Exploring Care Attributes of Nephrologists Ranking Favorably on Measures of Value

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ABSTRACT

Background Despite growth in value-based payment, attributes of nephrology care associated with payer-defined value remains unexplored.

Methods Using national health insurance claims data from private preferred provider organization plans, we ranked nephrology practices using total cost of care and a composite of common quality metrics. Blinded to practice rankings, we conducted site visits at four highly ranked and three average ranked practices to identify care attributes more frequently present in highly ranked practices. A panel of nephrologists used a modified Delphi method to score each distinguishing attribute on its potential to affect quality and cost of care and ease of transfer to other nephrology practices.

Results Compared with average-value peers, high-value practices were located in areas with a relatively higher proportion of black and Hispanic patients and a lower proportion of patients aged >65 years. Mean risk-adjusted per capita monthly total spending was 24% lower for high-value practices. Twelve attributes comprising five general themes were observed more frequently in high-value nephrology practices: preventing near-term costly health crises, supporting patient self-care, maximizing effectiveness of office visits, selecting cost-effective diagnostic and treatment options, and developing infrastructure to support high-value care. The Delphi panel rated four attributes highly on effect and transferability: rapidly adjustable office visit frequency for unstable patients, close monitoring and management to preserve kidney function, early planning for vascular access, and education to support self-management at every contact.

Conclusions Findings from this small-scale exploratory study may serve as a starting point for nephrologists seeking to improve on payer-specified value measures.

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Nephrology care is complex, costly, and variably delivered.1–4 In response to pressure from policy-makers working to slow rising United States health care costs without sacrificing quality of care,5,6 federal and private payers are increasing use of value-based payment and physician network inclusion. Because ESRD is the only disease-based entitlement to Medicare coverage, nephrologists are no strangers to a practice environment shaped by payers.7,8 The ESRD Quality Incentive Program provides incentives to nephrologists and dialysis providers to deliver high-quality care by imposing financial penalties on those who do not meet federal quality standards.9,10 Because quality is only part of the value equation, most nephrologists will soon have some accountability for the total cost of the care incurred by their Medicare patients.11,12

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The Medicare Access and CHIP Reauthorization Act (MACRA) of 2015 established a value-based payment system that includes positive and negative payment adjustments of as much as 9%, on the basis of measures of quality and efficient resource use.\textsuperscript{13} Although large health systems such as Kaiser Permanente, the Veterans Administration, and the Cleveland Clinic Foundation use scale-dependent strategies to improve the value of care,\textsuperscript{14} little is known about how smaller- and medium-sized physician practices deliver high-quality care with less combined spending by patients and payers (“total cost of care”). Recent small-scale exploratory studies of primary care and oncology practices using study designs similar to this study identified care delivery attributes that distinguish practices ranking more favorably on payer-defined measures of value than their peers.\textsuperscript{15,16} We used a similar mixed-methods positive deviance study design to identify attributes that may be transferable to improve care.\textsuperscript{17,18}

\section*{Significance Statement}
As federal and private payers move toward value-based payment, the authors sought to identify attributes of nephrology care associated with payer-defined value. The authors conducted site visits at United States nephrology practices ranking near the top or ranking near the 50th percentile on measures of quality and total cost of care commonly used by payers. They identified 12 care attributes common in highly ranked nephrology practices that fell into five themes: preventing near-term costly health crises, supporting patient self-care, maximizing effectiveness of office visits, selecting cost-effective diagnostic and treatment options, and developing infrastructure to support high-value care. A panel of nephrologists predicted that four value-based practices may be easiest to transfer to less-favorably ranked peers: rapidly adjustable office visit frequency for unstable patients, close monitoring and management to preserve kidney function, early planning for vascular access, and education to support self-management at every contact. Findings from this exploratory study may serve as a starting point for United States nephrologists who face increasingly value-sensitive payers and patients.

