



# Commercial Health Insurance and Quality of Care in US Dialysis Facilities

Anshul Bhatnagar, Allison C. Reaves, Daniel E. Weiner, and Kevin F. Erickson

**Rationale & Objective:** Commercial health insurance typically reimburses at a higher rate for dialysis than Medicare. A recent ruling by the US Supreme Court could result in many commercially insured patients who receive dialysis forgoing their private health insurance and shifting to Medicare as the primary payer. Our objective was to determine whether differences in commercial payers as a proportion of payer mix affect the quality of care at dialysis facilities.

**Study Design:** Cross-sectional study.

**Setting & Population:** We examined US patients receiving dialysis from US Dialysis Facility Reports and the Dialysis Facility Compare websites in 2019.

**Exposures:** Percentage of prevalent dialysis patients with commercial health insurance.

**Outcomes:** Seven key dialysis facility quality metrics included in Dialysis Facility Compare star ratings.

**Analytical Approach:** Multivariable linear regression models adjusted for observed confounders.

**Results:** Among 7,194 US dialysis facilities, an average of 4.4% of prevalent dialysis patients had

commercial insurance. Each 10% absolute increase in the percentage of dialysis patients in a facility with commercial insurance was associated with an adjusted 8.3% (3.0%-13.6%) lower standardized mortality ratio. Commercial health insurance was not significantly associated with the remaining quality metrics examined, including standardized fistula rate, long-term catheter rate, standardized hospitalization ratio, standardized transfusion ratio, dialysis adequacy, and In-Center Hemodialysis Consumer Assessment of Healthcare Providers and Systems patient experience score.

**Limitations:** The potential for unobserved confounders including social risk factors limits the ability to make causal inferences.

**Conclusions and Relevance:** Dialysis facilities with a higher percentage of patients with commercial health insurance had better performance in standardized mortality ratio. If this association reflects a causal connection, then increased shifting of coverage from commercial health insurance to Medicare could adversely affect the quality of care at dialysis facilities.

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In June 2022, the United States Supreme Court issued a ruling in *Marietta Memorial Hospital Employee Health Benefit Plan v DaVita, Inc* that allowed commercial health insurers to classify all dialysis facilities as out-of-network.<sup>1</sup> This ruling could result in many commercially insured patients who receive dialysis forgoing their commercial health insurance and shifting to Medicare as the primary payer. The ruling could also compel some dialysis facilities to accept lower payments from commercial insurers.<sup>2-4</sup>

Approximately 5% of patients receiving in-center hemodialysis are insured by commercial group health plans, which may reimburse up to 6-fold more than Medicare for dialysis.<sup>5</sup> Patients enrolled in commercial coverage at the start of dialysis can maintain this coverage for up to 30 months, during which time Medicare serves as secondary coverage. A shift in payer mix toward public insurers accompanied by lower payments from commercial insurers would result in decreased dialysis facility revenues.

The amount of revenue that health care providers receive may affect the quality of care provided to all patients cared for at a facility. This is because health care facilities can use additional revenues to provide higher quality care in ways that apply to all patients. For example, in the case of dialysis, higher revenues could make it easier to retain skilled staff. In studies of hospital discharges,

lower hospital revenues were associated with worse patient health outcomes, including higher rates of mortality, lower performance on quality measures, and more medical errors.<sup>6-8</sup> Kidney health stakeholders have raised concerns about the implications of the Supreme Court ruling on care access and quality for all dialysis patients, particularly given the limited revenue streams for dialysis facilities.<sup>2-4</sup>

More than 550,000 patients receive maintenance dialysis for the treatment of kidney failure.<sup>9</sup> Despite the extremely high costs of caring for people with kidney failure, patient outcomes remain suboptimal. After initiating dialysis, the average patient can expect to live fewer than 5 years and is hospitalized 1-2 times per year.<sup>9</sup> Longstanding efforts by clinicians, policymakers, and patient advocates to maintain or improve the quality of dialysis care have had some success. For example, national quality initiatives have coincided with increased use of arteriovenous fistulas for vascular access for dialysis as well as reductions in mortality and hospitalization.<sup>9</sup> However, concerning trends in the cost and quality of US dialysis care have recently emerged. In 2020, for the first time in more than a decade, there were increases in the use of central venous catheters for dialysis and in mortality, likely reflecting the turmoil to the health care system caused by the COVID-19 pandemic.<sup>9</sup> In the setting of price inflation,

