
	Mean	Std Dev		Mean	Std Dev		Mean	Std Dev		Mean	Std Dev	
Median household income (in \$10,000's) of patient's zip code *	4.04	1.56		3.80	1.46		4.06	1.58		3.81	1.44	
% 25+ years old who completed high school in patient's zip code *	76.80	12.54		74.62	12.66		76.67	12.62		74.57	12.70	

@ BMI is grouped as underweight (<18.5), normal range (18.5–29.9), and overweight (>=30.0)(25)

Serum albumin level is modeled as binary measures with cut-off point 3.5 g/dl (26) and 11 g/dl(27)

& Hemoglobin level is modeled as binary measures with cut-off point 11 g/dl(27)

* From the 2000 Census

Table 2

Clinical and Demographic Factors Impacting Transplantation Rates*

	Odds Ratio	95% Confidence Interval
Race (Ref.: Caucasian)		
<i>African-American</i>	0.52	0.51 0.53
<i>Other/Unknown</i>	0.80	0.78 0.83
Hispanic ethnicity	0.96	0.93 0.99
Male gender	1.05	1.03 1.07
Employed in the year of ESRD Medical Evidence form submission	1.54	1.51 1.57
Charlson Comorbidity Index (Ref.: CCI = 0/Unknown)		
<i>CCI=1</i>	1.03	1.00 1.06
<i>CCI=2</i>	1.14	1.11 1.17
<i>CCI=3+</i>	0.49	0.48 0.51
Hemodialysis within the year	0.38	0.36 0.39
Peritoneal dialysis within the year	0.51	0.49 0.53
Inability to transport/ambulate	0.26	0.24 0.30
BMI (Ref.: Normal/overweight i.e. 18.5 <= BMI < 30.0)		
<i>Below normal i.e. BMI < 18.5</i>	0.69	0.67 0.72
<i>Obese i.e. BMI >= 30.0</i>	0.75	0.74 0.77
<i>Other/Unknown</i>	0.88	0.85 0.91
Serum albumin <= 3.5 g/dL	0.79	0.77 0.80
Henoglobin <= 11 g/dL	0.88	0.86 0.89
Cause of kidney disease (Ref.: Diabetes)		
<i>Hypertension</i>	1.02	0.99 1.04
<i>Glomerulonephritis</i>	1.53	1.49 1.57
<i>Cystic Kidney Disease</i>	2.19	2.11 2.27
<i>Other urologic cause</i>	0.99	0.94 1.04
<i>Other cause</i>	0.85	0.82 0.87
<i>Unknown/Missing cause</i>	1.03	0.99 1.09
Medicare as a second payer in the year	1.62	1.58 1.65
Group health organization in the year	0.79	0.75 0.82

	Odds Ratio	95% Confidence Interval
Medicare and Medicaid dual eligible in the year	0.74	0.72 0.75
Number of years since ESRD diagnosis	1.04	1.03 1.04
Age at the beginning of the study	0.96	0.96 0.96
Median household income (in \$10,000s) of patient's census tract**	1.04	1.04 1.05
% 25+ years old who completed high school in patient's census tract**	3.11	2.81 3.44

* Also controlling for period (post vs. pre), "affected" by BIPA 2000 status (no vs. yes), and their interaction term

** From the 2000 Census