\section*{METHODS}

\subsection*{Study Design}
Our small-scale exploratory research design combined quantitative and qualitative assessment to identify care attributes more frequently present in nephrology practices ranking favorably on payer-defined measures of value. Similar mixed-methods positive deviance studies have been applied to infection control, in-hospital mortality, and adoption of evidence-based care processes.\textsuperscript{18–20} This quality improvement study of organizations was granted exempt status by the Stanford Institutional Review Board.

\subsection*{Data Sources}
We used health insurance claims data to rank practices on risk-adjusted total annual per capita spending for attributed patients and on a composite quality score comprising measures selected by a group of expert nephrologists from those commonly used by payers. The ranking was on the basis of an analysis from Intercontinental Medical Statistics (IMS) Health’s PharmetricsPlus data set that contains medical and pharmaceutical claims records for >60 million Americans with preferred provider organization health insurance. The data set includes patients aged 0–64 years with continuous enrollment in the same insurance plan for at least 12 months between July 2010 and June 2013. An additional linked data set, IMS Health’s OneKey containing descriptive provider data such as the specialties of physicians sharing a practice, was analyzed to identify individual nephrology practices. The unit of analysis for this study was a medical practice with at least one nephrologist. The data set was sufficient to rank 307 nephrology practices, representing a 4% sample of all United States nephrology practices (Supplemental Table 1).

\subsection*{Identifying and Ranking Practices on Value}
To assess care quality, a senior nephrologist selected nine quality-of-care measures relevant to nephrology that were calculable with the IMS data set and either used by the Centers for Medicare and Medicaid Services or endorsed by the National Quality Forum, assigned a subjective weight to each measure on the basis of its importance in nephrology care, and categorized them into three domains (Supplemental Table 2). To assess health care spending, we aggregated all claims incurred by each patient receiving nephrology care within each 12-month period to calculate the total cost of care per patient-year. Patient-years were attributed to the nephrology provider whose payer-allowable charges accounted for the highest percentage of payer-allowable charges within a given year. Nephrology providers practicing at the same address were grouped, and nephrology groups were included in the analysis if they had at least 30 patient-years attributed to them (Supplemental Tables 3 and 4). Because the lack of a national all-payer claims database requires analysis of small patient sample sizes per practice site, we used an independent scientific panel to make analytic decisions such as the 30 patient minimum sample size, outlier trimming, and patient attribution to a practice. The scientific panel comprised individuals who had published assessments in peer-reviewed journals with high-effect ratings of the validity of measures of clinician cost and/or quality of care.

We adjusted average payer-allowable annual health care cost for severity of illness by assigning each patient-year to a clinical risk group (CRG)\textsuperscript{21} using 3M Clinical Risk Group Software (Supplemental Table 5). Cost adjustment using CRGs is similar, although not identical, to using case-mix index in that it accounts for important comorbid conditions, such as coincident diabetes and transplant status, when adjusting health care costs. We accounted for geographic cost variation by using the multiplier used by Medicare for regional cost adjustment. We compared per-patient-per-month costs (observed costs) to an average per-patient-per-month cost for each CRG in our data set (expected costs). These data were then used to construct an observed to expected ratio of costs by CRG for each.
nephrology practice. We weighted this ratio for each practice on the basis of the number of individuals in each CRG attributed to the practice. We ranked the practices by this weighted observed to expected ratio of health care spending, with a lower ratio equating to a higher ranking (Supplemental Material).

We arbitrarily classified a nephrology practice as a high-value practice if it ranked in the top quartile on both quality and cost. If a practice’s quality and cost scores fell ten percentage points or less from the 50th percentile ranking, we classified it as an average-value practice. We used purposeful sampling to select and sequence a list of practices from across the country and with a case-mix index near the national median to recruit for site visits. We also excluded practices providing only pediatric care as well as those without a board-certified nephrologist. Within each of the two groups, the sequence for recruitment favored higher performance on quality and cost measures. We used the resulting sequence to recruit four high-value and three average-value practices for site visits.