**PLAIN LANGUAGE SUMMARY**

A recent US Supreme Court decision may lead US patients receiving dialysis to shift from commercial health insurance to Medicare. Our objective was to determine whether differences in commercial payers as a proportion of dialysis facility payer mix affect the quality of care at dialysis facilities. In an analysis of dialysis facility quality ratings from 2019, more commercial insurance was associated with better performance in standardized mortality ratio but not with other key dialysis facility quality measures. This finding suggests that the shifting of coverage from commercial health insurance to Medicare could adversely affect quality of care at US dialysis facilities.

dialysis care costs have recently increased at facilities in excess of government reimbursement, creating additional financial pressures that could affect care quality.

It is unknown whether a potential loss of revenues from commercial health insurers after the Supreme Court ruling would further erode the quality of dialysis care. For example, decreased revenues could reduce profit margins without materially affecting the quality of care provided. Accordingly, in this study, we examined the association between commercial health insurance and key indicators of dialysis facility quality.

**METHODS****Data Sources**

We obtained information about US dialysis facilities from Dialysis Facility Reports published by the Centers for Medicare & Medicaid Services (CMS).<sup>10</sup> These reports include each dialysis facility's performance on selected quality metrics along with the health, demographic, and health insurance characteristics of patients at each facility. Facility quality metric performance ratings are based on information collected from Medicare claims, information reported by facilities to Medicare's End Stage Renal Disease (ESRD) Quality Reporting System, and Medicare enrollment data. Claims-based quality metrics focus on indicators of the quality of care delivered to patients with Medicare coverage. Data about patient health insurance, including commercial insurance and dual eligibility for Medicare and Medicaid, came from the United States Renal Data System. Patients were defined as having commercial insurance coverage if this served as their primary form of coverage. We focused our analyses on information about patients receiving dialysis in 2019, which is the most recent year before the COVID-19 pandemic.

We obtained dialysis facility scores on the In-Center Hemodialysis Consumer Assessment of Healthcare Providers and Systems (ICH CAHPS) survey from the CMS Dialysis Facility Compare website.<sup>11</sup> We included scores from ICH CAHPS surveys administered from April 2018-

January 2019. This source also provided information about dialysis facility for-profit status and addresses. We used unique facility IDs to merge information from the different data sources. We used facility zip codes to ascertain information about area-level socioeconomic status obtained from the US Census and about population density from Rural-Urban Commuting Area codes.<sup>12</sup> For each census block, we used a previously published algorithm to calculate the Area Deprivation Index (ADI), which represents a measure of socioeconomic disadvantage in a geographic area.<sup>13,14</sup> Quartiles of ADI score were calculated using all of the 2020 census tracts in the contiguous 48 states.

