

# Defragmentation of Care in Complex Patients With ESKD Improves Clinical Outcomes

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A lack of coordinated care for patients is often referred to as care fragmentation, and it is associated with reduced quality of care, increased costs, and poor clinical outcomes.<sup>1,2</sup> Usually this arises from a lack of coordination among multiple providers and care organizations.<sup>3</sup> Fragmentation of care is more likely to occur in patients with multiple chronic conditions that necessitate care from several providers. Fragmented care increases the burden for patients and potentially opens the door for unnecessary or redundant treatments and/or tests.<sup>4,5</sup>

Whereas patients with less-complicated care needs may get the support and care coordination they need through a traditional patient-centered medical home, that model does not suit high-need, high-risk patients such as those with end-stage kidney disease (ESKD), cancer, or neurological diseases, especially in value-based care models.<sup>6,7</sup> More than 75,000 patients with ESKD are participants in accountable care organizations (ACOs) through the Medicare Shared Savings Program, and their yearly expenditures are almost 7 times greater than those for patients without ESKD.<sup>8</sup> Due to the complex constellation of conditions that often accompany ESKD (eg, diabetes, heart failure, anemia, bone disease), care for these patients typically involves multiple providers from several specialties, including nephrologists, cardiologists, and primary care providers. There is often a lack of coordination among these care teams,<sup>5</sup> which can potentially lead to worse clinical outcomes for patients with ESKD and poor performance for the value-based care organizations that care for these patients.<sup>9</sup>

Here we report preliminary findings regarding the novel Shared Patient Care Coordination (SPCC) program, which aims to reduce care fragmentation among patients with ESKD. In this case, a kidney care organization worked together with an integrated health system within a large ACO to improve coordination of care and clinical outcomes for the highly complex and high-cost shared population of patients with ESKD. In particular, we examined rates of hospitalization, emergency department (ED) utilization, central venous catheter (CVC) avoidance, dialysis treatment absenteeism, utilization of home dialysis therapy, and advance care plan documentation over the first 12 to 24 months of the program.

## ABSTRACT

**OBJECTIVES:** Given the problematic fragmentation of care for patients with end-stage kidney disease (ESKD), a kidney care organization and an integrated health system within a large accountable care organization partnered to best utilize their individual capabilities to collaborate around their shared patients in a coordinated care approach. Ultimately, the goal of the program is to allow care teams to achieve the triple aim of improving the patient experience, improving clinical outcomes, and reducing the total cost of health care.

**STUDY DESIGN:** This is a retrospective examination of the first year of the Shared Patient Care Coordination (SPCC) program.

**METHODS:** The analysis consisted of 2 parts. First, rates of hospitalizations and emergency department visits were compared between the SPCC patients and other patients of the integrated health system who had ESKD but did not participate in SPCC. Second, rates of clinical indicators—central venous catheter (CVC) use, home dialysis, advance care planning, and missed dialysis treatments—were benchmarked vs normative data taken by bootstrap sampling of the kidney care organization's patient population.

**RESULTS:** Overall, dialysis patients participating in the SPCC program had a 15% lower rate of hospital admissions than those not participating ( $P = .02$ ). Additionally, the bootstrap analysis showed that by the second year, dialysis patients in the program had favorable rates (above the 95th percentile) of CVC use, dialysis treatment absenteeism, and completion of advance care plans.

**CONCLUSIONS:** Enhanced and structured communication between dialysis providers and patient care teams provides a unique opportunity to coordinate patient-centered care and improve patient outcomes.

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### TAKEAWAY POINTS

The growing number of patients with end-stage kidney disease, who typically have multiple chronic conditions and high rates of health care utilization, makes them an ideal target for patient-centered approaches and defragmentation of care.

