Association of VA Payment Reform for Dialysis with Spending, Access to Care, and Outcomes for Veterans with ESKD

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Abstract

Background and objectives Because of the limited capacity of its own dialysis facilities, the Department of Veterans Affairs (VA) Veterans Health Administration routinely outsources dialysis care to community providers. Prior to 2011—when the VA implemented a process of standardizing payments and establishing national contracts for community-based dialysis care—payments to community providers were largely unregulated. This study examined the association of changes in the Department of Veterans Affairs payment policy for community dialysis with temporal trends in VA spending and veterans' access to dialysis care and mortality.

Design, setting, participants, & measurements An interrupted time series design and VA, Medicare, and US Renal Data System data were used to identify veterans who received VA–financed dialysis in community-based dialysis facilities before (2006–2008), during (2009–2010), and after the enactment of VA policies to standardize dialysis payments (2011–2016). We used multivariable, differential trend/intercept shift regression models to examine trends in average reimbursement for community-based dialysis, access to quality care (veterans' distance to community dialysis, number of community dialysis providers, and dialysis facility quality indicators), and 1-year mortality over this time period.

Results Before payment reform, the unadjusted average per-treatment reimbursement for non–VA dialysis care varied widely ($47–$1575). After payment reform, there was a 44% reduction ($44–$250) in the adjusted price per dialysis session ($P<0.001$) and less variation in payments for dialysis ($73–$663). Over the same time period, there was an increase in the number of community dialysis facilities contracting with VA to deliver care to veterans with ESKD from 19 to 37 facilities (per VA hospital), and there were no changes in either the quality of community dialysis facilities or crude 1-year mortality rate of veterans (12% versus 11%).

Conclusions VA policies to standardize payment and establish national dialysis contracts increased the value of VA–financed community dialysis care by reducing reimbursement without compromising access to care or survival.

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Introduction

The Department of Veterans Affairs (VA) Veterans Health Administration, the largest integrated health system in the United States, serves the health care needs of >6 million enrolled veterans. Traditionally, VA has primarily delivered care in its own facilities staffed with federally employed clinicians, purchasing care in the community when access to these services cannot be delivered in a timely fashion. Beginning with the Veterans' Access to Care through Choice, Accountability, and Transparency Act of 2014 (also known as the VA Choice Act) and continuing with the VA Mission Act, VA is currently engaged in a major national effort to expand veterans' access to VA-paid, community-based care to address concerns about wait times at some VA facilities (1).

Veterans with ESKD are one of the fastest growing and most costly segments of the veteran population (2–6). Because of limited capacity of VA dialysis facilities and the need for veterans to receive treatment close to home, VA has a long history of reliance on community dialysis providers that predates recent legislation to promote access to community care for veterans (7,8). Over time, the proportion of veterans with ESKD receiving community-based dialysis has increased from 56% in 2008 to 77% in 2017. Moreover, community-based dialysis accounts for a growing share of VA's overall dialysis spending, from 17% in 1993 to 81% in 2017 (9–11). Currently, payments for community dialysis comprise one of the largest expenditures under the VA Community Care program (previously known as VA Fee Basis or VA Purchased Care) (12).

Over the last decade, VA implemented a series of payment innovations intended to reduce dialysis spending and improve access to care for veterans undergoing

maintenance dialysis in community settings. Previously, each Veterans' Health Administration medical center (VAMC) had negotiated fee-for-service rates for non-VA dialysis treatment, related medications, and ancillary services with local dialysis providers on an *ad hoc* basis, with payments sometimes greatly exceeding reimbursement rates for dialysis under Medicare. Between 2009 and 2011, VA initiated a national policy intended to bring payments for dialysis into closer alignment with the Medicare fee schedule (Supplemental Figure 1) (13,14). These changes coincided with the introduction of Medicare's prospective bundled payment for dialysis in 2011 (15). Then, in 2013, VA introduced a national contracting mechanism for community dialysis with prices set slightly above Medicare rates. These contracts contained standard pricing and administrative processes for participating providers in each service region, replacing the previous *ad hoc*, locally negotiated, and highly variable reimbursement rates.

Little is currently known about how VA payment reforms may have affected payments to community providers, provider behavior (16–18), quality of care, and patient outcomes. It is possible that the payment reductions under the new policies' preset and nonvariable contracted payments may have diminished the appeal for community providers, particularly higher-quality providers, to accept serving veterans under the VA Community Care program. To address this knowledge gap, we examined whether changes in VA reimbursement and contracting policies were associated with VA spending on dialysis, veterans' access to dialysis care, and mortality.

