A Payer–Provider Partnership for Integrated Care of Patients Receiving Dialysis

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ABSTRACT

OBJECTIVES: Patients with end-stage renal disease (ESRD) are clinically complex, requiring intensive and costly care. Coordinated care may improve outcomes and reduce costs. The objective of this study was to determine the impact of a payer–provider care partnership on key clinical and economic outcomes in enrolled patients with ESRD.

STUDY DESIGN: Retrospective observational study.

METHODS: Data on patient demographics and clinical outcomes were abstracted from the electronic health records of the dialysis provider. Data on healthcare costs were collected from payer claims. Data were collected for a baseline period prior to initiation of the partnership (July 2011-June 2012) and for two 12-month periods following initiation (April 2013-March 2014 and April 2014-March 2015).

RESULTS: Among both Medicare Advantage and commercial insurance program members, the rate of central venous catheter use for vascular access was lower following initiation of the partnership compared with the baseline period. Likewise, hospital admission rates, emergency department visit rates, and readmission rates were lower following partnership initiation. Rates of influenza and pneumococcal vaccination were higher than 95% throughout all 3 time periods. Total medical costs were lower for both cohorts of members in the second 12-month period following partnership initiation compared with the baseline period.

CONCLUSIONS: Promising trends were observed among members participating in this payer–provider care partnership with respect to both clinical and economic outcomes. This suggests that collaborations with shared incentives may be a valuable approach for patients with ESRD.

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Patients with end-stage renal disease (ESRD) require extensive, complex, and costly medical care. Life-sustaining dialysis treatments, often administered as thrice-weekly hemodialysis, rid the body of the toxins and fluids normally removed from the blood by the kidneys. In 2013, although patients with ESRD represented less than 1% of the US Medicare population, they accounted for approximately 7% of Medicare fee-for-service expenditures, with an annual average cost of $84,550 per patient.[1] On average, patients with ESRD were hospitalized 1.69 times per year in 2013, and approximately one-third of those hospitalized were readmitted within 30 days of discharge,[1] making hospitalizations a major cost driver in this population.

Intensive patient management by dialysis providers and their partner nephrologists has been shown to improve outcomes among patients with ESRD[2] and may simultaneously reduce costs. For example, the method used to access the patient's circulatory system for dialysis has a strong association with outcomes: arteriovenous grafts (AVGs) or arteriovenous fistulae (AVFs) have a lower rate of infections and other complications compared with central venous catheters (CVCs). Thus, patient management at the time of dialysis initiation[3] and initiatives to increase the use of AVFs and minimize use of CVCs[4] have been associated with improved outcomes and lower costs. Patient management programs can also enhance adherence to complex medication regimens.[5]

Mechanisms for delivering coordinated care to patients with ESRD include federally funded experimental models such as the CMS ESRD Management Demonstration Project,[6] special needs plans,[7] and, most recently, ESRD Seamless Care Organizations. In the private sector, payer–provider partnerships have been proposed as a means to provide high-quality and cost-effective care for patients with chronic illnesses, including ESRD.[8]

Recently, a payer and a provider (a subsidiary of a large dialysis organization) initiated a contractual partnership with the goal of improving care and reducing costs for patients with ESRD who were receiving their dialysis treatments at the provider's facilities in Pennsylvania. The payer's claims data combined with the

provider's analytic capabilities enabled the use of risk stratification and predictive models to target patients for specific interventions. These included supplemental care pathways and clinical protocols targeting specific objectives, such as transitioning patients from CVCs to AVFs, reducing hospitalizations, and decreasing the frequency of readmissions. Field-based renal nurse care managers supported fluid management, immunizations, nutritional supplementation, and end-of-life counseling. Both Medicare Advantage (MA) and commercial insurance members were eligible for the program, which used a shared savings model to create economic incentives for the partners. Incentive payments were contingent on the provider meeting or exceeding United States Renal Data System quality benchmarks for rates of AVF and CVC use, influenza and pneumococcal pneumonia vaccination, and hospital readmissions. Savings were calculated by comparing the actual total cost of care with a predetermined, actuarially derived expected total cost of care. Incentive payments constituted a contractually stipulated portion of the calculated savings. Here, we report an observational analysis of outcomes and costs of care during the first 2 years of the partnership.

TAKEAWAY POINTS

- Payer–provider partnerships have been proposed as a means to improve patient outcomes and reduce healthcare costs among patients requiring complex, coordinated care. Here, we report the outcomes of such a partnership established to care for patients with end-stage renal disease (ESRD).
- In the 2 years following the initiation of the partnership, both Medicare Advantage and commercial insurance patients showed improvements in the proportion of patients dialyzing with a permanent vascular access, hospital and emergency department utilization, and total healthcare expenditures.
- Coordination of care through partnership programs may be of significant benefit to patients with ESRD.