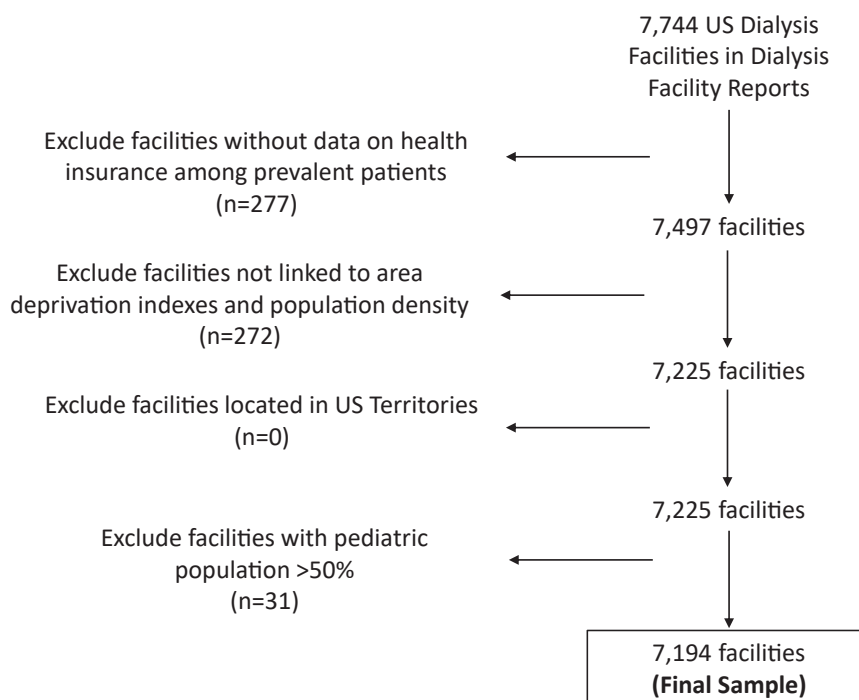
**Study Population**

We studied Medicare-certified dialysis facilities in the contiguous 48 states and District of Columbia operating in 2019 that had quality ratings published in Dialysis Facility Reports. We excluded facilities located in US territories, Hawaii, Alaska, and facilities with >50% pediatric population. When examining dialysis adequacy ratings, we excluded home dialysis facilities and facilities with fewer than 20% of patients receiving in-center hemodialysis. This was due to concern that patients receiving dialysis at these facilities may be unique, such as being treated with dialysis temporarily, and that dialysis access and patient experience metrics are not applied to home dialysis patients. Facilities were also excluded if they were missing patient information or if they could not be merged with US Census and population density data (Figure 1).

**Outcomes**

Study outcomes were dialysis facility performance on selected quality indicators that are included in Medicare's Dialysis Facility Compare Star rating program. Specifically, we examined facility standardized mortality ratio, standardized hospitalization ratio, standardized arteriovenous fistula rates, and standardized blood transfusion rates. We also examined the percentage of patients at a facility with long-term central venous catheters (defined as a catheter for >90 days), the percentage of thrice weekly in-center hemodialysis patients not receiving adequate hemodialysis (defined by a single pool [sp] Kt/V <1.2), as well as ICH CAHPS Star ratings.

ICH CAHPS Star ratings are based on a "top-box" methodology adopted by CMS and range from 1 to 5. Under the CMS methodology, each facility is rated according to the proportion of ICH CAHPS survey responses for which the facility was given the highest rating across 6 patient experience and satisfaction categories. Three categories are composites of questions about nephrologists' communication and caring, dialysis center care and operations, and providing information to patients, while the other 3 are overall ratings of satisfaction with nephrologists, dialysis center staff, and dialysis facilities. Dialysis facilities with fewer than 30 total survey responses summed over 2 administration periods each calendar year are not given an ICH CAHPS score. These facilities were excluded from the



**Figure 1.** Dialysis facility selection diagram.

examination of ICH CAHPS Star ratings but were included when examining other quality outcomes.

Non-standardized outcomes (long-term central venous catheters and dialysis adequacy) are reported in Dialysis Facility Reports as a value from 0 to 100, such that a given value represents the percentage of patients at a facility with a long-term central venous catheter or with a spKt/V <1.2. In contrast, most standardized quality ratings are represented in Dialysis Facility Reports as a numeric value centered around 1, where a score of 1 indicates that a facility had the expected rate of the quality outcome after adjusting for differences in patient characteristics at that facility. The specific set of characteristics included in risk adjustment varies for each standardized measure according to methodology adopted by CMS.<sup>15</sup> In Dialysis Facility Reports, standardized fistula rates are reported after recalibrating around the crude population mean of 63%.

To facilitate the comparison of facility performance across both standardized and non-standardized quality measures, we multiplied the 3 standardized quality ratings that were originally centered around a value of 1 (mortality, hospitalization, and blood transfusion) by 100. After this transformation, a value of 100 represents expected performance, and each difference of 1 in a standardized rating represents a 1% deviation from expected performance. We did not transform other outcome variables, such that a difference of 1 represents an absolute change of 1% in each other outcome.