Materials and Methods

Data, Study Design, and Cohort

We conducted a retrospective interrupted time series analysis of VA-enrolled veterans with ESKD who initiated maintenance dialysis between 2006 and 2016 and appeared in the US Renal Data System (USRDS), the national registry of all patients with ESKD (19). VA data sources included enrollment files, inpatient and outpatient encounters, and non-VA Community Care financed by VA. We linked Medicare enrollment and claims data, standard analysis files from USRDS, VA Community Care claims (previously known as VA Fee Basis claims) (20), and Medicare's annual Dialysis Facility Reports to identify and track VA payments and assess VA community dialysis facility quality (21).

We identified 130,261 VA-enrolled veterans who appeared in USRDS (Supplemental Figure 2) and ascertained each veteran's use of VA and Medicare-financed dialysis care from 2006 to 2016. We excluded those who did not receive any VA Community Care dialysis over this period because their dialysis was exclusively financed by Medicare or delivered by a VA facility (n=104,920), did not have a valid residential zip code, were living outside the United States (*i.e.*, Puerto Rico; n=329), had incomplete demographic or clinical information at the time of dialysis initiation in USRDS source data (n=33), or did not have valid community dialysis care claims (n=109). The final analytic sample included 24,870 veterans who received one or more dialysis treatments under VA Community Care during the observation period.

Outcome and Covariates

Study outcomes were observed to September 30, 2016 and included (*1*) dialysis session reimbursement, (*2*) access to VA Community Care dialysis providers, and (*3*) death within 1 year of dialysis initiation. Dialysis reimbursement was defined as the price per veteran per dialysis treatment day paid for by VA, including the price paid for the dialysis procedure, dialysis-related medication, and ancillary services. The total price of treatment calculated in this manner allowed us to compare total daily treatment payments before (2006–2008), in the interim (2009–2010), and after the implementation of payments reforms for dialysis in VA beginning in 2009 and fully enacted by VA and Medicare in 2011 (Supplemental Figure 1). Roughly 4% of community dialysis claims paid by VA were excluded because facility information was missing, facilities were located outside the United States, or the claim was submitted from a corporate rather than specific facility address (Supplemental Figure 2). An additional 2% of claims were excluded due to outlier charges (daily price <$40 or charges were in the top fifth percentile of VA payments for dialysis treatment in a given year [annual upper limits on VA payments ranged from $514 to $1982]). The remaining sample of 8,603,682 VA-paid claims was adjusted for inflation (on the basis of 2016 dollars).

Access to dialysis care was operationalized as (*1*) the quarterly number of community dialysis facilities providing VA-financed dialysis, (*2*) quintiles of veterans' community dialysis facilities' annual and risk-adjusted standardized hospitalization rate (SHR) and standardized mortality rate (SMR), and (*3*) the straight-line distance between veterans' residential zip code centroids and their treating community dialysis facility. These access outcomes were examined to test whether changes in VA reimbursement led to a decline in access to dialysis providers participating in VA Community Care, veterans' entry into high-quality community dialysis facilities, and veterans' travel distance to receive care from VA Community Care providers. The clinical outcome of interest was death within 1 year after dialysis initiation ascertained from a combination of VA administrative data (Vital Status file) and USRDS registry.

All analyses were adjusted for a comprehensive set of patient demographic characteristics at the time of dialysis initiation ascertained from VA, USRDS, and Medicare administrative data. Demographic covariates included age, race/ethnicity, sex, and calendar year of dialysis initiation. Clinical characteristics included baseline eGFR at dialysis initiation, receipt of pre-ESKD nephrology care within or outside VA during the 2-year period before ESKD onset, incident dialysis modality, type of vascular access at the time of dialysis initiation, listed cause of ESKD (*e.g.*, diabetes or hypertension), body mass index, and the Gagne score of comorbidity burden and individual indicators of mental health comorbidity (22,23) during the 1-year period before dialysis initiation.

Analyses were adjusted for baseline financial and geographic access characteristics that likely influence veterans' dialysis setting (24). These included insurance coverage derived from Medicare enrollment and USRDS data (19) (*e.g.*, Medicaid or employer-based group coverage), veterans' residential distance to the nearest VA outpatient dialysis unit ≤30 miles, and degree of VA versus Medicare reliance for other outpatient care (in the prior year) (25).