Identifying Care Attributes Distinguishing High-Value Practices via Site Visits
We conducted site visits to seven nephrology practices (four high-value and three average-value sites) between August 2014 and February 2015. A team consisting of a practicing nephrologist and a qualitative researcher conducted an 8-hour visit to each of the practices. Blinded to the ranking of the practices, the team interviewed practice team members, including physicians, nurses, medical assistants, and other staff, using a standardized interview guide. The guide consisted of (1) open-ended questions to elicit participants’ perspectives on attributes of their care likely to contribute to favorable ranking on value; (2) several nephrology patient vignettes designed to elicit approaches to diagnosis and treatment; and (3) questions about nonclinical attributes such as practice size, staffing composition, and electronic medical record use.

After each site visit, a qualitative researcher debriefed the field team in a structured, recorded telephone interview. The site visit team also prepared a report describing attributes of care delivery they believed contributed to superior value. Our centrally located team trained in qualitative analysis then reviewed debriefing notes and field reports, and used grounded theory to categorize and compile commonly observed practice attributes. Finally, we developed a scoring grid to rate the degree to which each attribute was present at each site (Supplemental Table 6).

Assessing the Face Validity and Transferability of Care Attributes Distinguishing High-Value Practices
To assess the face validity and transferability of care attributes associated with high-value practices, we used a modified Delphi method. Three experienced nephrologists scored each attribute on a one to five scale (five representing the highest score) for its potential effect on quality, cost, and on its transferability to less favorably ranked practices. We defined transferability as the degree to which a nephrology practice was likely to adopt each practice attribute under two reimbursement scenarios: (1) in today’s predominantly fee-for-service reimbursement system, and (2) in a predominantly value-based reimbursement system.

RESULTS
Baseline Characteristics
The seven practices subject to site visits ranged between 1 and 20 nephrologists. High-value practices had fewer attributed patients than average-value practices. The case mix of these attributed patients differed, with average-value practices having a higher acuity patient case-mix than the high-value practices.

Patient demographics within each practice were not obtained, but primary care service area demographics on the basis of census data are reported in Table 1. High-value practices served areas with a relatively higher proportion of black and Hispanic patients and with a lower proportion of patients aged 65 years. Income levels and education were similar among the areas with high- and average-value practices.

The mean risk-adjusted per capita per month spending was 24% lower in the visited high-value practices than the average-value practices (Table 2). The high-value practices scored 8%–9% higher on a composite quality score compared with average-value peers.

Care Attributes associated with High-Value Practices
We identified 12 care attributes observed more frequently in high-value practices than in average-value practices. These practice attributes are categorized into five themes, as presented in Table 3: (1) prevention of costly health deterioration and acute crisis, (2) supporting patient self-care, (3) maximizing effectiveness of office visits, (4) selecting cost-effective diagnostic and treatment options, and (5) developing infrastructure to support high-value care.

Preventing Near-Term Costly Health Deterioration and Acute Crisis
High-value practices prioritized responsiveness to patients’ needs. These practices emphasized treating patients in outpatient settings rather than reflexively referring to high-cost emergency room and inpatient settings. They leveraged multidisciplinary teams of nurses and vascular access coordinators to provide a “high touch” approach to keep their sickest patients from unexpected clinical crises. These high-value teams educated patients in medication adherence, lifestyle and dietary modifications, and helped patients overcome common socioeconomic barriers such as transportation to clinic visits. Nurse practitioners (NPs) had autonomy to schedule same-day visits for urgent patients and to treat lower-acuity patients, approaches that reserved nephrologists’ time for higher-acuity patients. One high-value practice used two vascular access
coordinators to oversee their practice panel of 600 patients receiving hemodialysis to facilitate rapid scheduling with vascular specialists for same-day angioplasty or thrombolysis/thrombectomy procedures. These specialized coordinators also educated patients and dialysis facility staff about signs and symptoms of infection or impending access failure.

