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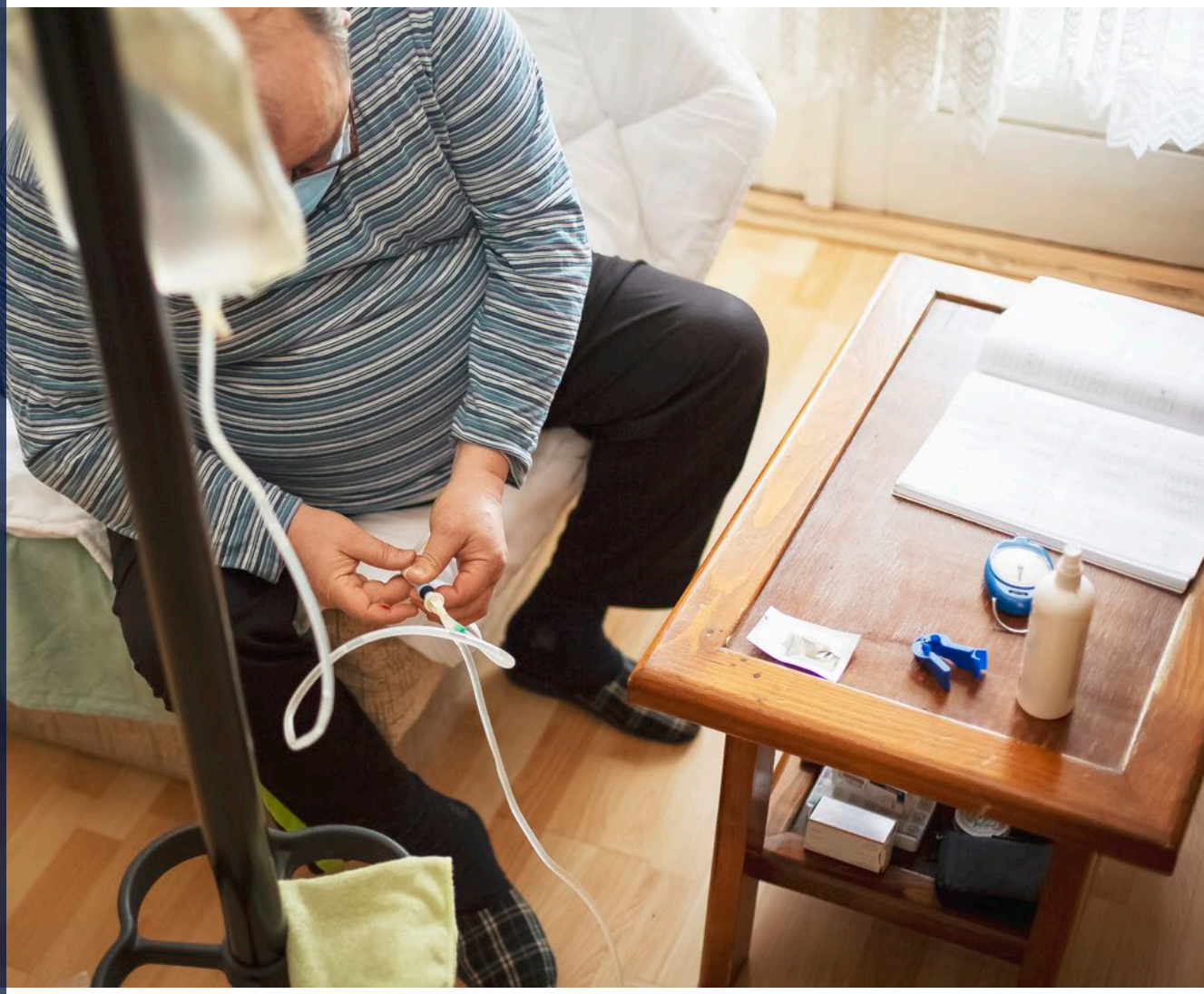
Kidney Care Choices (KCC) Model

First Annual Evaluation Report, Performance Year 2022



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Kidney Care Choices (KCC) Model: First Annual Evaluation Report, Performance Year 2022

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GLOSSARY OF TERMS

Acronym	Definition
ACE	Angiotensin-converting enzyme
ACH	Acute care hospitalization
ACO	Accountable Care Organization
ADI	Area Deprivation Index
AHRF	Area Health Resource File
AKI	Acute kidney injury
APM	Alternative Payment Model
ARB	Angiotensin-receptor blocker
AV	Arteriovenous
BETOS	Berenson-Eggers Type of Services
CBE	Consensus-Based Entity
CBSA	Core-based statistical area
CCN	CMS Certification Number
CCW	Chronic Conditions Data Warehouse
CEC	Comprehensive End-Stage Renal Disease Care
CI	Confidence interval
CKCC	Comprehensive Kidney Care Contracting
CKD	Chronic kidney disease
CMS	Centers for Medicare & Medicaid Services
DiD	Difference-in-differences
E/M	Evaluation and management
ECE	Extraordinary Circumstances Exception
ED	Emergency department
eGFR	Estimated glomerular filtration rate
ESRD	End-stage renal disease
ETC	End-Stage Renal Disease Treatment Choices
FFS	Fee-for-service
FIPS	Federal Information Processing Standard
GFR	Glomerular filtration rate
HCC	Hierarchical Condition Category
HCPCS	Healthcare Common Procedure Coding System
HD	Hemodialysis
HDTU	Home Dialysis True-Up
HPP	high performers pool
HRR	Hospital Referral Regions
HRSA	Health Resources and Services Administration
HRSN	Health-related social needs
ICD-10	International Classification of Diseases, Tenth Revision
IRB	Institutional Review Board
IPPS	Inpatient Prospective Payment System
ICC	intra-cluster correlation coefficients

Acronym	Definition
ICH	In-center hemodialysis
ICH CAHPS	In-Center Hemodialysis Consumer Assessment of Healthcare Providers and Systems
KCC	Kidney Care Choices
KCE	Kidney Contracting Entity
KCF	Kidney Care First
LASSO	Least absolute shrinkage and selection operator
LDO	Large dialysis organizations
MA	Medicare Advantage
MBSF	Master Beneficiary Summary File
MCP	Monthly Capitated Payment
MDD	Master Data Management Eligibility Data
MDM	Master Data Management
MD-PPAS	Medicare Data on Provider Practice and Specialty
MSSP	Medicare Shared Savings Program
N/A	Not applicable
NCQA	National Committee for Quality Assurance
NPI	National Provider Identifier
OMB	Office of Management and Budget
OPTN	Organ Procurement and Transplantation Network
PAC	Post-acute care
PAG	Patient Advisory Group
PAM	Patient Activation Measure
PD	Peritoneal dialysis
PHE	Public Health Emergency
POC	Point of contact
PPPM	Per patient per month
PY	Performance year
Q1	Quarter 1
Q2	Quarter 2
Q3	Quarter 3
Q4	Quarter 4
QCP	Quarterly Capitated Payment
QIP	Quality Incentive Program
QoC	Quality of care
RFA	Request for Applications
RTI	Research Triangle Institute
RUCC	Rural-Urban Continuum Codes
SD	Standard deviation
SDOH	Social determinants of health
SMD	Standardized mean difference
SRTR	Scientific Registry of Transplant Recipients
SS	Shared savings
SSP	Shared Savings Program

Acronym	Definition
SUR	seemingly unrelated regression
TIN	Taxpayer Identification Number
U.S.	United States
USDA	U.S. Department of Agriculture

Executive Summary

REPORT HIGHLIGHTS

MODEL OVERVIEW

Kidney Care Choices (KCC) is a voluntary model that provides incentives to improve care management for Medicare fee-for-service patients with chronic kidney disease Stage 4 or 5 and end-stage renal disease (ESRD). The model is designed to delay the onset of dialysis and improve dialysis starts, increase home dialysis, and incentivize kidney transplantation for patients while reducing Medicare expenditures and preserving or enhancing quality of care.