Statistical Analyses

For the mortality analysis, we observed death ≤1 year from dialysis initiation. Patients who received a kidney transplant within a year of dialysis initiation and before they died were excluded from this analysis. Patient and facility characteristics and crude mortality rates were assessed quarterly from 2006 to 2016. Time series were interrupted during a single time period from January to March 2011, with a prepolicy time trend that includes trends in the 2009–2011 interim policy period and on the basis of observed changes and specification testing in pricing trends (Figure 1). Although VA implemented payment reform in 2011 and its national dialysis contracts were not established until 2013, we did not detect differences in pricing trends between 2011 and 2013. Interrupted time series data were used to examine changes in the level and trends of VAMC dialysis payments, access, and mortality outcomes, allowing for a shift in both the mean and a change in trend during the first quarter of calendar year 2011. All models accounted for secular trends in study outcomes and controlled for demographic, clinical, and access characteristics.

In our analysis of the payment outcome, we conducted linear regression at the veteran-treatment-day level (on the basis of total charges and claims associated with a dialysis treatment date), with fixed effects at the VAMC level (*i.e.*, to account for differences in VAMC resources and negotiating approaches for community care) and clustering at the patient level. To estimate the association between VA policies and the number of participating VA Community Care dialysis facilities treating veterans, we performed separate linear regressions at the Veterans Integrated Service Network (or VA region) quarter level (due to small sample sizes in the original VAMC-level outcome), with clustering at the VA region level. To assess the likelihood that veterans were treated in poorer-quality community dialysis providers postpolicy, we used weighted linear regressions of SHR and SMR at the VAMC-quarter level (using the number of veterans within a VAMC quarter as weights) with clustering at the VAMC level. Median quantile regression was used to estimate distance from each veteran's residence and the community dialysis facility, conducted at the patient-quarter level. Last, logistic regression was conducted to examine 1-year mortality at the level of the individual patient with VAMC fixed effects and clustering SEMs at the VAMC level.

Sensitivity Analyses

We conducted the following sensitivity analyses to examine the strength of our results. First, we reran analyses of access outcomes among VAMCs with the highest and