### Study Exposures and Covariates

The study exposure was the percentage of patients at each facility with commercial group health insurance as their

primary coverage on January 1, 2019. This was ascertained from the United States Renal Data System payer file, which includes information from the Medicare Enrollment Database and dialysis claims.

In all regression models, we included information about patient demographics that had previously been aggregated within dialysis facilities. We also included area-level socioeconomic characteristics represented by the ADI and population density, geographic location (represented by ESRD Network), and selected dialysis facility characteristics. Adjustment for socioeconomic status (SES) is critical because the standardization procedures used by CMS do not account for SES. All included covariates are listed in Table 1.

In some instances, individual patient demographic information was also included in the risk adjustment algorithms used to standardize facility quality metrics. While we still included demographic information in our primary models, in these instances we also tested the sensitivity of our findings to the exclusion of demographic information in our regression models.

### Statistical Analyses

We used multivariable linear regression models to examine the associations of the percentage of patients with commercial group health insurance with each dialysis facility quality measure. Analyses were conducted at the level of the individual dialysis facility and used robust standard errors to account for clustering within each dialysis facility chain.<sup>16</sup> Due to marked variation in private insurance rates across facilities of different sizes, we used weighted regression models in which each dialysis facility received a

**Table 1.** Baseline characteristics stratified by dialysis unit commercial health insurance coverage

Facility Characteristic	Commercial Health Insurance Percentage		P
	Below Median (n = 3,584)	Above Median (n = 3,610)	
Dual eligible patients (% , SD)	29.5% (12.5%)	23.4% (10.8%)	<0.001
Area deprivation Index Quintile (% , n)			
1st (lowest deprivation)	14.6% (523)	13.3% (481)	0.12
2nd	16.1% (577)	21.0% (758)	<0.001
3rd	19.9% (712)	24.8% (894)	<0.001
4th	23.2% (834)	23.6% (852)	0.74
5th (highest deprivation)	26.2% (938)	17.31% (625)	<0.001
Patients receiving in-center hemodialysis (% , SD)	91.9% (15.9)	77.8% (29.5)	<0.001
Population density (% , n)			
Metropolitan	77.1% (2,762)	82.3% (2,972)	<0.001
Micropolitan	13.0% (464)	11.7% (422)	0.11
Rural	10.0% (358)	6.0% (216)	<0.001
Non-profit status (% , n)	12.3% (440)	10.4% (374)	0.01
Patient Race (% , SD)			
White	58.0% (29.4%)	63.0% (26.4%)	<0.001
Asian	4.7% (9.3%)	4.5% (7.9%)	0.33
African American	35.3% (30.3%)	31.2% (26.8%)	<0.001
American Indian	1.6% (9.2%)	1.0% (5.8%)	<0.001
Other race	0.3% (1.0%)	0.3% (0.8%)	0.04
Patient age, y (% , SD)			
<18	0.1% (1.4%)	0.1% (1.1%)	0.66
18-64	50.0% (12.0%)	51.0% (11.4%)	<0.001
≥65	49.9% (12.1%)	48.9% (11.5%)	<0.001
Facility size quartile (% , n)			
1st (smallest)	26.5% (946)	24.5% (877)	0.04
2nd	25.0% (890)	25.3% (906)	0.78
3rd	24.3% (866)	25.8% (926)	0.14
4th (largest)	24.2% (862)	24.5% (878)	0.77
ESRD network area (% , n)			
1	2.5% (91)	2.9% (105)	0.41
2	4.6% (165)	3.8% (137)	0.09
3	2.1% (76)	3.0% (108)	0.02
4	4.9% (176)	4.7% (169)	0.65
5	4.9% (174)	7.3% (265)	<0.001
6	10.2% (368)	10.0% (362)	0.74
7	7.5% (269)	5.7% (206)	0.002
8	6.2% (223)	6.7% (240)	0.46
9	7.8% (279)	9.7% (349)	0.01
10	4.7% (168)	4.4% (158)	0.53
11	6.9% (247)	7.2% (261)	0.58
12	4.0% (143)	5.4% (194)	0.01
13	5.2% (186)	4.3% (156)	0.08
14	8.5% (306)	10.5% (378)	0.01
15	4.5% (161)	5.2% (188)	0.16
16	2.3% (81)	3.6% (131)	0.001
17	4.8% (173)	2.5% (91)	<0.001
18	8.2% (295)	3.2% (114)	<0.001