Supporting Patient Self-Care
Physicians and other team members in high-value practices more often empowered their patients to take responsibility for their own health. Providers and staff used structured educational approaches to teach patients the importance of medication adherence and self-care for both symptom recognition and management as well as self-care for home dialysis. Education about self-care happened at every touch point during office visits, beginning with previsit, nurse-led medication reconciliation, reinforced by the providers’ discussions, and further reiterated with customized after-visit summaries that highlighted the teaching points in writing. Some practices leveraged the support of social workers, pharmacists, and even pharmacy students to help patients learn better medication management. Three of the four high-value practices used this same approach to self-care when counseling patients on starting peritoneal dialysis. Peritoneal dialysis nurses supported by lay patient coordinators championed these practices, which allowed

Table 1. Nephrology practices with service area demographics

<table>
<thead>
<tr>
<th>Nephrology Group Name</th>
<th>State</th>
<th>Population Density</th>
<th>Median Household Income ($)</th>
<th>Age &gt;65 yr (%)</th>
<th>College Graduates (%)</th>
<th>White (%)</th>
<th>Black (%)</th>
<th>Hispanic (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>High-value sites</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>North Houston nephrology</td>
<td>TX</td>
<td>2600</td>
<td>62,040</td>
<td>7</td>
<td>11</td>
<td>56.4</td>
<td>20.3</td>
<td>36.9</td>
</tr>
<tr>
<td>UAB Kirklin Clinic</td>
<td>AL</td>
<td>865</td>
<td>37,735</td>
<td>13</td>
<td>9</td>
<td>26.6</td>
<td>68.7</td>
<td>3.3</td>
</tr>
<tr>
<td>Southwest Kidney</td>
<td>AZ</td>
<td>4832</td>
<td>50,424</td>
<td>8</td>
<td>12</td>
<td>68.5</td>
<td>6.1</td>
<td>29.1</td>
</tr>
<tr>
<td>Naples nephrology</td>
<td>FL</td>
<td>152</td>
<td>64,240</td>
<td>17</td>
<td>14</td>
<td>86.7</td>
<td>5.8</td>
<td>22.4</td>
</tr>
<tr>
<td>High-value mean</td>
<td></td>
<td>2112.25</td>
<td>53,609.75</td>
<td>11.25</td>
<td>11.50</td>
<td>59.55</td>
<td>25.23</td>
<td>22.93</td>
</tr>
<tr>
<td>Average-value sites</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Practice 1</td>
<td>FL</td>
<td>1219</td>
<td>52,181</td>
<td>41</td>
<td>15</td>
<td>91.5</td>
<td>2.5</td>
<td>9</td>
</tr>
<tr>
<td>Practice 2</td>
<td>SC</td>
<td>172</td>
<td>40,147</td>
<td>13</td>
<td>7</td>
<td>49.4</td>
<td>45.6</td>
<td>3.3</td>
</tr>
<tr>
<td>Practice 3</td>
<td>PA</td>
<td>1049</td>
<td>63,263</td>
<td>15</td>
<td>12</td>
<td>80.5</td>
<td>5.6</td>
<td>15.6</td>
</tr>
<tr>
<td>Average-value mean</td>
<td></td>
<td>813.33</td>
<td>51,863.67</td>
<td>23.00</td>
<td>11.33</td>
<td>73.80</td>
<td>17.90</td>
<td>9.30</td>
</tr>
</tbody>
</table>

UAB, University of Alabama.