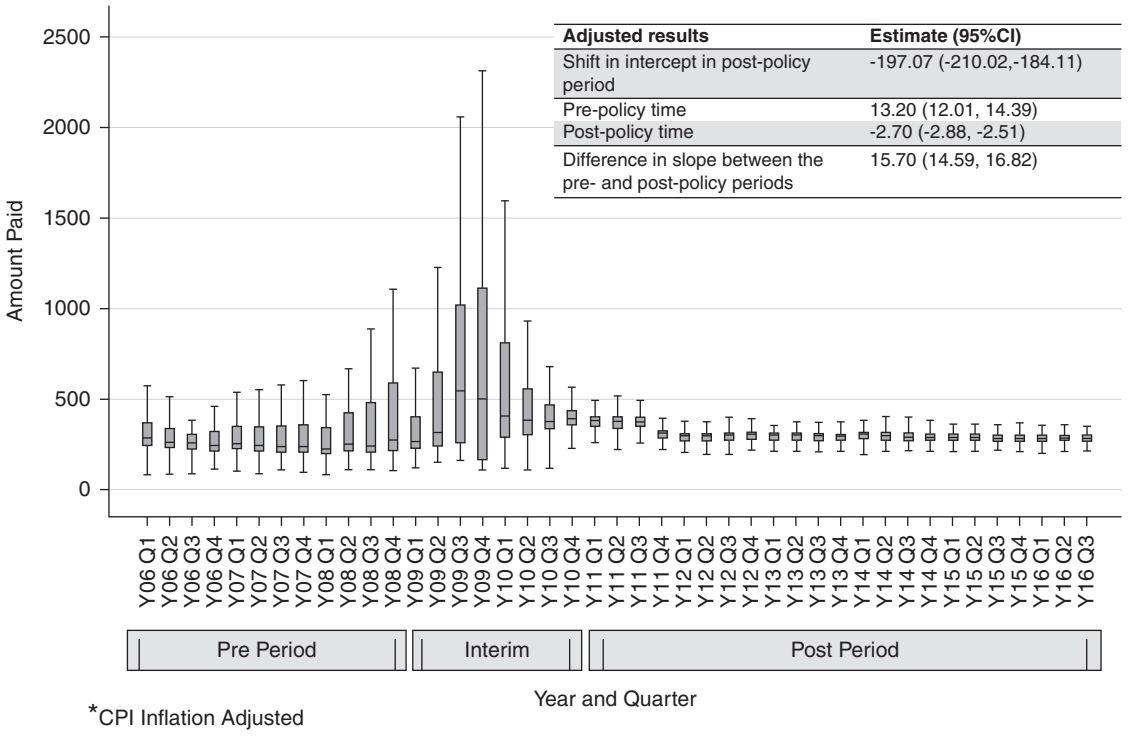

Figure 1. | Veterans Health Administration (VA) treatment day prices for non-VA dialysis care and variation in prices diminish after implementation of VA payment policies for non-VA dialysis services (*n*=7,368,282 claims for VA-financed Community Care dialysis treatment). (*1*) The preperiod reflects the years of the study before VA-initiated, Medicare-modeled price standardization for dialysis services. The interim period reflects the duration of time between VA's initial application of the Medicare fee schedule for dialysis services in 2009 and the legislatively authorized enactment of this pricing policy in 2011. The postperiod encompasses full implementation of VA standardized pricing (2011) and implementation of national dialysis contracts (2013). (*2*) Full regression results are available in Supplemental Material. The regression specification modeled a prepolicy time indicator that represents both prepolicy and interim policy periods (2006–2010). (*3*) The difference in slopes between the pre- and postpolicy periods is 15.7 (95% confidence interval [95% CI], 14.59 to 16.82). CPI, consumer price index; Q, quarter; Y, year.

lowest quintiles of VA Community Care dialysis payments prior to 2011. Second, we examined the extent to which 1-year mortality findings might reflect changes in the relative clinical complexity of patients receiving community dialysis as compared with within VA. Specifically, veterans receiving dialysis in the community may be healthier than those exclusively treated at VA facilities (24). To account for this possibility, we compared 1-year mortality among veterans with one or more claims for VA Community Care dialysis within 90 days of dialysis initiation versus veterans who received continuous VA Community Care dialysis throughout the first 90 days. All analyses were performed using SAS Enterprise Guide 7.1 (SAS Institute Inc, Cary, NC) and STATA 15. Details and model specification are provided in Supplemental Material. This study was approved by the Institutional Review Board of the Providence VAMC, and all data were acquired through data use agreements for VA and VA/Centers for Medicare and Medicaid Services data, provided by the Department of Veterans Affairs and the VA Information Resource Center.

Results

Characteristics of Patient Cohort

The cohort of 24,870 veterans who received one or more VA-financed treatments from a community dialysis facility had a mean age of 64 years (SD=11 years) and was predominantly men (98%) and White (57%) (Table 1).

Table 1. Baseline characteristics of veterans receiving at least one dialysis treatment through Veterans Health Administration–financed community-based dialysis (*n*=24,870)

Veteran Baseline Characteristics	Preperiod 2006–2008, *n*=6240		Interim Period 2009–2010, *n*=5409		Postperiod 2011–2016, *n*=13,221		Total, *n*=24,870	
	Mean or Frequency	SD or %	Mean or Frequency	SD or %	Mean or Frequency	SD or %	Mean or Frequency	SD or %
Age, yr	63	11	64	11	65	10	64	11
Gagne comorbidity score[a]	2.65	2.13	2.78	2.23	3.21	2.36	2.97	2.29
Mortality score[b]	0.11	0.07	0.11	0.07	0.11	0.07	0.11	0.07
Men	6139	98	5301	98	12,893	98	24,333	98
Race								
White, non-Hispanic	3505	56	3011	56	7564	57	14,080	57
Black	2108	34	1813	34	4327	33	8248	33
Hispanic	483	8	466	9	1036	8	1985	8
Other	144	2	119	2	294	2	557	2
Medicaid	817	13	731	14	1823	14	3371	14
VA reliance								
No VA	354	6	260	5	367	3	981	4
0%–50%	673	11	586	11	1455	11	2714	11
>50%	5213	84	4563	84	11,399	86	21,175	85
Distance from home to nearest VAMC with outpatient dialysis ≤30 miles	2814	45	2450	45	5684	43	10,948	44
eGFR, mL/mn/1.73 m^2								
<10	2800	45	2118	39	5660	43	10,578	43
10–15	2625	42	2371	44	5395	41	10,391	42
>15	815	13	920	17	2166	16	3901	16
BMI, kg/m^2								
<18.5	183	3	144	3	322	2	649	3
18.5–24	1780	29	1399	26	3448	26	6627	27
25–29	2015	32	1606	30	3852	29	7473	30
>29	2262	36	2260	42	5599	42	10,121	41
Primary cause								
Diabetes	3237	52	2756	51	6627	50	12,620	51
Hypertension	1595	26	1459	27	3687	28	6741	27
GN	481	8	389	7	833	6	1703	7
Other/uncertain	927	15	805	15	2074	16	3806	15
Previous nephrology care	4094	66	3441	64	8449	64	15,984	64
First access type								
Arterial venous fistula/graft	1596	26	1359	25	3377	26	6332	25
Catheter	4274	68	3761	70	8781	66	16,816	68
Other/uncertain	370	6	289	5	1063	8	1722	7
PTSD	390	6	384	7	1169	9	1943	8
Severe mental illness[c]	158	3	159	3	439	3	756	3
Depression	861	14	918	17	2608	20	4387	18