Participants engage in one of two model options:

Kidney Care First (KCF)
Available to nephrology practices and their nephrologists.

Comprehensive Kidney Care Contracting (CKCC)
Available to nephrology practices that team with a transplant provider and optional partners such as dialysis facilities to form Kidney Contracting Entities (KCEs).

PARTICIPANTS

Participants in Performance Year 2022 **spanned 33 states and the District of Columbia**.

The **Midwest and West were underrepresented** in the model.

30 practices in KCF
55 KCEs in CKCC

291 nephrology professionals in KCF
2,565 nephrology professionals in CKCC

133 transplant providers in CKCC
2,217 dialysis facilities in CKCC

KEY FINDINGS IN THE FIRST PERFORMANCE YEAR

Home Dialysis | The KCF model option increased the proportion of patients with ESRD dialyzing at home. Both model options increased the use of peritoneal dialysis, the primary modality for home dialysis.

Utilization | KCC had no impact on the overall frequency of outpatient dialysis utilization, hospitalizations, readmissions, or emergency department visits.

Medicare Payments | The model had no impact on Total Medicare Parts A & B payments or Part D drug costs per patient per month, and it did not result in statistically significant net savings or losses to Medicare.

Quality | The CKCC model option increased the percentage of new patients with ESRD who received a planned start of renal replacement therapy (Optimal ESRD Starts).

Transplants | Overall, the KCC Model did not affect the kidney transplant rate, but the CKCC option increased the percentage of patients with an "active" waitlist status.

Model Implementation | KCC Participants used Benefit Enhancements, developed partner relationships, participated in Learning System activities, addressed low patient activation scores, and screened for social needs.

The Centers for Medicare & Medicaid Services (CMS) Center for Medicare and Medicaid Innovation launched the Kidney Care Choices (KCC) Model on January 1, 2022. KCC is a voluntary model that provides incentives to improve care management for Medicare fee-for-service patients with chronic kidney disease (CKD) Stage 4 or 5 and end-stage renal disease (ESRD). Specifically, the model is designed to achieve the following goals for this patient population:

Delay the progression to dialysis	**Increase** use of home dialysis	**Increase** access to kidney transplantation	**Reduce** the cost of care	**Improve** quality of care

KCC builds on the Comprehensive ESRD Care (CEC) Model, which operated from October 2015 through March 2021. The CEC Model led to small decreases in Medicare payments for services and maintained or improved quality of care and patient outcomes.[1] The KCC Model differs from the CEC Model in several key ways. For example, the KCC Model:

- Strengthens financial incentives for desired outcomes, such as increased home dialysis and transplantation rates
- Includes patients with CKD Stage 4 or 5 (not just those with ESRD on dialysis) to help delay kidney disease progression and better prepare patients whose kidneys do fail
- Offers multiple options for provider participation to increase opportunities for engagement
- Centers on nephrology practices, rather than dialysis facilities, as the primary participants

The Innovation Center contracted with The Lewin Group and our partners at the University of Michigan Kidney Epidemiology and Cost Center and Arbor Research to evaluate the KCC Model, with a focus on whether the model achieved its primary objectives. In this first annual evaluation report, we examine the impacts of KCC on important aspects of kidney care and patient outcomes during the first model performance year (Performance Year [PY] 2022).

ES.1. Model Overview

The KCC Model began with an initial cohort of 85 participants in 2022 and will run for 5 years. Between PY 2022 and PY 2023, five Cohort 1 KCEs and four Cohort 1 KCF Practices left their respective model options, with one practice leaving KCF to create additional partnerships to form a KCE. A second and final cohort of participants joined the model on January 1, 2023, resulting in a total of 130 participants. The concurrent and complementary ESRD Treatment Choices (ETC) Model, which began operations on January 1, 2021, mandated participation by dialysis facilities and managing clinicians in a randomly selected 30% of Hospital Referral Regions (HRRs).[2] Conversely, KCC participation was fully voluntary, although it could overlap with mandatory ETC participation. Both models provide incentives spanning a range of clinical opportunities for improvement.

KCC Participants engage in one of two model options, Kidney Care First (KCF) or Comprehensive Kidney Care Contracting (CKCC), which are summarized below.

Kidney Care First (KCF)

- Nephrology practices and their nephrologists and nephrology professionals can elect to participate in the KCF option.
- They receive capitated payments for managing the care of aligned patients, payment adjustments based on quality and utilization, and bonus payments for successful transplantation.

Comprehensive Kidney Care Contracting (CKCC)

- CKCC is available to nephrology practices that team with a transplant provider and optional partners such as dialysis facilities, vascular access surgeons, care management companies, or home care providers to form Kidney Contracting Entities (KCEs).
- CKCC is a total cost of care model for all Medicare Parts A & B (hospital and medical) services and features varying levels of risk borne by the KCEs.

[1] Marrufo, G., Negrusa, B., Ullman, D., et al. (2022). *Comprehensive End-Stage Renal Disease Care (CEC) Model: Fifth annual evaluation report.* https://www.cms.gov/priorities/innovation/data-and-reports/2022/cec-annrpt-py5

[2] In addition to the randomly selected HRRs, ETC includes HRRs for which at least 20% of the component ZIP Codes are in Maryland. These HRRs were included in conjunction with the Maryland Total Cost of Care Model.

In both model options, participants receive capitation payments, including an Adjusted Monthly Capitated Payment for patients with ESRD and a Quarterly Capitated Payment for patients with CKD, and earn a bonus payment for patients who receive a kidney transplant. In CKCC, participants are also eligible for shared savings depending on the level of risk they bear.

ES.2. Summary of Findings

To estimate impacts of the KCC Model, we compared changes in outcomes before and after model implementation for patients aligned to the model and patients aligned to similar nephrology practices not participating in the model.[3] The results of these impact analyses for PY 2022 are summarized in **Exhibit ES-1**.[4] Impacts are expressed as favorable, unfavorable, or no change.

Several impacts were favorable (that is, the model improved outcomes), but for many outcomes, we did not identify statistically significant effects of the model in PY 2022. For example:

- We observed significant increases in home peritoneal dialysis (PD) in both model options.
- We found significant increases in home dialysis in KCF and home dialysis training in CKCC.
- Total Medicare Parts A & B payments did not change significantly in either model option, and the model did not result in a statistically significant net impact.
- Most quality measures were unchanged, but we identified a substantial increase in Optimal ESRD Starts in CKCC.
- Transplantation rates did not change significantly in either model option, but active waitlisting increased in CKCC, which may be a precursor of future increases in transplantation.
- Patient experience of care for in-center dialysis was largely unchanged, but Patient Activation Measure (PAM®) survey scores, which measure patients' ability to manage their health care, increased in both model options.