METHODS

Study Design

We conducted an observational analysis of outcomes and costs among a payer's plan members receiving dialysis through a specific provider. The payer's MA and commercial insurance members were analyzed separately. Two consecutive 12-month periods (April 1, 2013-March 31, 2014 and April 1, 2014-March 31, 2015) following initiation of the partnership were compared with a 12-month baseline period (July 1, 2011-June 20, 2012). We excluded patients who 1) were in the top 1% in terms of total annual aggregated nondialysis costs, 2) were missing dialysis/inpatient/skilled nursing facility (SNF) claims in at least 50% of the identified eligible member months, 3) had dialysis/inpatient/SNF claims of less than $1500 (commercial) or $1000 (MA) per member per month (PMPM) in at least 50% of eligible member months, or 4) received a kidney transplant (exclusion began in the month that the transplant was received).

Data Sources

This retrospective, observational, noninterventional analysis of outcomes in patients in the partnership was conducted using existing deidentified patient data; therefore, according to the HHS regulations, 45 CFR Part 46, this study was exempt from institutional review board or ethics committee approval. We adhered to the Declaration of Helsinki and informed consent was not required.

Demographic information and clinical data in each study period were abstracted from the electronic health records of the dialysis provider. Comorbidities were determined from patient utilization within the payer claims database using *International Classification of Diseases, Ninth Revision* diagnosis codes. Payer claims were used to determine healthcare costs.

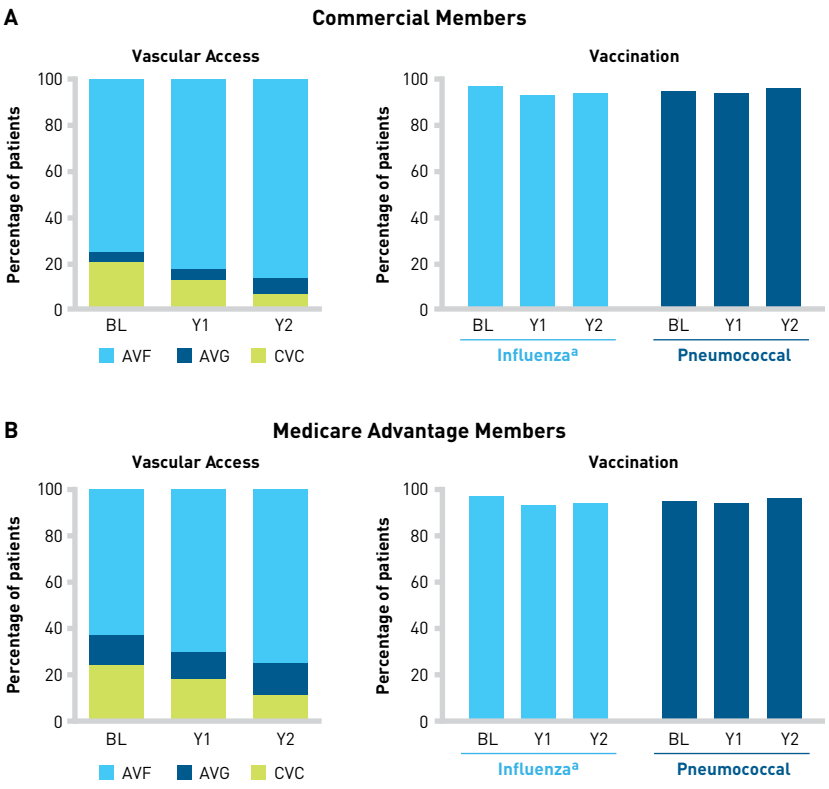
Outcomes and Analysis

We considered several outcomes that were based on benchmarks set by the National Kidney Foundation, including vascular access type, vaccination rates, and hospital readmission rates. Vascular access type among hemodialysis patients was defined as AVF, AVG, or CVC based on the access type used for the majority of treatments in each month and was expressed as the proportion of patients using each access type in each study period. Rates of pneumococcal vaccination were considered as the proportion of patients who had received the vaccination in the past 5 years or had received 2 doses ever. Influenza vaccination rates were determined as the annual period prevalence of patients (aggregated proportion) who received vaccinations between September 1 and March 31 within each study year. Hospital readmission rate was defined as the proportion of patients readmitted within 30 days of discharge following an inpatient stay.