VA, Veterans Health Administration; VAMC, Veterans Health Administration Medical Center; BMI, body mass index; PTSD, post-traumatic stress disorder.
[a]Weighted score computed from Medicare, VA, and Fee Basis Claims in the year prior to starting dialysis.
[b]Predicted risk of death within 1 year of starting dialysis.
[c]Bipolar disorder or schizophrenia.

Overall, 44% of cohort members lived ≤30 miles from their nearest VA-based outpatient dialysis unit. Most were living in urban areas (88%), and approximately half (51%) were living in southern states. Approximately 42% of cohort members initiated dialysis with an eGFR<10 ml/min per 1.73 m^2; 69% had diabetes, 96% had hypertension, 28% had congestive heart failure, and 27% had a mental health diagnosis (Supplemental Table 1 lists all comorbid conditions). Most (65%) cohort members had received nephrology care ≤2 years before starting dialysis, and 79% had been hospitalized during the preceding year.

Most measured patient characteristics were stable throughout the observation period (Table 1), with the exception of slightly higher body mass index, degree of VA reliance for outpatient care, and mental health diagnoses and lower proportion of patients who had received predialysis nephrology care and initiated dialysis with an eGFR<10 ml/min per 1.73 m^2.

Changes in Veterans Health Administration Price for Dialysis Treatment

There was marked variation in VA reimbursements for community dialysis care prior to legal authorization of the first of VA's first of two price-setting policies in 2011 (Figure 1 and Supplemental Table 2). The unadjusted average price paid for community-based dialysis treatment across VA facilities ranged from $47 to $1575 per treatment day (interquartile range [IQR], $162–318) during 2006–2008, from $44 to $613 during the interim policy period 2009–2010 (IQR, $192–447), and from $40 to $500 during 2011–2016 (IQR, $268–334). Immediately before policy implementation during 2009–2010, there was a substantial increase in the degree of variation in daily payment. In adjusted analysis, the estimated average VAMC dialysis payment in the prepolicy period (reflecting pooled prepolicy and interim policy periods) decreased from $447 in the last quarter of 2010 to $250 thereafter, reflecting a reduction in daily payments of nearly $200 per session (95% confidence interval [95% CI], −210 to −184) and an adjusted 44% reduction in average payment.

Changes in Veterans' Access to Veterans Health Administration Community Care Dialysis and Survival

The unadjusted number of dialysis facilities participating in VA Community Care per VAMC doubled from 19 in 2006–2010 to 37 after 2011. The reported quality of VA Community Care dialysis facilities remained stable over time, with little variation over time in the average SHR (0.94 in 2006–2010 and 0.95 after 2011) and SMR (1.03 in 2006–2010 and 1.03 after 2011) for contracting facilities. Likewise, the average number of veterans treated in a community-based dialysis facility under VA Community Care increased, from seven patients per facility-quarter in 2006–2010 to nine patients after 2011. The median distance between a veteran's home and the community dialysis facility declined modestly from 19 to 15 miles.

In regression analyses adjusting for patient and VAMC characteristics (Table 2 and Supplemental Tables 3–5), there were no statistically significant changes over time in veterans' access to community-based dialysis. This was true for all measures of access examined, including the number of community-based facilities per VAMC providing dialysis under VA Community Care (−4.15 community dialysis facilities; 95% CI, −10.17 to 1.88), the quality of these facilities in terms of observed versus expected hospitalization (0.025 unit change in SHR; 95% CI, −0.04 to 0.09) and mortality rates (0.006 unit change in SMR; 95% CI, −0.06 to 0.07), or distance from patients' residence to their community dialysis facility (−1.23 miles; 95% CI, −3.96 to 1.49). We conducted a sensitivity analysis among VAMCs in the highest and lowest quintiles of VA community-based dialysis payments before policy implementation (2006–2010) and found no statistically significant difference in the number of veterans utilizing VA Community Care during this time period. This was the case even among VAMCs with the most marked reductions (9.30 patients per facility; 95% CI, −1.65 to 20.3) and increases (2.41 patients per facility; 95% CI, −5.48 to 10.31) in average payments for community dialysis (not shown).