[3] PAM scores were compared between initial and follow-up surveys in 2022 among patients aligned to KCF or CKCC. The analysis did not use a comparison group because PAM scores were available only for KCC-aligned patients.

[4] **Notes for Exhibit ES-1:** Arrow indicates the direction of the statistically significant cumulative impact estimate. Detailed impact estimates for each outcome are included in the body of the report. ^In-center HD includes in-center hemodialysis, in-center self-dialysis, and in-center nocturnal dialysis. † indicates a parallel trends violation. [1]PAM scores are compared from initial to follow-up survey in 2022 among patients aligned to KCF or CKCC. The analysis does not use a comparison group due to the unavailability of PAM scores other than for KCC-aligned patients. * Indifferent interpretation of favorable or unfavorable, as graft use increased and the shift might not clearly represent lower quality. CKCC = Comprehensive Kidney Care Contracting; CKD QCP = chronic kidney disease Quarterly Capitated Payment; DiD = difference-in-differences; ED = emergency department; ESRD = end-stage renal disease; HD = hemodialysis; KCF = Kidney Care First; PAM = Patient Activation Measure; PY = performance year.

Exhibit ES-1. Summary of Evaluation Findings

Domain	Outcome	KCF Option Impact PY 2022	CKCC Option Impact PY 2022
Dialysis Modality	Home Dialysis	↑	
	Peritoneal Dialysis	↑	↑
	Home Hemodialysis		
	In-Center Hemodialysis ^	↓	
	Number of Outpatient Dialysis Sessions		
	Home Dialysis Training		↑
Transplantation	Overall Waitlisting		↑†
	Active Status		↑
	Inactive Status		
	Overall Transplants		
Utilization	Acute Care Hospitalization		
	Readmission		
	All ED Use		
	Outpatient ED Use		
Medicare Payments	Total Parts A & B		
	Total Part A		
	Total Part B	↓†	
	Evaluation and Management		↑
	Hospital Outpatient Payments		
	Total Dialysis Payments	†	↑
	Home Dialysis Payments	↑	↑†
	Home Hemodialysis Payments	†	↓
	Peritoneal Dialysis Payments	↑†	↑†
	Net Impact to Medicare		
	Part D		
Quality of Care	Percentage of Patients with No Nephrology Care		
	Hospitalizations for Vascular Access Complications		
	Hospitalizations for ESRD Complications		
	Care Utilization Due to Hyperkalemia		
	Fistula Use*	↓	
	Graft Use	↑†	
	Optimal ESRD Starts		↑
	Hypertension Medication Use		
	Diabetes Medication Use (Metformin)		
	Diabetes Medication Use (SGLT2)		
	Testing Labs		↑
	CKD QCP List Services		
Patient Experience	PAM Survey Score[1]	↑	↑

		DiD	Dose Response
In-Center HD Patient Experience of Care for CKCC Participants	Rating of Kidney Doctors		
	Rating of Dialysis Center Staff		
	Rating of Dialysis Center		
	Nephrologists' Communication and Caring		
	Quality of Dialysis Center Care and Operations		
	Providing Information to Patients		
	Discussions about Right Treatment for Beneficiary		
	Beneficiary Received Explanation for why They Were Ineligible for Transplant		
	Discussions about Peritoneal Dialysis		↑

Key:	Favorable at p<0.10	Unfavorable at p<0.10	No Change

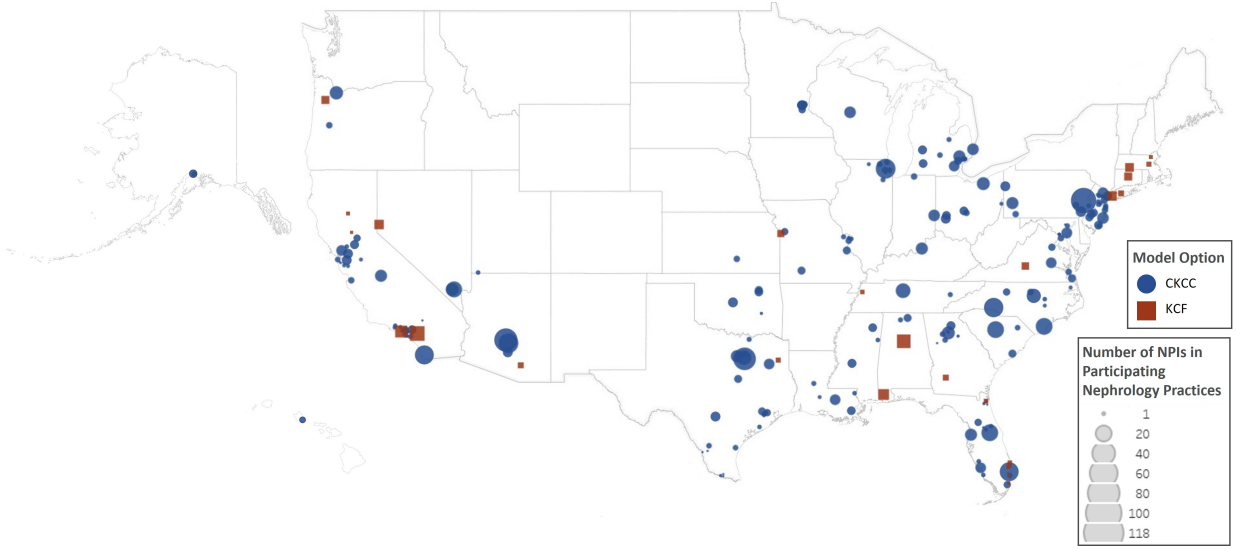
ES.3. Findings by Research Question

ES.3.1. Who Participates in the KCC Model?

- Cohort 1 included 30 KCF Practices and 55 KCEs across 33 states and the District of Columbia.
- A total of 291 nephrology professionals participated in KCF and 2,565 participated in CKCC, with 133 transplant providers and 2,217 dialysis facilities joining CKCC as optional partners.
- KCC Participants treated 30% of patients eligible for the model nationwide.

Because KCC is a voluntary model, understanding which providers participate is important for conducting the evaluation. Cohort 1 consisted of 30 KCF Practices and 55 KCEs spanning 33 states and the District of Columbia, as shown in **Exhibit ES-2**. Seventeen states, primarily in the West and more rural parts of the Midwest, did not have any Cohort 1 KCC Participants.

Exhibit ES-2. Location and Size of KCF Practices and Practices That Formed KCEs as of 2019



Notes: Data on KCF Practices and KCEs were based on the Q2 PY 2022 participation list of aligning providers. We used physician ZIP from CKD and ESRD claims submitted by aligning providers to identify a practice's primary ZIP Code (practices often have more than one location). Size of practice is based on the number of NPIs in 2019. CKCC = Comprehensive Kidney Care Contracting; CKD = chronic kidney disease; ESRD = end-stage renal disease; KCE = Kidney Contracting Entity; KCF = Kidney Care First; NPI = National Provider Identifier; PY = performance year; Q = quarter.