We further considered healthcare costs, hospitalization and emergency department (ED) visit rates, length of stay, and hospitalized days. PMPM costs were considered, excluding dialysis treatment costs, and a 90-day claims run-out period was used to allow consistent data capture. Nondialysis medical costs included 4 categories: 1) inpatient hospital care costs, excluding inpatient care following kidney transplant; 2) professional medical care costs, defined as costs attributed to physician visits; 3) prescription drug costs; and 4) all other medical care costs, including but not limited to those of laboratory tests, SNFs, EDs, and home health care. Hospitalization and ED visit rates were calculated as the number of events per 1000 patient-years; length of hospital stay (days) and costs per admission were considered as the mean values in each study period. The total number of hospitalized days in the period was also determined.

All outcomes were considered separately for commercial and MA members; no statistical comparisons were made.

FIGURE 1. Vascular Access and Vaccination Outcomes by Plan Type



AVF indicates arteriovenous fistula; AVG, arteriovenous graft; BL, baseline; CVC, central venous catheter; Y1, year 1; Y2, year 2.

A. Outcomes for commercial members are presented. The percentages of patients using AVF, AVG, or CVC for vascular access in each study period are presented in the left panel. The percentages of commercial members receiving an influenza vaccine and who had received the pneumococcal vaccine within 5 years or 2 doses ever in each period are presented in the right panel.

B. Outcomes for Medicare Advantage members are presented. The percentages of patients using AVF, AVG, or CVC for vascular access in each study period are presented in the left panel. The percentages of Medicare Advantage members receiving an influenza vaccine and who had received the pneumococcal vaccine within 5 years or 2 doses ever in each period are presented in the right panel.

[a]For influenza vaccine, percentage reflects the full season rate (September-March).

RESULTS

Payer beneficiaries receiving dialysis at the provider's facilities in Pennsylvania were eligible for enrollment in the program; approximately 80% to 85% of eligible patients elected to enroll. Patient characteristics by type and year are summarized in the **eAppendix Table** (eAppendix available at **ajmc.com**). Year to year, member characteristics were similar within each plan type. Overall, compared with commercial plan members, MA members tended to be older, have a greater burden of comorbidity, and have been on dialysis longer.

Analysis of plan members with respect to the vascular access and vaccination outcomes that were part of the program performance metric is shown in **Figure 1**. Among both commercial and MA members, AVF and AVG utilization was greater in year 2 than at baseline, whereas CVC utilization was lower. Pneumococcal and influenza vaccination rates were consistently higher than 95% among both commercial and MA members across all study periods.

Analyses of hospitalizations and ED visits are shown in **Figure 2A** and **2B**. Among both member cohorts, the hospital admission rate declined over the study period. The length of stay for inpatient admissions also declined, from 6.4 days at baseline to 5.3 days in year 2 for commercial members and from 6.9 to 6.3 days, respectively, for MA members. The reductions in the hospital admission rate and length of stay resulted in a marked decline in the number of hospitalized days for plan members over the study period.