Table 2. Practice-specific demographics

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>High-Value Practice</th>
<th>Average-Value Practice</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Practices, n</td>
<td>4</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Mean (SD) no. of Specialists</td>
<td>2.3 (0.6)</td>
<td>10.0 (7.62)</td>
<td>0.07</td>
</tr>
<tr>
<td>Single specialty</td>
<td>3 (75)</td>
<td>2 (67)</td>
<td></td>
</tr>
<tr>
<td>Independently owned</td>
<td>3 (75)</td>
<td>1 (33)</td>
<td></td>
</tr>
<tr>
<td>Mean attributed patient-years per practice per specialist (SD)*</td>
<td>56 (21.1)</td>
<td>263 (127.0)</td>
<td>0.12</td>
</tr>
<tr>
<td>Mean case-mix index (SD)</td>
<td>0.826 (0.010)</td>
<td>1.297 (0.296)</td>
<td>0.04</td>
</tr>
<tr>
<td>Mean risk-adjusted per capita per month spending, $ (SD)</td>
<td>1279.8 (50.2)</td>
<td>1683.1 (16.28)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Quality score (composite [SD])</td>
<td>1.12 (0.09)</td>
<td>1.03 (0.01)</td>
<td>0.001</td>
</tr>
<tr>
<td>No. of measures</td>
<td>8</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>Population density*</td>
<td>2112</td>
<td>813</td>
<td></td>
</tr>
<tr>
<td>Median household income</td>
<td>53,610</td>
<td>51,863</td>
<td></td>
</tr>
<tr>
<td>Age &gt;65 yr, %</td>
<td>13.9</td>
<td>22.9</td>
<td></td>
</tr>
<tr>
<td>College degree, %</td>
<td>11.6</td>
<td>11.5</td>
<td></td>
</tr>
<tr>
<td>Race/ethnicity, %</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>White</td>
<td>59.6</td>
<td>73.8</td>
<td></td>
</tr>
<tr>
<td>Black</td>
<td>25.2</td>
<td>17.9</td>
<td></td>
</tr>
<tr>
<td>Hispanic</td>
<td>22.9</td>
<td>9.3</td>
<td></td>
</tr>
</tbody>
</table>

*aThis is the average number of patient-years attributed to a practice divided by the average number of specialists. It is calculated for average- and high-value sites in each specialty.

bMeasured in number of people per square mile by census tract.
nephrologists to make peritoneal dialysis the preferred initial dialysis modality.

**Maximizing Effectiveness of Office Visits**
All high-value practices ensured that patients maximized their office visit by establishing procedures for previsit preparation. This preparation often began a week before the patients’ visits to ensure all necessary laboratory studies and other required tests had been performed, and to give the patient time to complete any outstanding items. At one high-value practice, medical assistants initiated the previsit review 1 week in advance, identified missing relevant information such as discharge summaries, laboratory tests, or consultant notes, and subsequently coordinated the completion of this information.

**Selecting Cost-Effective Diagnostic and Treatment Options**
Providers at the high-value practices exercised cost-consciousness when ordering tests or prescribing treatments. Clinical decision support tools helped guide provider choices, particularly on high-cost imaging and invasive procedures.25,26 Early planning for outpatient placement of vascular access and in-office anemia management with intravenous iron (in advance of, or in addition to, more-costly erythropoiesis-stimulating agents) were two cost-sensitive areas where high-value practices focused their efforts. Patients received early education about the need for vascular access, and fistula placement was planned in conjunction with a vascular access surgeon well in advance of patients starting dialysis. At the University of Alabama’s (UAB) Kirklin Clinic, NPs and vascular access coordinators kept track of patient referrals and ensured follow-up with scheduled vascular appointments. At the UAB practice, NPs managed anemia with standardized, physician-developed protocols, using in-office intravenous iron infusions as a cost-effective approach to treating iron-deficiency anemia in patients with CKD.27,28

**Developing Infrastructure to Support High-Value Care**
High-value practices invested in a practice infrastructure to support the delivery of high-quality, low-cost care. Salaried advanced practice providers (APPs; NPs and physician assistants) saw patients independently in addition to supporting nephrologists in care coordination tasks. The additional clinical capacity provided by APPs allowed for more flexible scheduling and nimbler accommodation of urgent patient needs. At one high-value practice, NPs conduct three out of four monthly visits for patients on hemodialysis, which releases time commitments from the nephrologists, allowing for more time to handle complex, higher-acuity patients in the office, or facilitating care transitions from hospital to home or skilled nursing facility. At UAB Kirklin, the advanced (“predialysis”) CKD program is run entirely by NPs, who see patients for follow-up care after hospitalization, provide education, and manage anemia and mineral bone disease using standardized protocols. This practice uses NP-generated dialysis clinical revenue to support the NP-run predialysis CKD program.