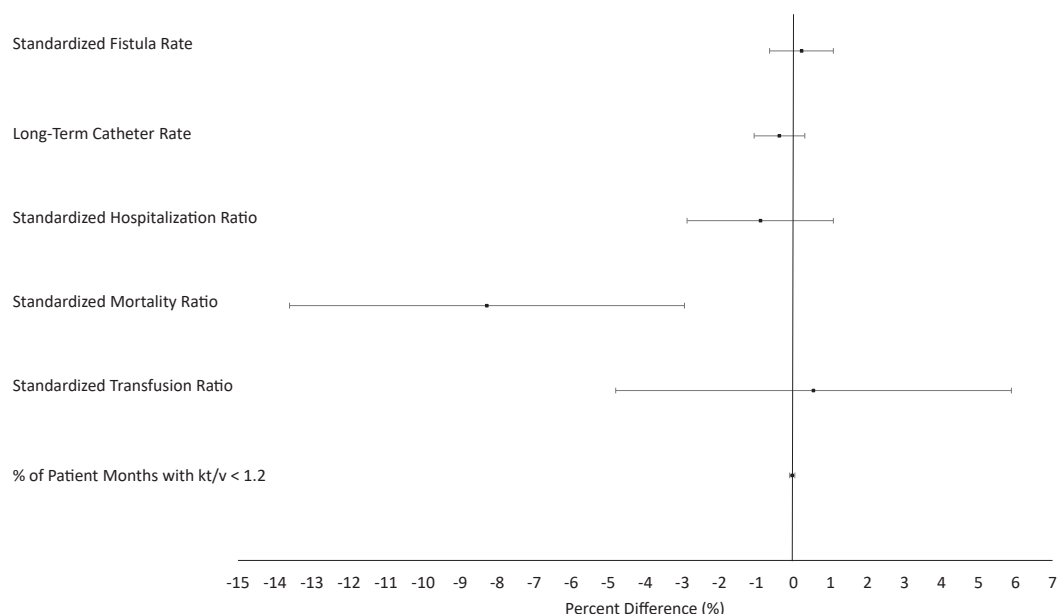
Note: % of Dual Eligible Patients and Commercial Health Insurance percentage came from the United States Renal Data System database. All other variables came from publicly available Dialysis Facility Reports and US Census data.

Abbreviations: ESRD, end-stage renal disease; SD, standard deviation.

weight according to the number of patients that they cared for in 2019.

For continuous explanatory variables that were represented as percentages (including the main study exposure),

we examined changes in increments of 10%. The coefficient associated with each continuous variable can be interpreted as the change in a given outcome associated with an absolute change of 10% in the covariate. We assessed for the nonlinear



**Figure 2.** Associations among dialysis facility quality measures and a 10% increase in commercial health insurance. Note: In-Center Hemodialysis Consumer Assessment of Healthcare Providers and Systems scores are not included in this figure. Higher values are better for the standardized fistula rate, while lower values are better for all other measures.

effects of commercial health insurance on each significant quality outcome by including a quadratic term equal to the square of commercial health insurance percentage in regression models. To understand how quality measures vary across the actual range of commercial insurance percentages, we also examined commercial insurance as a set of categorical variables stratified by quintiles.

The project was approved by an institutional review board at the Baylor College of Medicine.

## RESULTS

### Baseline Characteristics

Among 7,194 US dialysis facilities with information from 2019 Dialysis Facility Reports (Figure 1), outcomes of interest were missing in 2.8%-8.4% of facilities, with the exception of the standardized transfusion ratio (12.5% missing) and the ICH CAHPS Star rating (53% missing). The mean percentage of prevalent dialysis patients with commercial health insurance was  $4.4 \pm 5.9\%$ . The average standardized mortality rate was  $100.2 \pm 38.6$ ; average standardized hospitalization rate,  $98.9 \pm 25.4$ ; average standardized transfusion rate,  $97.9 \pm 61.4$ ; and average standardized fistula rate,  $63.4 \pm 10.4\%$ . The average percentage of patients receiving hemodialysis with a  $\text{spKt/V} < 1.2$  was  $1.6 \pm 2.4\%$ , and the average long-term catheter rate was  $12.3 \pm 6.9\%$ . The average ICH CAHPS Star rating was  $3.41 \pm 1.0$ .