The crude annual mortality rates for veterans who received VA Community Care dialysis were 12% between 2006 and 2010 and 10% thereafter, with no statistically significant changes in 1-year mortality over time in adjusted analyses (−0.01% point change in mortality; 95% CI, −0.04 to 0.01) (Figure 2 and Supplemental Table 6). The results of sensitivity analyses examining mortality rates among veterans who received differing proportions of their dialysis under VA Community Care dialysis within 90 days of dialysis initiation were consistent with the primary analysis (not shown).

Discussion

VA policies to reduce and standardize pricing for community-based dialysis care were accompanied by a 44% reduction in average treatment payments and a reduction in overall variation in treatment prices. The markedly lower and less variable VA payments (compared with Medicare rates) after policy implementation in 2011 likely reflect the effect of VA-wide payment reform for dialysis. The steepest change occurred in average prices and variation in prices from higher claim amounts VA reimbursed in the 2009–2011 interim policy period and may signal community providers' response to VA's 2009 internal policy directive to implement the Medicare fee schedule. This effort was rescinded in July 2009 to undergo the formal federal rulemaking process and later legislatively approved for VA-wide implementation in February 2011.

In order to meet the needs of veterans with ESKD, VA has been tasked with improving veterans' access to needed services while containing costs. This requires thoughtful payment setting to ensure that community providers continue to serve veterans. The higher VA payments (compared with Medicare rates) issued before 2011 likely reflect the decentralized, *ad hoc* approach to procuring VA-purchased community care and motivated VA to develop policies to regulate and standardize these payments. Although changes to how VA paid for dialysis in the community raised concerns that community dialysis providers might be less willing to care for veterans or it represented attempts by VA to divert more veteran dialysis care to the community, we found no evidence to suggest that this happened. Instead and despite parallel cost

Table 2. Adjusted changes in the distance to care, patients receiving Veterans Health Administration community-based dialysis treatment, and community dialysis facilities providing Veterans Health Administration–financed dialysis care

Veteran Baseline Characteristics	Veterans Health Administration Community Dialysis Facilities per Veterans Health Administration Medical Center, n=901 Veterans Integrated Service Network Quarters[a]		Veterans Health Administration Community Dialysis Quality: Standardized Hospitalization Rate, n=4784 Veterans Health Administration Medical Center Quarters		Veterans Health Administration Community Dialysis Quality: Standardized Mortality Rate, n=4784 Veterans Health Administration Medical Center Quarters		Veterans' Distance to Veterans Health Administration Community Dialysis, miles, n=7,261,246 claims	
	Estimate	95% Confidence Interval	Estimate[b]	95% Confidence Interval	Estimate	95% Confidence Interval	Estimate	95% Confidence Interval
Shift in intercept in postpolicy period (2011–2016)	−4.15	(−10.17 to 1.88)	0.025	(−0.04 to 0.09)	0.006	(−0.06 to 0.07)	−1.23	(−3.96 to 1.49)
Indicator for interim period (2009–2010)	−0.31	(−4.22 to 3.59)	0.010	(−0.04 to 0.06)	−0.006	(−0.05 to 0.04)	−1.12	(−3.11 to 0.87)
Slope of prepolicy quarterly time trend (2006–2008)	1.50	(0.88 to 2.11)	−0.001	(−0.01 to 0.00)	0.000	(−0.01 to 0.00)	−0.44	(−0.64 to −0.24)
Slope of postpolicy quarterly time trend (2011–2016)	0.75	(0.35 to 1.16)	−0.001	(−0.00 to 0.00)	−0.002	(−0.00 to 0.00)	−0.12	(−0.16 to −0.07)
Slope differences, pre- to postpolicy	0.75	(0.72 to 0.77)	0.000	(−0.00 to 0.00)	0.002	(−0.00 to 0.00)	−0.32	(0.28 to 0.36)

[a]Because of small sample sizes in some of the Veterans Health Administration medical center–level outcomes, regression analysis was conducted at the Veterans Integrated Service Network level (this refers to VA health care system regional designations).
[b]Estimates reflect change in outcome after implementation of Veterans Health Administration (VA) payment policies beginning in 2011. These outcomes include number of community dialysis facilities, publicly reported quality of VA Community Care dialysis facilities (observed versus expected standardized hospitalization rate and standardized mortality rate), and veterans' distance to VA Community Care dialysis facility. Coefficients in the standardized hospitalization and mortality rate regressions represent the quarterly change in participating community dialysis facilities' reported standardized annual hospitalization or standardized annual mortality rate.