At the provider level, Cohort 1 included 291 nephrology professionals in KCF and 2,565 in CKCC. In addition, 133 transplant provider partners and 2,217 dialysis facilities joined CKCC as optional partners. KCC Participants cared for 30% of patients eligible for the model nationwide. Model participants were larger than non-participants, in terms of number of aligned patients. KCC Model participation was also positively associated with prior CEC Model participation.

ES.3.2. What Were the Impacts of the KCC Model?

Utilization

- **Use of home dialysis** in KCF grew by 2.1 percentage points (or 20%). **Use of PD** increased by 2.3 percentage points (or 26%) in KCF and 0.74 percentage points (or 8%) in CKCC.
- We did not identify impacts on emergency department use or hospitalizations for either model option.

Payments

- The model did not affect **Total Medicare Parts A & B payments**.
- We observed a small increase in evaluation and management payments ($1 per patient per month, or 2%) and total dialysis payments ($28 per patient per month, or 1%) in CKCC.
- The model did not result in statistically significant net savings or losses to Medicare.

Quality of Care

- Most quality metrics were unchanged in both model options, with two notable exceptions:
  - In KCF, we found a decline in arteriovenous fistulas of 5.3 percentage points (or 9%), which does not necessarily imply a decrease in quality without a corresponding increase in catheter use (to be examined in future reports).
  - In CKCC, we observed a 6.9 percentage point (or 16%) increase in **Optimal ESRD Starts**.

Transplantation

- We did not find a differential increase in **kidney transplant rates** between the model and comparison groups.
- We observed a 1.8 percentage point (or 15%) increase in patients with an active **waitlist status** in CKCC.

Key model outcomes are bolded.

Utilization

The model's incentives could drive an increase in the use of home dialysis, a key utilization outcome of the model. Dialysis-specific measures changed in both model options. In KCF, home dialysis (PD or home hemodialysis) rose by 2.1 percentage points (or 20% in relative terms), and use of PD increased by 2.3 percentage points (or 26%). In CKCC, the increase in overall home dialysis use was smaller (0.76 percentage points, or 7%) and narrowly missed statistical significance, but the increase in PD (0.74 percentage points, or 8%) was significant. We also measured changes in the use of home dialysis training, an important step for patients to dialyze at home. CKCC had a significant increase in home dialysis training (0.15 percentage points, or 32%), so it will be useful

to track the extent to which this increase in training translates into subsequent changes in home dialysis use. Utilization measures, such as hospitalization and emergency department use, were unaffected in the first year of KCC.

Payments

A key payment outcome of the model is lowering Total Medicare Parts A & B payments. The model may reduce Medicare payments by shifting patients toward home dialysis and improving care management and patient education, which could decrease hospitalizations and emergency department visits. Overall, the KCC Model did not affect Total Medicare Parts A & B payments. KCF Practices experienced a potentially meaningful decline in Total Medicare Parts A & B per patient per month (PPPM) payments of $134 (3%), but the estimate was not statistically significant. In CKCC, although Part B payments were unchanged overall, we observed a small, statistically significant increase in the subcategories of evaluation and management payments ($1 per patient per month, or 2%) and total dialysis payments ($28 per patient per month, or 1%). Changes in payments by dialysis modality corresponded to the changes in utilization described above. For example, home dialysis payments increased in KCF, consistent with the increase in home dialysis utilization in this model option.

To estimate net impacts of KCC, we calculated the difference between aggregate payment reductions and model costs during the first performance year. We identified non-statistically significant net losses to Medicare of $52 million, or $44 PPPM.

Quality of Care

Higher-quality care due to the model could lead to better patient outcomes. We found that KCF quality metrics were largely unchanged, except we did identify a decline in arteriovenous (AV) fistulas (5.3 percentage points, or 9%). This shift is not a concern as long as there is not a corresponding increase in catheter use, which we will investigate in future reports. Effects on several KCF measures had potentially meaningful magnitudes but were not statistically significant, suggesting that these outcomes may emerge as significant as additional data accrue through longer follow-up. Most CKCC quality metrics were also unchanged, with one notable exception: a 6.9 percentage point (or 16%) increase in Optimal ESRD Starts, a key outcome of the model. This increase could reflect improvements in pre-ESRD education and planning, through use of the Kidney Disease Patient Education Services waiver, a desired outcome of including patients with CKD Stage 4 or 5 in the model. Optimal ESRD Starts measures the percentage of new patients with ESRD who have a planned start of renal replacement therapy.[5]

Transplantation

Increased transplant waitlisting and transplant rates are key outcomes of the model. For transplant waitlisting, which is often a precursor to transplantation, the KCF model option had no impact on overall rates or rates of active or inactive status. In the CKCC model option, we found a 1.8 percentage point (or 15%) increase in patients with an active waitlist status, indicating that they are suitable for immediate transplantation when an organ becomes available.

[5] For this measure, a "planned start of renal replacement therapy" means the patient (1) received a preemptive kidney transplant, (2) initiated chronic dialysis on a home dialysis modality, or (3) initiated outpatient in-center hemodialysis via AV fistula or AV graft.

The model incentivizes kidney transplantation through bonuses for transplants. Transplant rates rose over time in both model options and comparison groups, but there was no differential increase in either model option during the first performance year. However, in CKCC, there was an increase in preemptive transplants (that is, transplant before starting dialysis) of 1.9 per 1,000 patient-months that was nearly significant. In relative terms, the increase was large (57%), so if this effect becomes statistically significant as more data accrue over time, it would be a meaningful increase.

ES.3.3. Did the KCC Model Affect Patient Experience of Care?

- For in-center dialysis patients in CKCC, we observed limited changes in patients' experience of care from the pre-KCC period to the KCC intervention period relative to the comparison group or dialysis facilities with a KCC presence.
- PAM scores for patients aligned to KCC improved by 8.8 points from the first to the second survey administered in 2022, but no pre-KCC or comparison group data were available to help determine whether this change was due to the model.

By promoting kidney disease education and awareness of treatment options, the KCC Model intends to make care more patient centric. To that end, we convened a Patient Advisory Group (PAG) to inform this evaluation. The PAG consisted of patients who had experienced CKD and various renal replacement therapy modalities. Four major themes emerged from the discussions: (1) insufficient kidney disease education, (2) gaps in modality education and selection, (3) the need for improved access to transplants, and (4) recognition of care partner burden. These findings guide interpretation of quantitative results and design of qualitative approaches, such as the site visits to be conducted in the second year of the evaluation.

> *"No one ever mentioned anything about options. The few times I saw a nephrologist each time … you know, they sent me to their [in-center] dialysis clinic."*
>
> *– Patient Advisory Group Participant*

We assessed the model's impact on patient experience through two surveys. The In-Center Hemodialysis Consumer Assessment of Healthcare Providers and Systems (ICH CAHPS®) survey gathers information on patients' experience with in-center dialysis. The PAM survey assesses patients' fundamental knowledge, skills, and confidence necessary to manage their health care.

For in-center dialysis patients in CKCC, we found limited changes in ICH CAHPS Survey responses for facilities partnered with KCEs.[6] We did not observe a difference for eight of the nine measures evaluated. However, we did find that having a higher percentage of KCC-aligned patients at a given facility was associated with an increase in the share of patients who responded that they have discussed PD, the predominant form of home dialysis, with their kidney doctor.