Compared with facilities with fewer commercially insured patients receiving dialysis, facilities above the median in commercial insurance percentages had fewer patients dually eligible for Medicare/Medicaid, were less

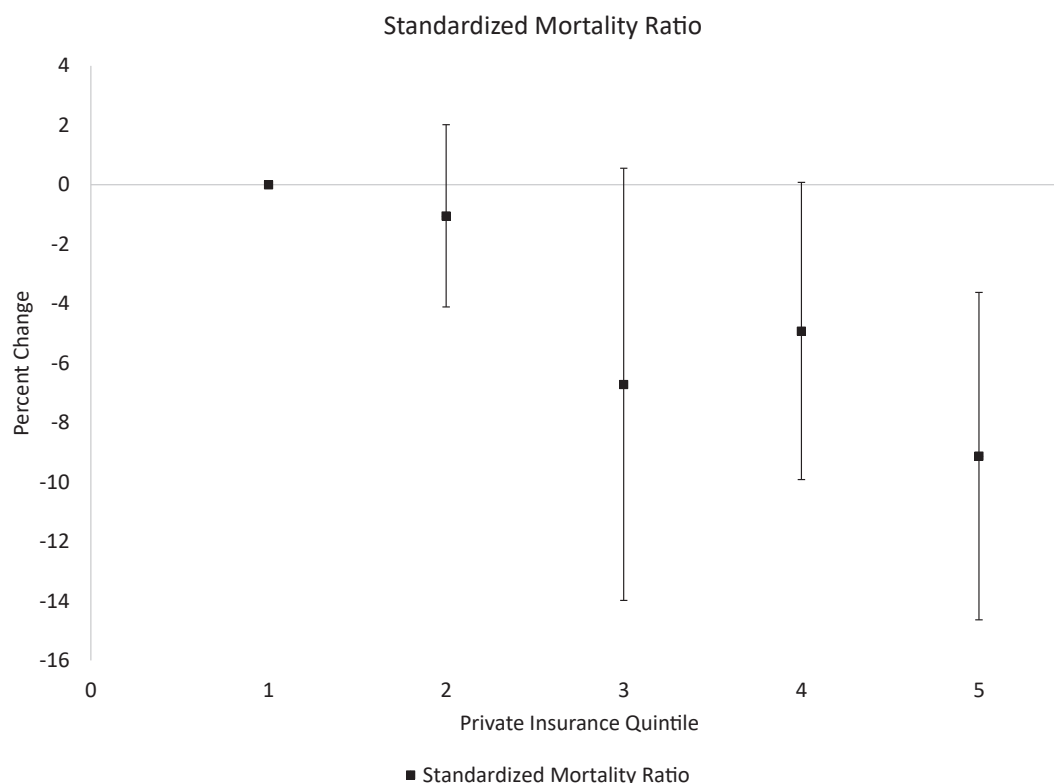
likely to be in the smallest quartile of size, and had lower percentages of patients receiving in-center hemodialysis. They also had smaller percentages of patients of African American and American Indian race and were less likely to be in the highest quintile of ADI and to have non-profit ownership. Facilities above the median in commercial insurance percentages were more likely to be in metropolitan areas and had more patients of White race (Table 1).

### Associations With Quality Metrics

A higher percentage of commercial health insurance among patients initiating dialysis at a facility was significantly associated with better performance in the standardized mortality ratio quality metric. Each 10% absolute increase in the commercial insurance percentage was associated with an 8.3% (95% confidence interval [CI], 3.0%-13.6%) lower standardized mortality ratio. While commercial health insurance was associated with higher rates of standardized fistulas (0.2%; 95% CI, -0.6% to 1.1%), lower rates of long-term catheters (-0.4%; 95% CI, -1.1 to 0.3), and a lower standardized hospitalization ratio (-0.9%; 95% CI, -1.9% to 1.1%), these associations were not statistically significant. Associations between commercial insurance and standardized transfusion ratio (0.5%; 95% CI, -4.8% to 5.9%) and ICH CAHPS Star rating (0.05; 95% CI, -0.1 to 0.2) were also not statistically significant (Figure 2; Tables S1-S7).