**Effect and Transferability**
Results from the Delphi panel’s rating of the likely effect and transferability for each of the 12 practice attributes noted are described in Table 4.

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### Table 3. High-value practice features

<table>
<thead>
<tr>
<th>Category</th>
<th>Feature</th>
<th>High-Value Practices (%)</th>
<th>Average-Value Practices (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prevention of costly health deterioration and acute crisis</td>
<td>Rapidly adjustable office visit frequency for unstable patients</td>
<td>75</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Close monitoring and management to preserve renal function</td>
<td>100</td>
<td>33</td>
</tr>
<tr>
<td></td>
<td>Rapid access to surgeon for vascular access problems</td>
<td>50</td>
<td>0</td>
</tr>
<tr>
<td>Supporting patient self-care</td>
<td>Multidimensional medication management at every visit</td>
<td>100</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Education to support self-management at every contact</td>
<td>100</td>
<td>67</td>
</tr>
<tr>
<td></td>
<td>Optimizing peritoneal dialysis selection and management</td>
<td>75</td>
<td>0</td>
</tr>
<tr>
<td>Maximizing effectiveness of office visits</td>
<td>Previsit preparation</td>
<td>100</td>
<td>0</td>
</tr>
<tr>
<td>Selecting cost-effective diagnostic and therapeutic options</td>
<td>Early planning for and execution of vascular access</td>
<td>75</td>
<td>33</td>
</tr>
<tr>
<td></td>
<td>In-office infusion for anemia management</td>
<td>100</td>
<td>0</td>
</tr>
<tr>
<td>Developing infrastructure to support high-value care</td>
<td>Encouragement of autonomous practice for midlevel providers for low-complexity patients</td>
<td>75</td>
<td>33</td>
</tr>
<tr>
<td></td>
<td>Upshifted staff roles for medical assistants</td>
<td>50</td>
<td>67</td>
</tr>
<tr>
<td></td>
<td>Investment of dialysis revenue into predialysis patient care</td>
<td>50</td>
<td>0</td>
</tr>
</tbody>
</table>
DISCUSSION

This small exploratory analysis of nephrology practice sites found 12 practice attributes, categorized into five broad themes, to be more frequently present in high-value practices than average-value practices. A Delphi panel rated four attributes highly for their transferability.

Theme 1: Preventing Near-Term Costly Health Deterioration and Acute Crisis

High-value nephrology practices emphasized a high-touch, open-access approach to their patients with advanced CKD to detect impending clinical deterioration early, prevent crises, and utilize effective outpatient interventions. High-value practices were comprised of multidisciplinary teams to accommodate more frequent laboratory checks and office visits, allowing for more effective triage, timely referrals, and improved utilization of cost-effective outpatient visits. This proactive approach to chronic disease management (CDM) and maximal utilization of lower-cost outpatient visits over the too-often used expensive emergency room evaluations has demonstrated similar cost-effective results effects in other chronic disease settings.39–41

Theme 2: Supporting Patient Self-Care

Nephrology has been less apt than other medical subspecialties to adopt patient self-care strategies.32–33 Our analysis found that practices delivering high-value nephrology care used structured educational programs to improve patient engagement, and an evidence-supported approach to improving care quality and lowering health care costs.34,35 The high-value practices used multidisciplinary teams of nurses, pharmacists, nutritionists, and social workers to empower patients to better manage their medications and prioritize peritoneal dialysis as the preferred renal replacement modality. These findings are in line with the broader value-based reimbursement literature that has identified care coordination as a strategy to improve care quality and lower population-wide health care spending.36–38

Theme 3: Maximizing Effectiveness of Office Visits

High-value practices made concerted efforts to ensure that patients maximized their time during clinic visits through structured previst preparation. Office staff, usually medical assistants, took on previst chart reviews to minimize treatment disruptions caused by poor care transitions, inadequate medication reconciliation, and patient-centered issues such as transportation. This proactive approach to maximizing visit effectiveness allowed more extensively trained clinical staff (Medical Doctors and APPs) to devote the visit time to listening, analyzing, diagnosing, and developing a treatment plan for the patient, rather than engaging in extensive administrative data collection.