For the PAM survey, we found that scores improved between patients' first and last survey administered in 2022, suggesting that efforts to increase patients' engagement in their care were

[6] ICH CAHPS is a facility-level survey. The KCF model option focuses on nephrology practices, with little participation from facilities. Therefore, the ICH CAHPS analysis focuses on CKCC.

effective. Results should be interpreted with caution since PAM scores were not available for aligned KCC patients for the pre-KCC period or for the comparison group.

ES.3.4. How Did Participants Implement the KCC Model?

- To implement the model, KCC Participants used Benefit Enhancements, developed partner relationships, participated in Learning System activities, addressed low PAM scores, and screened for health-related social needs.
- CKCC Participants reported higher use of interventions for low PAM scores or social needs than did KCF Participants.

We surveyed KCC Participants to understand how they implemented the model, including their:

- Preparations for model participation
- Use of model design features such as Benefit Enhancements, Beneficiary Engagement Incentives, and Learning System activities
- Strategies to increase transplantation
- Use of the PAM and assessments of patients' health-related social needs

On most measures, CKCC Participants reported more extensive engagement and implementation activities than did their counterparts in KCF. These differences make sense given that the CKCC model option requires collaboration between different provider partners, whereas KCF is limited to nephrology practices and their nephrologists or nephrology professionals. KCEs are also larger on average relative to KCF Practices, which may help explain why CKCC Participants reported more implementation activities.

In addition, CKCC Participants reported higher use of interventions for low PAM scores or social needs. These survey results will help inform upcoming site visits and allow us to assess implementation steps and barriers in more detail.

ES.3.5. Did the KCC Model Have Unintended Consequences?

- The model did not appear to have the unintended effect of increasing Medicare Part D costs, which could indicate a shift toward care outside of KCEs' shared responsibility.
- We will continue to monitor for evidence of care shifting and other potential unintended consequences of the model.

We assessed unintended consequences, such as care skimping or shifting, that may be incentivized in a shared savings model such as CKCC. For PY 2022, we tested for increases in Part D costs, which could indicate a shift toward care outside the KCE's shared responsibility. However, we did not find evidence of such care shifting in the first year.

We will continue to monitor care shifting and remain aware of other potential unintended consequences of the model. For example, the PAG raised concerns about model implementation that could guide future analyses of unintended consequences, including the possibility that some home dialysis use might be provider driven rather than patient centric. If shifts toward home dialysis are not centered on patient needs and preferences, we might expect to see an increase in patients who start home dialysis but quickly switch or return to in-center dialysis.

ES.4. Discussion

The evaluation findings for the KCC Model's first performance year, PY 2022, provide insights into the early effects of the model and lay the groundwork for future reports.

PY 2022 Insights

Several observations about KCC Model participation may have implications for both the evaluation strategy and the model's ultimate scalability. Cohort 1 KCC Participants operated in about two-thirds of states but were underrepresented in more rural states. In addition, participating practices tended to be larger than non-participants and were more likely to have prior experience in value-based kidney care through the CEC Model. To account for these differences, our analysis used matched comparison groups on non-participants to assess the impact of the KCC, rather than making comparisons to the performance of all non-participants. This approach reduces the potential for selection bias to affect our findings. Nonetheless, the disproportionate participation by larger and more experienced providers implies that the findings might not apply to the smaller or less experienced practices that tended not to participate. In the next annual evaluation report, we will be able determine whether participants who joined in Cohort 2 were more likely than those in Cohort 1 to be small practices with less prior experience in value-based care models. If so, this could reduce concerns about whether the findings would apply to those types of providers.

In the first year of the KCC Model, we found evidence of gains in certain aspects of care incentivized under the model, such as the use of home dialysis, transplant waitlisting, Optimal ESRD Starts, and PAM scores. However, some of these results were limited to only one of the model options. Further, we did not identify statistically significant effects of the model on Total Medicare Parts A & B payments, net Medicare savings or losses, hospitalizations, most quality measures, or transplantation rates.

Higher use of home dialysis is a major model objective. In KCF, overall home dialysis and home PD rates increased. In CKCC, PD rates increased, and the increase in overall home dialysis was almost significant. Increased access to transplantation is another major model objective. Transplantation rates did not change differentially for participants relative to non-participants in the first performance year, but we did find an increase in patients with active status on the transplant waitlist in CKCC. Site visits in the coming evaluation year will explore potential mechanisms underlying this result.

Next Steps

Overall, the KCC Model showed some promising effects in its first performance year. In future annual evaluation reports, we will identify whether these early trends persist and whether other patterns emerge as more data accrue and participants gain more experience with the model. In particular, we found several suggestive results where the estimated impact appeared qualitatively meaningful but the

effect narrowly missed statistical significance. Further, new findings could emerge for outcomes that take multiple years of intervention to change, such as those that require sustained efforts, major investments, or multiple steps. For example, transplant waitlisting trends may respond quickly, but that would only be the first step toward increasing the frequency of transplants. In addition, some outcome measures apply only to specific subgroups of aligned patients (for example, patients with CKD Stage 4 or 5, patients just starting dialysis, or those eligible for a transplant). Thus, it may take multiple years to accrue sufficiently large samples or sufficiently long follow-up to detect differences for some measures that do not apply to the entire population. Finally, we may gain sufficient statistical power to pursue new participant subgroup analyses (for example, examining differences in risk options within CKCC). Evaluations of subsequent years will also include Cohort 2, which will add to the sample size and statistical power.

Another area of interest in future annual evaluation reports will be potential interactions or complementary effects between the voluntary KCC Model and the mandatory ETC Model. Important model goals, such as increasing home dialysis and transplantation, overlap across both models. Given the PAG's emphasis on the importance of early, repeated, and multipronged modality education efforts, the inclusion of patients with CKD Stage 4 or 5 in the KCC Model may enhance the opportunities of providers jointly participating in ETC to affect those outcomes. Similarly, the ETC Model's health equity incentives may enhance the effectiveness of KCC Participants that care for historically underserved populations.

1. Introduction

The Centers for Medicare & Medicaid Services (CMS) Center for Medicare and Medicaid Innovation launched the Kidney Care Choices (KCC) Model on January 1, 2022. The KCC Model is voluntary and aims to delay the onset of dialysis and to incentivize kidney transplantation, while also reducing Medicare expenditures and preserving or enhancing quality of care (QoC) for patients. CMS designed KCC and the complementary, mandatory End-Stage Renal Disease (ESRD) Treatment Choices (ETC) Model to work in concert, with the goals of engaging participating providers and patients by creating incentives spanning a range of clinical opportunities for improvement. The key design features of the KCC Model include voluntary provider participation, a range of payment incentives, and levels of risk.