- ▶ Opportunities exist to improve care for patients outside of the traditional patient-centered medical home model if stakeholders can be identified and aligned around those patient populations to bridge gaps and provide the coordination and support functions of a medical home.
- ▶ To effectively coordinate patient care and make appropriate escalations bidirectionally, care teams must understand the capabilities and processes of the other care team. Enhanced, more real-time communication will continue to improve the ability to coordinate care between care teams for shared patients.
- ▶ Consistent review and tracking of program impact across a broad array of clinical and nonclinical metrics that correlate with improved patient outcomes are vital to measuring progress and identifying additional opportunities for enhanced coordination and patient care.

## METHODS

Eligible patients for this program were those with ESKD who were attributed to the ACO and were currently receiving treatment from the dialysis provider. Data sharing to support the care coordination effort was achieved through a combination of secure electronic communication and scheduled meetings, occurring both ad hoc and on a scheduled basis.

### SPCC Program Team Members

The dialysis team included the regional operations director, central program coordinator, nephrologists, and dialysis centers' interdisciplinary teams. Of note, the nephrologists were mainly the patients' treating providers and not participating in the ACO. The ACO team members included the medical director, claims data analysts, clinical program manager, assistant nurse manager, and care management team (eAppendix Figure [eAppendix available at [ajmc.com](http://ajmc.com)]).

### Care Team Coordination

After the launch of the SPCC program, the teams met regularly to review key patient information from primary care providers, nephrologists, and other specialists not visible to both sides. If a patient visited an ED or was hospitalized, a detailed case update (including an updated care plan and medication list) was provided by the ACO care coordinator for dissemination to the appropriate dialysis clinic team, including additional focus on reconciling medications, scheduling follow-up appointments, and ensuring adequate home support to reduce risk of readmission. The 2 teams created a common care plan for these patients and assigned responsibilities for implementation.

During the care team meetings, additional discussion topics included chronic disease management, behavioral health, missed dialysis treatments, home modality adoption, vascular access, transplant status, and socially determined factors for all patients as needed. The team regularly reviewed this information utilizing a program-specific clinical scorecard. In addition, rising-risk

patients, or those in need of additional follow-up or proactive intervention, were bilaterally flagged for engagement in real time. Some of the situations typically triggering program coordination included specialty referrals and follow-up, advance care planning, transitions of care, medication adjustments, dietary education, and communication with other members of the clinically integrated network care team.

Additionally, program leaders and key team members on a quarterly basis reviewed data in categories including hospitalizations, readmissions, missed dialysis treatments, home modality adoption, transplant referral, advance

care plans, influenza/COVID-19 vaccination, and other cross-team escalations as needed. Regular data collection and monitoring allowed reviewers to identify and track areas of success and those warranting greater attention.

### Statistical Analysis

The analysis was conducted in 2 parts as necessitated by data availability. In the primary analyses, SPCC patients were compared with controls: other geographically proximate patients with ESKD attributed to the ACO who did not participate in the SPCC program. Data for these analyses were abstracted from Medicare claims files (BJC-ACO unpublished data, October 2020–September 2021). In parallel analyses, hospital admissions and ED visits were abstracted for the period October 2020 through September 2021, considered as rates (events per patient per 1 year of at-risk time), and compared using negative binomial regression models.

Because the other outcomes being considered (dialysis vascular access, modality choice, dialysis treatment attendance, and advance care plan utilization) cannot be abstracted from Medicare claims files, data for the secondary analyses were abstracted from the kidney care organization's electronic health records. Absent available data on control patients, SPCC program performance was benchmarked vs a normative ESKD population. The normative population consisted of approximately 26,700 patients from geographies (bordering states) similar to participants in the SPCC program. Further, the patients selected in the normative population were also Medicare fee-for-service patients. Lastly, as the comparator metric required, modality consistency also was considered (the CVC metric considered only in-center hemodialysis patients, whereas advance care planning allowed for home patient inclusion as well). Normative data were obtained by bootstrap sampling of the kidney care organization's entire patient population in a regionally comparative cohort with 5000 replicates of similarly sized populations to those in the SPCC program to create an expected distribution of performance. These analyses were considered for the first 2 program years (October 2020–September 2022).