Theme 4: Selecting Cost-Effective Diagnostic and Therapeutic Options

Practices focused on delivering high-value care made a concerted effort to consider cost and management implications of diagnostic tests ordered or therapies prescribed, often with the support of decision aids such as “appropriate use” criteria. High-value practices focused their efforts on early vascular access placement, a cost-effective alternative to central venous catheters.39 Office nurse and vascular access coordinators engaged patients early in discussions of vascular access and ensured early referrals to vascular surgeons aiming to minimize the number of emergent dialysis starts requiring a central venous catheter and inpatient admission.

Theme 5: Developing Infrastructure to Support High-Value Care

High-value nephrology practices invested in personnel to both coordinate and deliver care. These practices used APPs to assist in routine CKD and dialysis care, typically using physician-approved treatment protocols. One innovative practice funded...
the NP-lead CKD education program through revenue generated from NP dialysis visits. Although a causal relation between care coordination and health care cost reduction has not been established, accountable care organizations, other financial risk-bearing practices, and even the Centers for Medicare and Medicaid Innovation have acted on evidence suggesting that care coordination is associated with quality improvement and cost containment.

Effect and Transferability of Practice Attributes
In the same way that other industry sectors have borrowed best practices from high performers through initiatives such as lean management, we aimed to highlight those attributes of high-value nephrology practices judged by experienced nephrologists to have face-validity for quality effect, cost effect, and ease of transferability to other nephrology practices. Rapidly adjustable office visit frequency for unstable patients, close monitoring and management to preserve kidney function, early planning for vascular access, and education to support self-management at every contact rated favorably on all three measures of face validity. The four attributes resonate with attributes of the patient-centered medical home model, and commensurately, were unsurprisingly rated more highly when coupled with value-based payment. These four readily transferrable practice attributes that scored highly on cost and quality may provide a starting point for nephrology practices preparing for Medicare’s Quality Payment Program, as well as private payers’ value-based payment and provider network inclusion.

An important implementation consideration of these practice attributes is the financial investments required to build infrastructure to support care coordination. Four of the five identified practice attribute themes involve the use of ancillary staff such as medical assistants and APPs. Although this requires upfront investment from a practice, the improvement to value performance conferred by nonphysician employees, working at the top of their respective practice licenses to coordinate care, has been well described in the value-based care literature. However, although this investment could comprise a relatively larger proportion of practice revenue for smaller nephrology practices, as compared with medium and large nephrology practices, the majority of these small nephrology practices will be subject to the Center for Medicare and Medicaid Services’ Quality Payment Program and face reimbursement incentives and disincentives. Finding innovative methods to make these investments will become increasingly important as value-based reimbursement from Medicare ties higher percentages of reimbursement payments to measures of value.

High-Value Practice Attributes in Broader Context
The management of patients with kidney disease through the stages of CKD and eventually ESRD fits well into the CDM care model often used to manage chronic illnesses such as congestive heart failure, chronic obstructive pulmonary disease, and diabetes. Many of the nephrology-specific attributes from high-value practices are identified, in more general terminology, as key components of CDM. Education to support patient self-management, rapid access to vascular surgery expertise, and office reorganization to reallocate tasks to nonphysician employees align well to key components of the CDM construct. Additionally, many of the attributes identified at high-value practices also correlate with well validated assessment tools used both by patients and health systems to evaluate the delivery of chronic illness care. The alignment of many of the identified practice attributes with both important components of CDM and several external care delivery assessment tools, may help reinforce their potential for wider adoption.