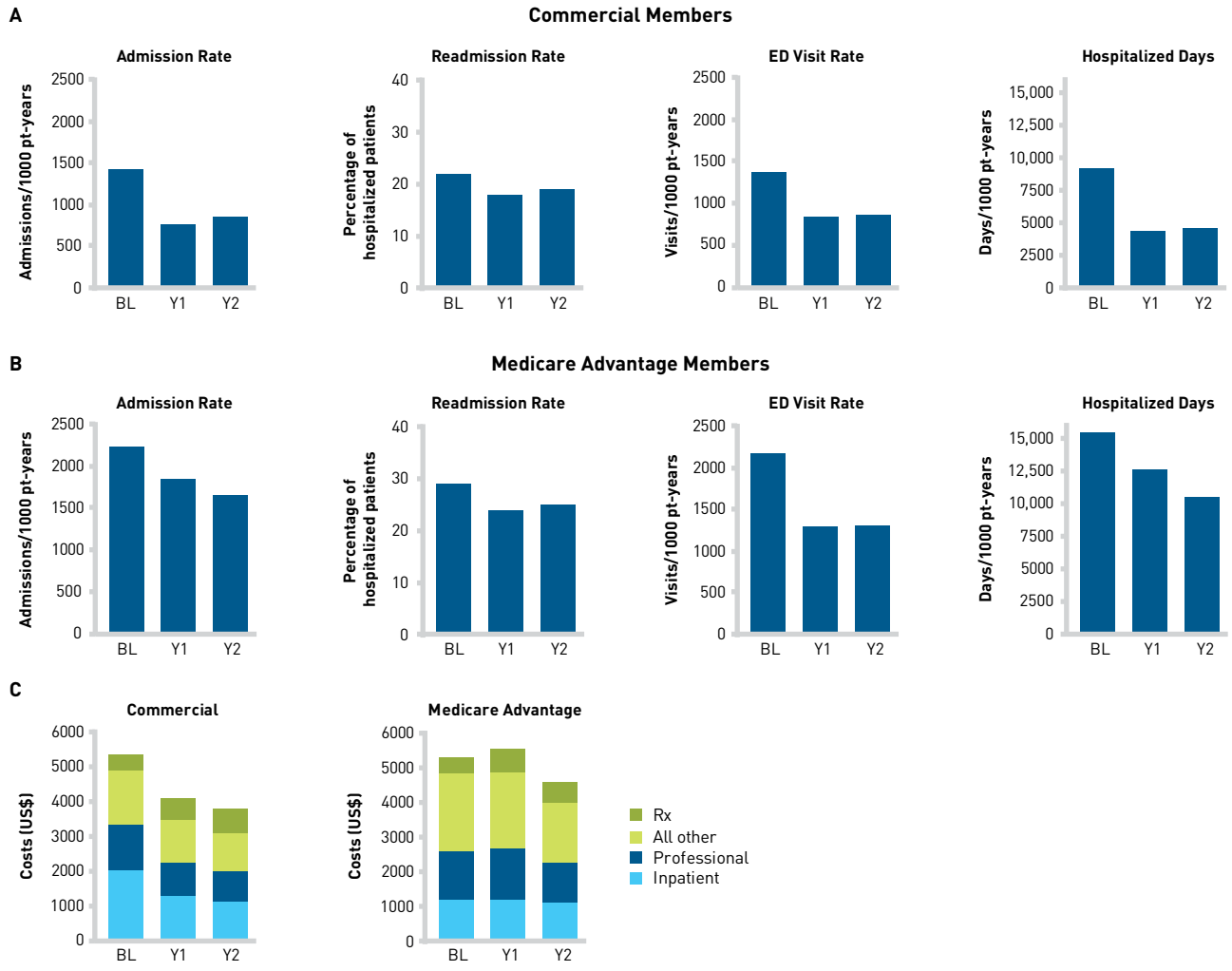
Hospital readmission rates were moderately lower in year 2 than at baseline. Among commercial plan members, the rate fell from 22% at baseline to 18% and 19% in years 1 and 2, respectively. The readmission rate was 29% at baseline among MA members, declining to 24% and 25% in years 1 and 2, respectively. The ED visit rate among commercial members declined from 1377 to 864 visits per 1000 patient-years from baseline to year 2. For MA members, it declined from 2178 to 1305 visits per 1000 patient-years over the same period.

Costs of medical care for program members also declined over the 2 years of the program (**Figure 2C**). In aggregate, more than $5 million was saved relative to the year 1 and year 2 actuarially determined cost expectations, with $3.04 million derived from the commercial members and $2.01 million from the MA members. Across the primary cost categories and considering both years, commercial members experienced a 48% decline in inpatient care costs, a 38% decline in professional costs, and a 34% decline in other medical expenses. For the MA members, these costs decreased by 19%, 9%, and 12%, respectively. The only exception to this trend toward decreasing costs was prescription drug costs, which increased from baseline through year 2 in both member cohorts (by 32% for commercial members and 30% for MA members).

DISCUSSION

Management of patients with ESRD is difficult, requiring frequent and routine access to patients, partnership with nephrologists, specialized care protocols, and customized technology. In an effort to improve

FIGURE 2. Hospital Admission, Readmission, and ED Visit Rates; Hospitalized Days; and Cost Outcomes, by Plan Type



BL indicates baseline; ED, emergency department; inpatient, inpatient hospitalization costs including long-term acute care facility costs; pt-years, patient-years; professional, costs attributed to outpatient physician visits; Rx, prescription drug costs; Y1, year 1; Y2, year 2.

A. Outcomes are presented for commercial plan members. At baseline, 197 patients (1534 patient-months) were analyzed; in Y1, 99 (718 patient-months); in Y2, 101 (750 patient-months).

B. Outcomes are presented for Medicare Advantage plan members. At baseline, 295 patients (2452 patient-months) were analyzed; in Y1, 204 (1582 patient-months); in Y2, 191 (1665 patient-months). Admissions include both hospital and long-term care facility admissions.

C. Per member per month costs (excluding dialysis costs) for commercial members (left) and Medicare Advantage members (right) are presented.

outcomes and lower costs, a dialysis provider and a payer created a shared savings incentive program. Members enrolled in the program were provided targeted services aimed at improving specific quality metrics and controlling nondialysis healthcare expenditures.