**TABLE 1.** Comparison of Hospital Admissions and ED Visits Between SPCC Patients and Controls for Program Year 1<sup>a</sup>

Outcomes	Controls	SPCC patients
Patient time, years	260.9	278.6
Hospital admissions, n	467	425
Rate of hospital admissions <sup>b</sup>	1.79	1.53
IRR (95% CI) <sup>b</sup>	1.00 (ref)	<b>0.85 (0.75-0.97)</b> <i>P</i> = .02
ED visits, n	369	327
Rate of ED visits	1.41	1.17
IRR (95% CI) <sup>b</sup>	1.00 (ref)	0.85 (0.68-1.08) <i>P</i> = .19

ED, emergency department; IRR, incidence rate ratio; SPCC, Shared Patient Care Coordination program.

<sup>a</sup>Bold indicates significance.

<sup>b</sup>Per patient per year; estimated by negative binomial regression model.

**TABLE 2.** SPCC Performance on Secondary Outcomes for Program Years 1 and 2<sup>a</sup>

Outcomes	Population expectation <sup>b</sup>					SPCC program year 1	SPCC program year 2
	← Worst		Best →				
	5th	25th	50th	75th	95th		
CVC rate	18.7	17.7	16.9	16.1	15.1	<b>13.5</b>	<b>12.0</b>
Missed treatment rate <sup>c</sup>	0.56	0.54	0.52	0.49	0.46	<b>0.33</b>	<b>0.34</b>
Home rate	13.2	14.4	15.2	16.0	17.1	15.8	15.6
ACP rate	20.2	21.4	22.2	23.2	24.6	16.4	<b>25.8</b>

ACP, advance care planning; CVC, central venous catheter; SPCC, Shared Patient Care Coordination program.

<sup>a</sup>Bold indicates better performance than 95th percentile.

<sup>b</sup>Based on bootstrap resampling of the kidney care organization source dialysis population (N = 26,700) with 5000 replicates.

<sup>c</sup>Expressed per patient per month; all other data presented as percentages.

## RESULTS

### Patient Demographics

A mean of 90 patients participated in the SPCC program each month between October 2020 and September 2021. In the SPCC program, 55.6% of participants were men, there was a mean age of 71.2 years, and 46.4% were White (eAppendix Table 1). An additional analysis of the SPCC patients who received dialysis from the kidney care organization revealed that 84% were receiving in-center hemodialysis (eAppendix Table 2).

### Primary Outcomes

During the study period, 337 SPCC patients and 332 controls accrued 279 and 261 patient-years at risk, respectively (Table 1). SPCC patients had a significantly lower rate of hospitalization (1.53 admissions per patient per year [PPPY]) than non-SPCC patients (1.79 admissions PPPY) (incidence rate ratio [IRR], 0.85; 95% CI, 0.75-0.97; *P* = .02). SPCC patients similarly had a lower rate of ED visits (1.17 visits PPPY) than controls (1.41 visits PPPY), although this difference did not achieve significance (IRR, 0.85; 95% CI, 0.68-1.08; *P* = .19).

### Secondary Outcomes

In program year 1, the rate of CVC use among SPCC patients (13.5%) was favorable to (ie, lower than) the 95th percentile based on the normative population; this rate further improved to 12.0% in program year 2 (Table 2). In both program years, SPCC patients' rate of skipping dialysis treatments (0.33 and 0.34 missed treatments per patient per month) was favorable to the 95th percentile. In program year 1, the rate of advance care plan completion (16.4%) was below the 5th percentile, but it improved by year 2 (25.8%) to above the 95th percentile. In both program years, rates of home dialysis for SPCC programs (15.8 and 15.6, respectively) were between the 50th and 75th percentiles.

## DISCUSSION

Care fragmentation is an obstacle to good outcomes, particularly for patients with multiple chronic comorbidities, such as those with ESKD. SPCC is a novel partnership between an ACO and a dialysis provider aimed at providing less fragmented care for patients with ESKD. In this preliminary analysis, we demonstrated that SPCC participation was associated with a 15% lower rate of hospital admission, as well as favorable performance on key clinical performance metrics. Lower rates of CVC use are beneficial for dialysis patients because CVC use is associated with higher rates of infection, which can lead to increased morbidity and mortality. Likewise, lower rates of dialysis treatment absenteeism are beneficial because treatment nonadherence is common among patients with ESKD and associated

with adverse clinical outcomes.