Limitations
Exploratory studies such as an investigation of this scope are subject to several limitations. It is possible that the nephrology practices we studied might not be broadly representative of practices throughout the United States, although they were diverse in terms of size, structure, and geographic location. The small sample size precluded inference testing when comparing attributes across high-value and average-value sites. We ranked practices using data spanning 2010–2013, before MACRA was legislated. If we were to repeat rankings after MACRA’s implementation, practices may have ranked differently. Using a database of commercially insured patients biases our findings toward attributes of care associated with attaining higher value for younger, privately insured patients. This limitation is particularly relevant in the ESRD population, where Medicare pays for most health care costs. Although our study would not have identified practices that care exclusively for patients insured by safety net programs or uninsured patients, identified practices cared for a broad patient population from across the socioeconomic spectrum. The same practice attributes delivered to patients with preferred provider organization insurance were likely delivered similarly to patients with Medicare, Medicaid, and other insurance products. Many of the quality metrics used for ranking practices were designed to evaluate primary care practices rather than nephrology practices; this is a notable limitation of many subspecialty evaluations of quality, which rely on more generalized quality metrics. Under the Center for Medicare and Medicaid Services’ Quality Payment Program, which ties providers’ reimbursement to evaluation of predefined quality metrics, there are a few nephrology-specific quality measures. Most measures on which nephrologists are evaluated are more broadly applicable to general medical care, such as screening for falls risk or documentation of an advanced directive. Further, the nephrology-specific measures weight more toward ESRD and dialysis care (i.e., anemia management and permanent vascular access), rather than earlier stages of CKD care. Until more mature quality metrics evaluating CKD care are developed, adequate evaluation of nephrology practice performance, outside of ESRD and dialysis care, remains challenging. Additionally,
although using CRGs to adjust cost accounts for many medical comorbidities, it does not allow for determination of CKD stage, which would have provided a more granular evaluation. Further, although we ascribe patient care to nephrology practices, we acknowledge that patient care is also strongly affected by the strength of each regional medical community; nephrology practices may be misclassified as high value because of high-quality general medicine or cardiology care, not only because of high-quality nephrology care. Finally, despite our efforts to minimize bias, several steps in the qualitative component of our analysis, such as grouping site visit findings into attributes and broad themes, could be subject to researcher biases. Despite the complexity of this undertaking and the limitations of a small exploratory study, in the absence of a larger-scale, hypothesis-driven study, our findings may be helpful to nephrologists facing increasing pressure from payers to improve value now.

In conclusion, we used measures of value commonly used by payers and national private payer claims data to explore care attributes of nephrology practices that rank favorably. Through site visits and Delphi panel ratings by nephrologists, we identified transferrable attributes that distinguish more favorably ranked practices. As policymakers continue to more strongly reward value, our findings may be a starting point for nephrologists seeking to improve.

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This study was granted exempt status by the Stanford Institutional Review Board.

DISCLOSURES

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SUPPLEMENTAL MATERIAL

This article contains the following supplemental material online at http://jasn.asnjournals.orglookup/suppdoi:10.1681/ASN.2019030219/-/DCSupplemental.

Supplemental Table 1. Results of quantitative method of analytically identifying and characterizing performance of medical groups.
Supplemental Table 2. Selected quality metrics and subjective weights.
Supplemental Table 3. Comparison of High-Value Practices: Visited to cohorts.
Supplemental Table 4. Comparison of Average-Value Practices: Visited to cohort.
Supplemental Table 5. Patient Year CRG Breakdown by Value for Visited Sites.
Supplemental Table 6. Scoring grid to rate the presence of each feature at visited site.

REFERENCES

20. Luft HS: Data and methods to facilitate delivery system reform: Harnessing collective intelligence to learn from positive deviance. Health Serv Res 45: 1570–1580, 2010

See related editorial, “Value-Based Kidney Care: Aligning Metrics and Incentives to Improve the Health of People with Kidney Disease,” on pages 2282–2284.