Nearly every quality measure varied widely across different geographic regions, as measured by ESRD Network estimates. Standardized fistula rates, hospitalization and mortality ratios, and transfusion rates were particularly variable across ESRD Networks (Tables S1-S7).





**Figure 3.** Quality metric performance stratified by the amount of commercially insured patients. Note: Higher quintiles correspond to more patients with commercial insurance.

### Additional Analyses

In addition to examining commercial insurance percentages as a single continuous variable, we examined for nonlinear effects and assessed outcomes across quintiles of commercial insurance percentages. The association between commercial insurance and the standardized mortality ratio moderated slightly at facilities with more commercially insured patients. However, a stepwise decrease in standardized mortality ratio with higher rates of commercial insurance remained (Figure 3; Table S4). In a sensitivity analysis in which we did not include demographic characteristics, the association between commercial insurance and standardized mortality ratio was virtually unchanged (−8.2; 95% CI, −13.6 to −2.8).

In a sensitivity analysis in which we used unweighted regression, each 10% absolute increase in the commercial insurance percentage was associated with a 5.5% (95% CI, −1.3% to 12.2%) lower standardized mortality ratio, but the association was not statistically significant.

### DISCUSSION

In this nationwide analysis, dialysis facilities with a higher proportion of commercially insured patients had better performance on the standardized mortality ratio quality metric. A 10% increase in the proportion of commercially insured patients was associated with an 8.3% reduction in

the standardized mortality ratio. Commercial insurance was not significantly associated with the remaining 6 quality metrics examined. These findings suggest that commercial health insurance may be important for maintaining some aspects of dialysis facility quality in the United States.

There are several mechanisms that could explain the association between commercial health insurance and mortality rates at dialysis facilities. First, reimbursement from commercial plans may contribute more to facility revenues, which may improve patient health by supporting facility quality initiatives and staff retention. Studies in other areas of health care indicate similar associations between remuneration related to payer mix, facility revenues, and performance on quality measures. One nationwide study of patients with acute coronary syndromes found that hospitals with higher proportions of low-income payers had lower rates of surgical intervention and increased mortality.<sup>17</sup> Another study found that hospitals with lower profit margins had higher rates of adverse patient safety events.<sup>7</sup> Increased revenues may be particularly important for quality in the setting of ongoing labor crises and financial stresses after the COVID-19 pandemic.<sup>18</sup>

While some of the quality measures examined only involved patients with Medicare (eg, standardized hospitalization ratio), the standardized mortality ratio includes all patients at a dialysis facility, regardless of whether they

have Medicare, commercial insurance, or another type of insurance. This suggests that, to the extent that higher revenues lead to improvements in quality of care at a facility, these improvements apply more broadly to all patients at a facility.

A second possible explanation for our findings could be that commercial insurance reflects a younger and less comorbid population, as has been observed previously.<sup>19</sup> If commercial insurance is an indicator of patient health, and if the underlying health of patients with Medicare who were included in our analyses mirrors the health of commercially insured patients at their facility, then differences in underlying patient health could drive variation in quality measure performance. However, many examined outcomes were standardized by the CMS to account for differences in the health of patient populations, our statistical analyses controlled for patient demographics, and outcomes included many patients with Medicare rather than patients with commercial health insurance, mitigating this concern somewhat.

Differences in SES could also contribute to our findings. This limitation is common to virtually every analysis of payer mix and health care quality. If patients at facilities with lower rates of commercial insurance have lower SES, then differences in social determinants of health across facilities could drive the observed association between commercial insurance and standardize mortality. Lower SES is associated with increased mortality among patients receiving dialysis,<sup>20</sup> and patients with lower SES are less likely to receive home dialysis or a kidney transplant.<sup>21,22</sup> In our cohort, facilities with more commercial insurance were less likely to be in the highest quintile of ADI and had fewer patients dually eligible for Medicare and Medicaid. If other differences in SES were not observed, then social determinants of health could confound our findings.