### Innovative SPCC Program Solutions

Maintaining the necessary shared patient lists in real time proved challenging to both organizations due to frequent changes in patient program eligibility (eg, changing insurance coverage, changing dialysis providers, or stopping dialysis). However, iterative collaboration between data analysis teams and the creation of a regular process for communicating patient list changes helped to address this challenge.

Additionally, identifying and communicating existing and emerging patient needs, with timely escalation needed for proactive intervention in a high-need ESKD population, proved challenging. To solve for this, the team created a structured process for sharing dialysis centers' updates and concerns with the ACO on a regular basis. This allowed both teams to focus on addressing patients' most urgent needs promptly and to collaborate on preventive solutions. Because dialysis center teams have the advantage of

## TRENDS FROM THE FIELD

seeing patients in person regularly (typically 3 times per week for those who receive treatment in a center), urgent updates could be shared with the ACO in near real time. Similarly, as these patients were cared for by primary care providers, specialists, and inpatient teams at ACO facilities, these case managers were encouraged to share their questions and concerns regarding shared patients with the dialysis team in real time.

The SPCC program also offered a solution centered around proper patient engagement. Although patients with ESKD are typically highly engaged with their nephrologists, they are often less engaged with their primary care physicians and other specialists. To overcome this, patients in need of additional care management support were identified. Then the dialysis team—using their strong relationship with the patient and frequent contact opportunities—helped educate the patient about the benefits of engaging with all of their care management teams. The patient was then “warm-transferred” to the ACO care management team, which could then involve the appropriate physicians and specialists to address the patient’s unique broader care needs.

## CONCLUSIONS

In this preliminary report, we documented that the SPCC program, by defragmenting care for patients with ESKD via interdisciplinary team communication and stepwise protocols centered around collaborative patient care, has been able to improve patients’ health care quality and reduce unnecessary utilization. ■

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**Authorship Information:** Concept and design (NM, DR); acquisition of data (NM); analysis and interpretation of data (DR); drafting of the manuscript (NM, DR); critical revision of the manuscript for important intellectual content (NM, DR); and supervision (DR).

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**eAppendix Table 1.** Baseline Patient Characteristics of ESKD Patients at the Accountable Care Organization

	<b>Control Group (n=256)</b>	<b>SPCC Participants (n=293)</b>
<b>Male, n (%)</b>	132 (51.6)	163 (55.6)
<b>Age, mean (SD)</b>	70.0 (12.9)	71.2 (12.8)
<b>Race, n (%)</b>		
White	124 (48.4)	136 (46.4)
Black	91 (35.6)	105 (35.8)
Asian	0 (0.0)	2 (0.7)
Unknown	41 (16.0)	50 (17.1)

**eAppendix Table 2.** Baseline Patient Characteristics of SPCC Participants at the Kidney Care Organization

<b>Baseline Patient Characteristics</b>	
<b>N patients</b>	152
<b>Male, n (%)</b>	84 (55.3)
<b>Age, mean</b>	70.22
<b>Modality, %</b>	
In-center hemodialysis	84
Peritoneal dialysis	14
Home hemodialysis	2
<b>Race, n (%)</b>	
Caucasian	81 (53.3)
African American	65 (42.8)
Middle Eastern	2 (1.3)
Native American	1 (0.7)
Unknown	3 (2.0)
<b>Etiology, n (%)</b>	
Diabetes	56 (36.8)
Hypertension/large vessel disease	42 (27.6)
Other/Unknown	54 (35.6)

eAppendix Figure. Shared Patient Care Coordination Program specifics

# Shared Patient Care Coordination (SPCC) Program

Enables timely bi-directional patient-information flow, allowing patients to receive the right care at the right time from the caregiver best positioned to deliver it.