CMS contracted with The Lewin Group, Inc. (Lewin) and our partners at the University of Michigan Kidney Epidemiology and Cost Center and Arbor Research to evaluate the KCC Model. The KCC evaluation research questions focus on determining whether the model achieves its primary objectives:

Delay the progression to dialysis	**Increase** use of home dialysis	**Increase** access to kidney transplantation	**Reduce** the cost of care	**Improve** quality of care

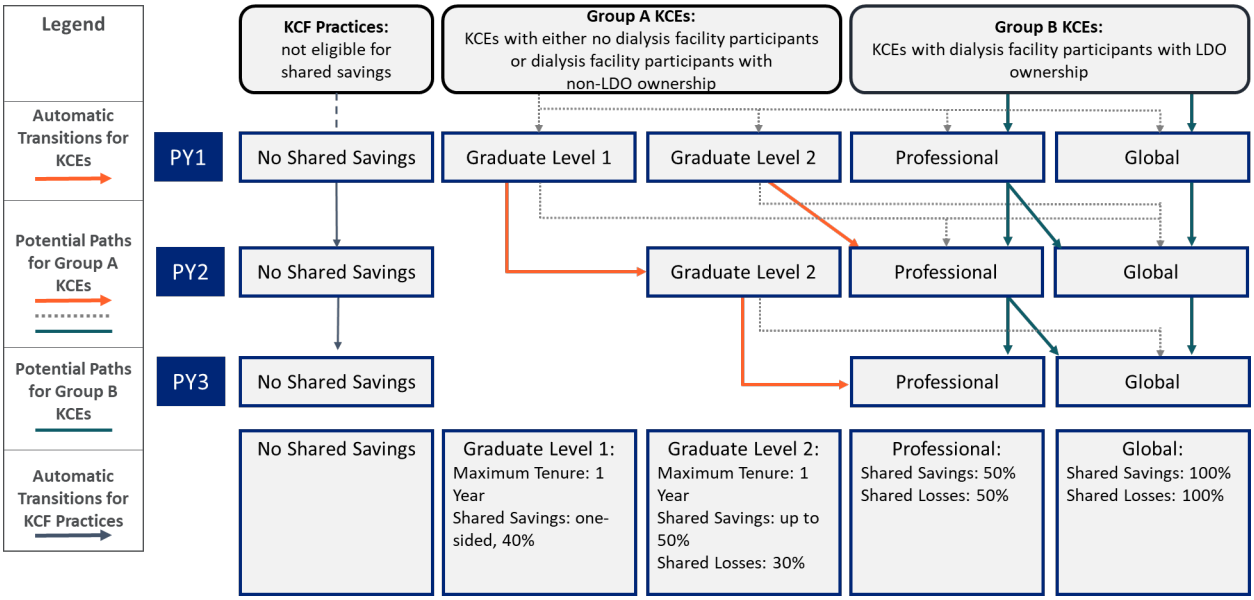
Progress on these primary objectives should avoid adverse unintended consequences or exacerbation of disparities in care.

In this first annual evaluation report, we examine KCC Model effects during the initial year of the model (Performance Year [PY] 2022). We employed a mixed-methods evaluation design that incorporated both quantitative and qualitative data. We used CMS administrative data as well as data from patient surveys to conduct quantitative impact analyses. In addition, we gleaned insights from our Patient Advisory Group (PAG) and KCC Participant Implementation Survey to provide context for the quantitative findings and inform future analyses.

1.1. Overview of the KCC Model

The KCC Model was designed to delay the onset of ESRD, better prepare patients for dialysis, coordinate care across settings, and incentivize kidney transplantation. The KCC Model creates a structure under which providers (nephrologists, transplant providers, dialysis facilities, and others) can voluntarily come together to provide care to Medicare fee-for-service (FFS) patients with kidney disease. KCC is composed of two model options, Kidney Care First (KCF) and Comprehensive Kidney Care Contracting (CKCC). The KCF and CKCC model options differ in important ways, including the characteristics of eligible providers and the potential level of risk borne under each option (see **Exhibit 1**). In both model options, participating nephrology practices receive payments for chronic kidney disease (CKD) management, quality, and transplant outcomes. Under CKCC, practices can partner with transplant providers to form Kidney Contracting Entities (KCEs), which are accountable for the total cost of care for aligned patients with CKD Stage 4 or 5 or ESRD.

Exhibit 1. KCC Model Options and Potential Risk Graduation Paths



Notes: This graphic shows the possible trajectories of KCF Practices (KCF model) and KCEs (CKCC model option). KCEs in Group A can follow any path, while those in Group B are restricted to the Professional and Global options. KCEs cannot move to a lower risk option but have the choice to move to a higher risk option beginning in their third performance year. KCF Practices are not eligible for shared savings but can become a KCE (and therefore become eligible for shared savings) by adding a transplant center transplant surgeon, transplant nephrologist, or organ procurement organization to their organization. CKCC = Comprehensive Kidney Care Contracting; KCE = Kidney Contracting Entity; KCF = Kidney Care First; LDO = large dialysis organization; PY = performance year.

Voluntary participation framework. KCC Model participation is voluntary in both the KCF and CKCC options, and eligibility for each option is based on the number of patients served. A KCF Practice must have at least 350 aligned patients with CKD Stage 4 or 5 and 200 with ESRD. A KCE in CKCC must have at least 750 aligned patients with CKD Stage 4 or 5 and 350 with ESRD. KCF allows participation by nephrologists and nephrology practices only. Under CKCC, nephrologists or nephrology practices must partner with transplant providers to establish a KCE, which may also include optional participants such as dialysis facilities. In both model options, participants are responsible for managing the care of patients with CKD Stage 4 or 5 or ESRD. The first cohort of KCC Participants began operations on January 1, 2022. Cohort 2 began operations on January 1, 2023. Both cohorts will operate through 2026, and no further cohorts are currently anticipated. This report includes results for only Cohort 1; subsequent annual evaluation reports will include results for both cohorts.

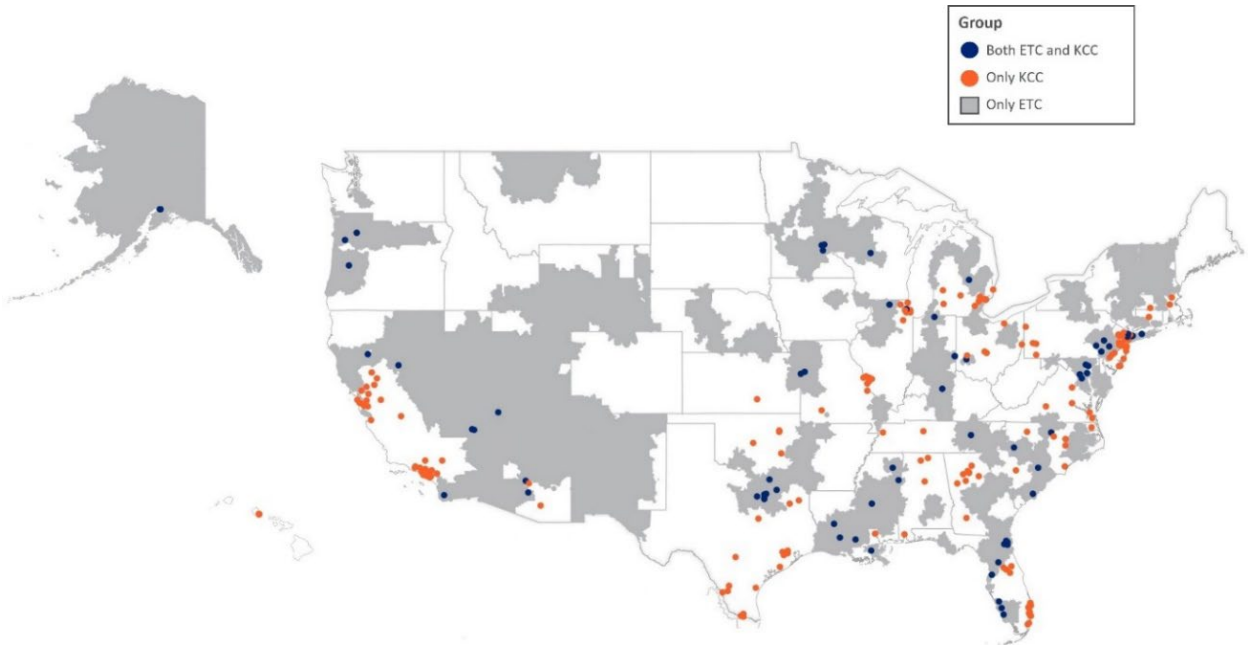
Payment incentives. The KCC Model includes Medicare FFS patients with CKD Stage 4 or 5 or patients with ESRD receiving dialysis whose nephrology care is being delivered by a model participant, as well as aligned patients who subsequently receive a transplant. The KCC Model options, KCF and CKCC, have several similarities. For patients with CKD, CMS will pay practices an up-front, per-patient CKD Quarterly Capitated Payment (QCP) for several outpatient evaluation and management (E/M) codes and other care management codes. Nephrology professionals will receive an Adjusted Monthly Capitated Payment for every aligned patient with ESRD whom they see at least once a month. In the KCF model option, these capitation rates are adjusted for health outcomes, quality, and utilization. For aligned patients who receive a transplant, KCF Practices and KCEs will also receive a bonus payment, paid annually for up to 3 years based on continued