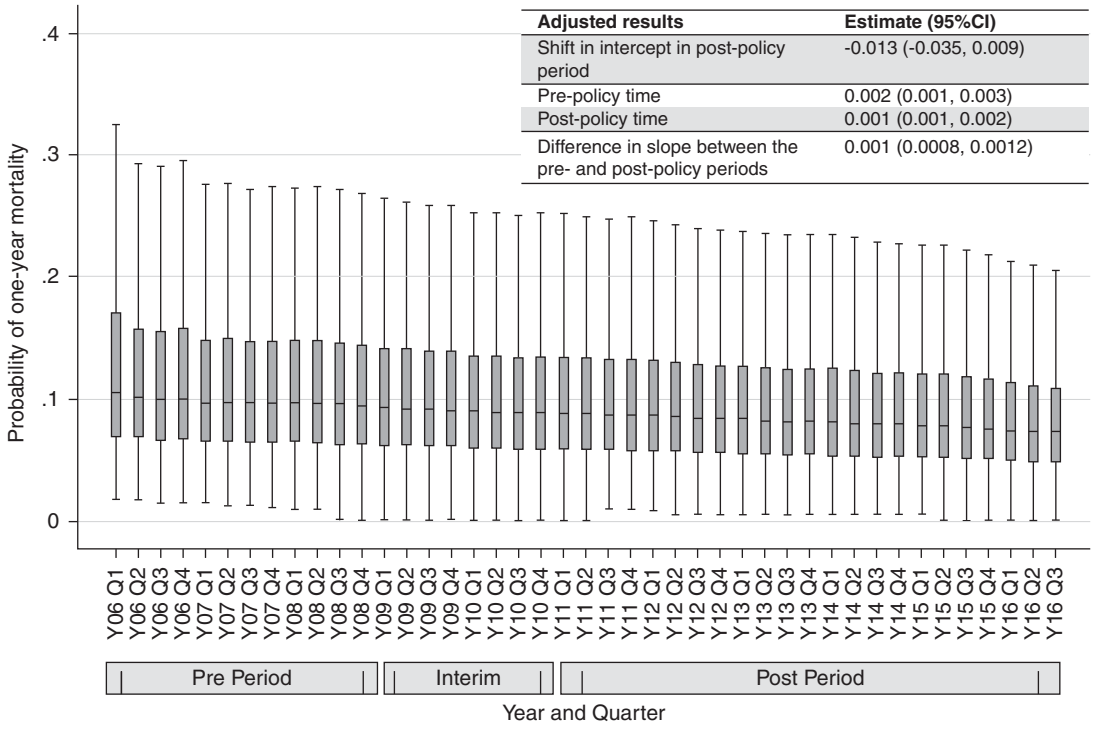

Figure 2. | There were no statistically significant differences in 1-year mortality after implementation of VA payment policies for non-VA dialysis services. (*1*) The preperiod reflects the years of the study before VA-initiated, Medicare-modeled price standardization for dialysis services. The interim period reflects the duration of time between VA's initial application of the Medicare fee schedule for dialysis services in 2009 and the legislatively authorized enactment of this pricing policy in 2011. The postperiod encompasses full implementation of VA standardized pricing (2011) and implementation of national dialysis contracts (2013). (*2*) Full regression results are available in Supplemental Material. The regression specification modeled a prepolicy time indicator that represents both prepolicy and interim policy periods (2006–2010). (*3*) The difference in slopes between the pre- and postpolicy periods is 0.001 (95% CI, 0.0008 to 0.0012).

containment initiatives under Medicare, the number of incident VA Community Care patients on dialysis was relatively stable over time, there was an increase in the number of community dialysis providers caring for veterans, there was a slight decrease in average distance to dialysis care, and there was no change in the overall quality of dialysis facilities serving veterans. VA experience is consistent with earlier efforts under Medicare to reduce dialysis payments without adversely affecting patient outcomes (26–28).