Finally, our findings could be explained by increased market competition among dialysis facilities in areas with higher proportions of commercially insured individuals. Areas that have fewer dialysis recipients with Medicare fee-for-service as their primary payer exhibit more competition among dialysis facilities and an increased likelihood of acquisitions by larger chains.<sup>23,24</sup> If non-Medicare insurance reimbursements are higher than traditional Medicare, then facilities operating in areas with fewer Medicare beneficiaries might compete more fiercely against one another for the higher numbers of non-Medicare insurance beneficiaries. Enhanced competition for patients and physician referrals could include efforts to increase staffing and enhance the quality of services at dialysis facilities. Previous studies of dialysis facilities have associated increased market competition with improved health outcomes.<sup>25-27</sup> Reduced market competition may contribute to reductions in highly skilled staff and listings for kidney transplants, all of which may negatively affect care quality.<sup>28</sup>

While commercial insurance was associated with mortality, it was not significantly associated with other measures of dialysis facility quality. This could be due to an

issue of small sample size in a cross-sectional study design. Perhaps a larger study with more data points over a longer period of time would identify significant differences in other quality metrics. Alternatively, it is possible that differences in quality address issues specific to mortality. For example, quality improvements that reduce rates of sudden cardiac death could affect mortality alone.

Many of the quality metrics examined varied widely across geographic regions. The reasons for this variation are unclear and could reflect unobserved differences in patient health, SES status, or dialysis facility practices. Future research will be needed to examine this variation.

Our study has several limitations. We used dialysis facility-level data, which may allow for possible biases in aggregation. Some of the quality metrics examined in the study may have questionable value. For example, facility reporting of transfusion ratio is known to be imperfect,<sup>29</sup> and ICH CAHPS data have a high degree of non-random missingness, limiting the interpretation of patient experience.<sup>30</sup> Since passage of the 21<sup>st</sup> Century Cures Act, an increasing number of patients receiving dialysis have shifted to Medicare Advantage. We examined dialysis facilities before these changes, which may limit the generalizability of our findings to facilities with a different payer mix. We did not examine private health insurance obtained through individual markets.

In summary, we found that dialysis facilities with a higher proportion of commercially insured patients had better dialysis facility performance on the standardized mortality rate quality measure but not on other quality measures. A recent United States Supreme Court decision, *Marietta Memorial Hospital Employee Health Benefit Plan v DaVita, Inc*, may lead some patients receiving dialysis to shift away from commercial insurance to Medicare, thereby reducing facility revenues. Future research will be needed to determine if there is a causal link between commercial insurance and mortality. If the observed association between commercial insurance and mortality reflects a causal connection, then our findings suggest that the effects of the Supreme Court ruling, combined with other cost pressures currently facing US dialysis facilities, could negatively affect care quality and outcomes for dialysis patients. Clinicians, dialysis facility administrators, and policymakers should be aware of the potential effects of this decision on patient care and consider possible mitigation strategies for maintaining patient outcomes.

## SUPPLEMENTARY MATERIALS

### Supplementary File (PDF)

**Table S1.** Results Examining Standardized Fistula Rate.

**Table S2.** Results Examining Long-Term Catheter Rate.

**Table S3.** Results Examining Standardized Hospitalization Ratio.

**Table S4.** Results Standardized Mortality Ratio.

**Table S5.** Results Examining Standardized Transfusion Ratio.

**Table S6.** Results Examining Dialysis Adequacy.

**Table S7.** Results Examining ICH CAHPS Star Rating.

## ARTICLE INFORMATION

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**Other Disclosure:** This work was conducted under a data use agreement between Dr Kevin Erickson and the United States Renal Data System (USRDS). The data reported here have been supplied by the USRDS. The interpretation and reporting of these data are the responsibility of the author(s) and in no way should be seen as an official policy or interpretation of the US government.

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