As shown here, this payer–provider partnership resulted in improved clinical care quality metrics and reduced medical costs relative to the baseline population. Improvements were observed in vascular access utilization, with an increase in AVF and AVG utilization and a decrease in CVC utilization among both commercial and MA members. Vaccination rates for influenza and pneumococcus were above 95% for both member cohorts across the study period. These vaccination rates are substantially higher than those most recently reported for the Medicare ESRD population generally (30% for pneumococcus[1] and 75% for influenza[9]).

Hospitalizations are a major cost driver among the ESRD population. Notably, the hospital admission rate, number of hospitalized days, ED visit rate, and 30-day readmission rate all decreased following the inception of the payer–provider partnership, and these decreases were accompanied by decreases in inpatient costs and healthcare costs overall. The hospital admission rate for MA program members in

year 2 (1.3 admissions/patient-year) compares favorably with the rate for the Medicare hemodialysis population overall, which averaged 1.69 admissions per patient-year in 2013.[1] The hospital readmission rate for MA program members in year 2 (25%) was markedly lower than the Medicare average (36.9% in 2013).[1] Our findings are consistent with prior evidence demonstrating that care coordination can improve outcomes and may help contain costs for patients with ESRD.[7,10]

Although overall costs and inpatient costs declined among plan members, our analyses documented incremental increases in overall medication costs during years 1 and 2 compared with the baseline period. This result may be related to improved patient adherence to prescribed medications arising from enhanced clinical management. Alternatively, this observation may have been driven by a small number of patients receiving treatment with extremely expensive medications; further analysis will be required to fully understand this result.

Limitations

Several factors may limit the generalizability of our findings to other ESRD populations. First and foremost, this was a retrospective observational analysis that was not designed to address cause-and-effect relationships. The patient population studied was defined by the patients' choice of payer and provider and their willingness to enroll in the program. These factors, along with annual changes in membership and patient attrition, must be taken into consideration when interpreting our findings. Additionally, geography has been shown to influence healthcare spending,[10] as well as dialysis access and modality[1]; our study was limited to patients who received treatment in Pennsylvania.

CONCLUSIONS

The promising trends observed among members participating in this payer–provider ESRD population health partnership suggest that collaborations with shared incentives may be a valuable approach for improving ESRD patient outcomes and reducing care costs. ■

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Authorship Information: Concept and design (JK, DR, RW, SM); acquisition of data (RW); analysis and interpretation of data (JK); drafting of the manuscript (DR, SM); critical revision of the manuscript for important intellectual content (JK, DR, RW, SM); and administrative, technical, or logistic support (RW).

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eAppendix Table. Baseline Patient Characteristics by Study Period

	Baseline		Year 1		Year 2	
	Commercial (n = 197)	**MA (n = 295)**	**Commercial (n = 99)**	**MA (n = 204)**	**Commercial (n = 101)**	**MA (n = 191)**
Female (%)	35.6	45.4	33.0	48.7	28.9	42.2
Age, years (mean ± SD)	53.8 ± 9.8	73.6 ± 8.9	57.1 ± 9.9	74.6 ± 9.3	56.0 ± 12.5	75.2 ± 8.5
Mean duration on dialysis, months[a]	16.6	21.6	20.8	24.8	21.6	26.2
Mean comorbidity score[b]	6.1	9.4	6.3	9.4	6.0	9.5
Comorbidities (%)						
Alcohol or drug abuse	3	4	2	1	3	2
Cancer	11	17	9	20	10	19
Cardiovascular disease (any)	65	87	60	86	58	86
Cardiac arrhythmias	31	54	24	51	27	57
Cerebrovascular disease	18	30	17	29	12	31
Chronic pulmonary disease	23	44	17	40	19	47
Coagulopathy	11	17	7	15	3	14
Congestive heart failure	37	65	28	60	34	61
Diabetes	61	66	65	68	53	63
Electrolyte and fluid disorders	43	54	31	48	26	52
Hypothyroidism	14	27	18	28	13	30
Liver disease	8	8	9	5	5	6
Myocardial infarction	11	21	9	21	11	23
Neurologic disorders	12	21	7	15	7	20
Obesity	11	11	13	12	14	12
Peripheral vascular disease	28	45	20	49	21	48
Psychiatric disease	13	23	12	26	9	25
Pulmonary circulation disease	11	17	9	15	12	20
Rheumatic disease	2	4	1	8	3	7
Valvular disease	22	43	18	41	17	35
Weight loss	8	16	6	18	4	16

MA indicates Medicare Advantage.

[a]Adjusted dialysis start dates were used for consistency across time periods and could not be more than 36 months prior to the end of the baseline period program year.

[b]Average Charlson/Age index score.