Although crude mortality trends observed in our cohort are consistent with that of the general US dialysis population over time, there was no change in veterans' adjusted mortality among veterans receiving VA Community Care dialysis care between 2006 and 2016. Given prior studies that found lower veteran mortality rates in VA compared with VA Community Care dialysis (29,30), the stable mortality trend we observed in veterans receiving VA Community Care dialysis provides important empirical evidence to inform further changes to VA Community Care payment (*e.g.*, VA risk-adjusted or quality-based payments to encourage high-value community dialysis) and new approaches to care delivery (*e.g.*, improving coordination of care between VA and non-VA providers).

It is important to note that although these policies reduced VA prices in excess of the Medicare rate, VA's negotiated contract rates for community dialysis continue to be slightly higher than under Medicare. This excess per treatment day payment may reflect variability in demand and capacity in local markets (as contract rates vary by provider and region) or a strategy to encourage increased patient access and dialysis facility participation by intentionally contracting at rates higher than Medicare. Unlike Medicare Advantage or other insurance companies with a dominant presence in local markets across the country, adjustments may be needed to account for VA's limited negotiating power in some markets (*i.e.*, efficacy of pricing strategies may differ depending on regional supply and competition among community dialysis providers).

Our study has several limitations. First, it can be difficult to disentangle the relationship between payment changes and changes in the composition of patients receiving community-based care. Nonetheless, we did not find evidence of changes in the numbers or characteristics of patients receiving non-VA dialysis over time. We also were not able to distinguish the effect of the Medicare prospective payment reform because Medicare-bundled payments were established around the same time that VA embarked on changes to standardize payments to community providers. Second, our outcome of VA payments for VA Community Care dialysis care assessed total reimbursement by VA. Our results do not reflect overhead costs incurred directly by local or national VA nephrology or VA's national Community Care program. It is unclear how these unrecognized operating costs have changed. Moreover, we excluded 2% of outlier payments to reduce

bias in adjusted estimates. As a result, our findings may be a conservative estimate of variability in pricing. Additionally, our analyses do not include information on level of social support (*e.g.*, marital status) or detailed clinical measures (*e.g.*, urea reduction ratio or anemia treatment) that may affect care and outcomes. However, our results were robust to sensitivity analyses conducted among subsamples of patients with differing levels of reliance on VA Community Care for dialysis. In part because of small sample sizes, we were not able to examine the effect of VA policies on veterans with ESKD residing in rural areas (12% of the overall cohort). Finally, our analyses addressed only the effect of policy changes on pricing, access to care, and mortality. Unfortunately, we did not have access to data to evaluate the effect of policy changes on outcomes that might be more important to patients (*e.g.*, quality of life, satisfaction with care, or symptom control).

In summary, we found that changes in how VA paid for community dialysis services likely served to increase the value of outsourced VA dialysis. Changes in payment policy were accompanied by marked reductions in variability and average payments for community dialysis without measurable reductions in access to quality dialysis care or increases in mortality. In the context of VA's increasing reliance on community care for a growing number of services, these findings support the feasibility of implementing payment strategies that lower costs without jeopardizing VA partnerships with community providers or compromising access to care or clinical outcomes (8).

Disclosures

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All authors designed the study; E. Corneau, Vincent Mor, S. Swaminathan, and V. Wang obtained data and constructed variables for analysis; E. Corneau and S. Swaminathan analyzed the data and made the figures; and all authors interpreted results, drafted and revised the paper, and approved the final version of the manuscript.

Supplemental Material

This article contains the following supplemental material online at http://cjasn.asnjournals.org/lookup/suppl/doi:10.2215/CJN.02100220/-/DCSupplemental.

Supplemental Figure 1. Timeline of VA policy implementation.

Supplemental Figure 2. CONSORT diagram of patient cohort.

Supplemental Material. Technical specification of regression specification and full model results.

Supplemental Table 1. Full set of baseline characteristics of veterans receiving at least one dialysis treatment through VA-financed Community Care dialysis (n=24,870).

Supplemental Table 2. Policy intervention and mean total payment for VA Community Care dialysis (n=7,368,282 claims).

Supplemental Table 3. Policy intervention and supply at VA region-quarter level: Number of participating VA Community Care dialysis facilities (n=901 VA region-quarters).

Supplemental Table 4. Veterans' VA Community Care dialysis facilities' quality indicators (n=4784 VAMC quarters).

Supplemental Table 5. Policy intervention and veterans' median distance from home (miles) to participating VA Community Care dialysis facility (n=7,261,246 claims).

Supplemental Table 6. One-year mortality for veterans receiving at least one VA Community Care dialysis treatment (n=22,262 veterans).

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