transplant survival. In addition, the CKCC model option is a total cost of care (Medicare Parts A & B) model that builds on the Comprehensive ESRD Care (CEC) Model. A KCE's level of risk is based on its selection of risk-sharing options: Graduated (upside only to start, transitioning to two-sided risk), Professional (50% shared savings or losses), or Global (100% risk).

Health equity. We will remain cognizant of issues of health equity and ensure that equity analyses based on factors such as dual eligibility, low-income subsidy status, race and ethnicity, and rural versus urban location are reflected in future annual evaluation reports.

Model overlap. Primary goals shared across ETC and KCC include promotion of transplants, encouragement of home dialysis, and improvement of care quality. Voluntary KCF and CKCC Participants can be located inside or outside of the mandatory ETC Model market areas (see **Exhibit 2**). Because ETC has multiple objectives that overlap with those of KCC, ETC market status may influence providers' decisions to participate in KCC. Further, some of the models' incentives may reinforce each other, particularly for patients who could simultaneously become eligible for both models. For example, both models seek to increase the use of transplantation and home dialysis, but only KCC includes patients with advanced CKD who are not yet receiving dialysis, the ideal time for education and preparation for modality choice.

Exhibit 2. KCC Cohort 1 and ETC Geographic Overlap

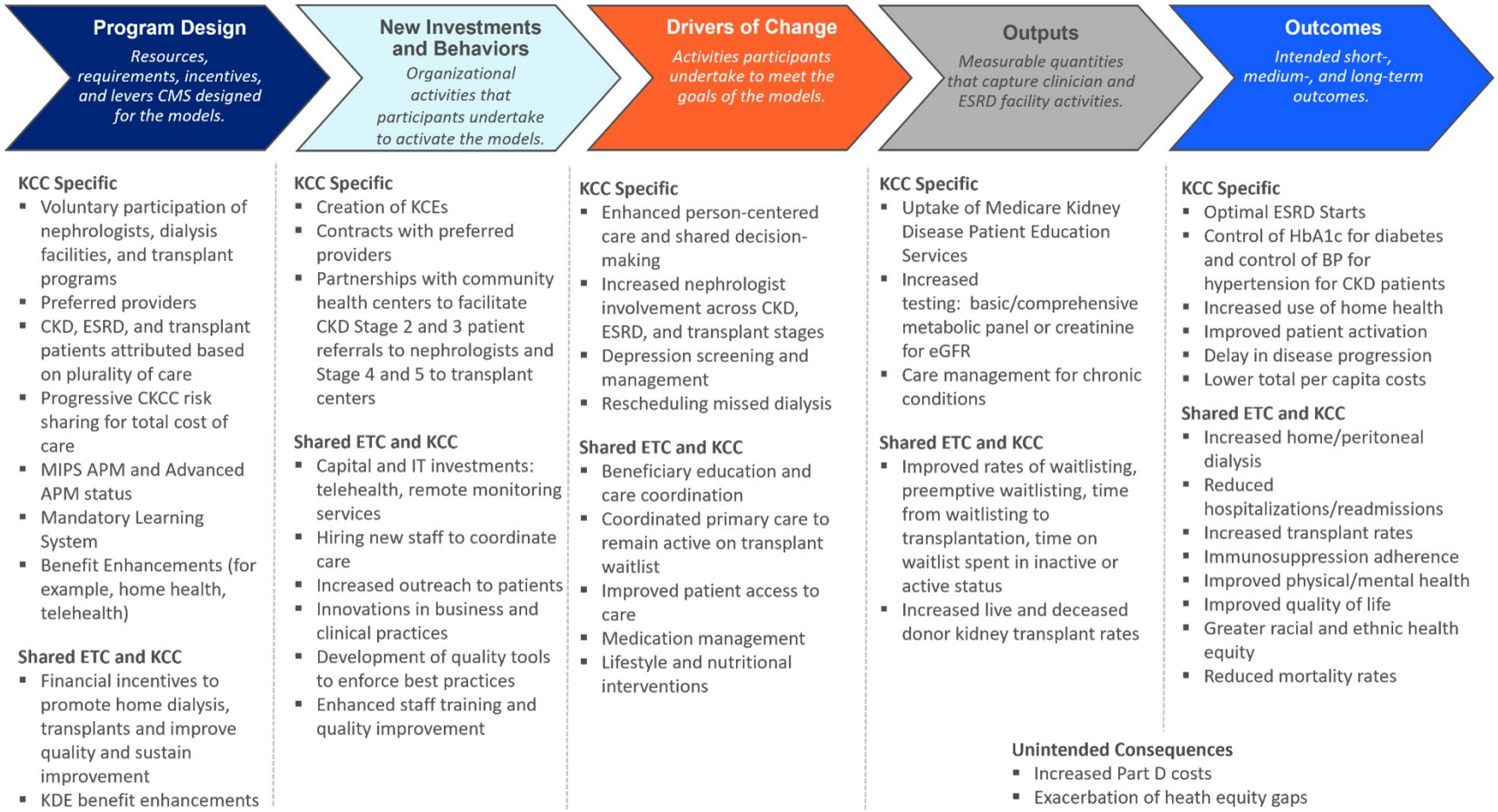


Note: ETC = End-Stage Renal Disease Treatment Choices.

1.2. Research Questions

The evaluation logic model, shown in **Exhibit 3**, describes the design features, incentives, and process through which the KCC Model is predicted to affect behavior and indicates how changes in behavior (drivers of change) could lead to observable changes in outcomes. This structure provides a common framework for identifying and linking program goals, activities, and outcomes. We apply the logic model and the embedded hypotheses to guide our analyses of the main research questions for the evaluation.

Exhibit 3. KCC Evaluation Logic Model



Notes: APM = Alternative Payment Model; BP = blood pressure; CKCC = Comprehensive Kidney Care Contracting; CKD = chronic kidney disease; eGFR = estimated glomerular filtration rate; ETC = End-Stage Renal Disease Treatment Choices; IT = information technology; KCE = Kidney Contracting Entity; MIPS = Merit-based Incentive Payment System.

1.2.1. Who Participates in the KCC Model?

The common element of the KCC Model options is participation by nephrology practices. We assessed the characteristics of provider participants in each model option relative to non-participants (for instance, practice sizes, locations, overlap with ETC areas, prior participation in CEC, patient and area population characteristics). We used these comparisons to assess levels of balance on patient, provider, and market characteristics between KCC Participants and non-participants, to guide the selection of matching characteristics for the creation of comparison groups, and to account for covariates in the quantitative modeling.

One aspect of participation that we examine is the percentage of eligible Medicare FFS patients aligned to the model. An important consideration for the reach of the model to eligible FFS patients is the potential movement of patients toward Medicare Advantage. Since 2021, Medicare patients with ESRD have been allowed to enroll in Medicare Advantage plans as a result of the 21st Century Cures Act. If patients with ESRD who decide to join Medicare Advantage differ from those with Medicare FFS coverage, the case mix of the sample could shift. We will continue to monitor the balance in patient composition over time and consider the possible implications of this policy change.

1.2.2. What Were the Impacts of the KCC Model?

Changes in utilization and payments are the basis for determining whether the model generates savings. In this first annual evaluation report, we assessed KCC's early impact on several utilization measures, Medicare payments, and net savings to Medicare. Cost analyses focused on Total Medicare Parts A & B payments, as well as components (Medicare Parts A & B separately and subcomponents such as payments by provider type or type of service). Parallel to these payment analyses, we also estimated impacts on associated utilization metrics (acute care hospitalizations, readmissions, emergency department [ED] use with or without hospitalization, ED use without hospitalization), with a particular focus on dialysis modalities: home (total, home hemodialysis [HD], home peritoneal dialysis [PD]) and in-center HD, as well as home dialysis training. One of the model's primary objectives is to increase the QoC for patients with CKD Stage 4 or 5 or ESRD. To assess the model's impact on QoC, we assessed measures such as Optimal ESRD Starts[7]; use of indicated medications, including those that may slow the progression of kidney failure, and avoidance of contraindicated medications; hospitalizations that are avoidable through better care; and vascular access. Finally, the KCC Model incentives aim to increase access to kidney transplantation. To analyze any model effects, this report includes an assessment of transplant waitlisting (overall, active, and inactive status) and transplants (overall, deceased, living donor, and preemptive transplants).

1.2.3. Did the KCC Model Affect Beneficiary Experience of Care?

The KCC Model may enhance patients' experience of care if the incentives improve provider coordination, communication, and care management. KCC may also better prepare patients to

[7] Optimal ESRD Starts is one of the KCC Model quality measures tied to performance-based payments. The measure score is the percentage of new (incident) adult patients with ESRD during the measurement period who have a planned start of renal replacement therapy; that is, the patient (1) received a preemptive kidney transplant, (2) initiated chronic dialysis on a home dialysis modality (PD or home HD), or (3) initiated outpatient in-center HD via arteriovenous (AV) fistula or AV graft.

engage in shared decision-making about their care by increasing education about kidney disease and understanding of treatment options. To assess the experience of patients receiving in-center dialysis, we used In-Center Hemodialysis Consumer Assessment of Healthcare Providers and Systems (ICH CAHPS®) survey scores. We used the Patient Activation Measure (PAM®) survey, which participants are required to administer under KCC, to examine changes over time in patients' activation and engagement in managing their care.

1.2.4. How Did Participants Implement the KCC Model?

Our mixed-methods evaluation design relies on qualitative data to help us understand the mechanisms that underlie the KCC Model's success or factors that have impeded the achievement of success. In this report, we present the results of the KCC Participant Implementation Survey, which collected data on the following:

- Why participants joined the model, their preparations for participation (for instance, partnerships, participation in Learning System activities)
- Their use of available Benefit Enhancements and Beneficiary Engagement Incentives[8]
- Perceived barriers to increasing transplantation
- The use of PAM as well as social needs assessments and resulting interventions

These findings provide insights into why the model generated its results. They will also help us draw inferences about how the model could be modified to improve outcomes of interest and how likely it is that the model could be scaled beyond voluntary participants. In addition, survey results will help inform future site visits, which will gather more detailed information on implementation activities, successes, and barriers. We will report site visit findings in the next annual evaluation report.

1.2.5. Did the KCC Model Have Unintended Consequences?

For this first annual evaluation report, we assessed one potential unintended impact of the model. Care skimping or shifting may be incentivized in a shared savings model such as the CKCC model option. Accordingly, we tested for increases in Medicare Part D costs, which could indicate the substitution of care outside the KCE's shared responsibility.

In future evaluation reports, we will assess other potential unintended consequences. For example, inequities may be exacerbated if participants believe attaining model goals will be easier by targeting their efforts to certain patient groups. We may identify other potential unintended consequences through further quantitative and qualitative data analyses.

[8] Benefit Enhancements and Beneficiary Engagement Incentives are available to KCC Participants to support them in managing the care of aligned patients. These options include flexibility in the delivery of Kidney Disease Patient Education Services, increased availability of telehealth services, waiver of the 3-day skilled nursing facility rule, increased availability of post-discharge home visits, waiver of the home health homebound requirement, and waiver of certain restrictions against concurrent care while using the Medicare hospice benefit. Participants in both model options could also opt to use Beneficiary Engagement Incentives for chronic disease management rewards and cost-sharing support. For more information, see **Appendix A**

2. Who Participates in the KCC Model?

The first KCC Model cohort, which began January 1, 2022, included 30 KCF Practices and 55 KCEs distributed across 33 states and Washington, D.C. Voluntary provider participation is a key design feature of both the KCF and CKCC model options. Like KCF, CKCC requires participation by nephrologists or nephrology practices; however, unlike KCF, KCEs under CKCC can include multiple nephrology practices. In addition, CKCC requires participation by transplant providers to establish a KCE and allows optional participation by other providers, such as dialysis facilities.

Most participants that joined CKCC selected the Professional option (37), followed by the Global option (7), the Graduated Level 2 option (7), and the Graduated Level 1 option (4). While both the KCF and CKCC options include capitation payments (CKD QCP, Adjusted Monthly Capitated Payment) and kidney transplant bonuses (KTBs), the three CKCC options (Graduated, Professional, or Global) incorporate varying levels of shared savings/losses. The Graduated option poses the lowest risk and lowest reward option, whereas the Global option offers the highest. The Graduated option has two levels, Graduated Level 1 and Level 2, which differ based on the level of risk borne by KCEs and CMS, with Graduated Level 2 having two-sided risk. More information can be found on the KCC Model overview CMS webpage.[9]

Large practices with existing partnerships and more risk tolerance may be more likely to form a KCE, thus selecting a CKCC option. Smaller practices that cannot absorb risk and do not have extensive networks of potential partners are more likely to choose the KCF option. Nephrology practices may also select a higher-risk option if they are comfortable with that level of risk based on previous experience with the CEC Model.

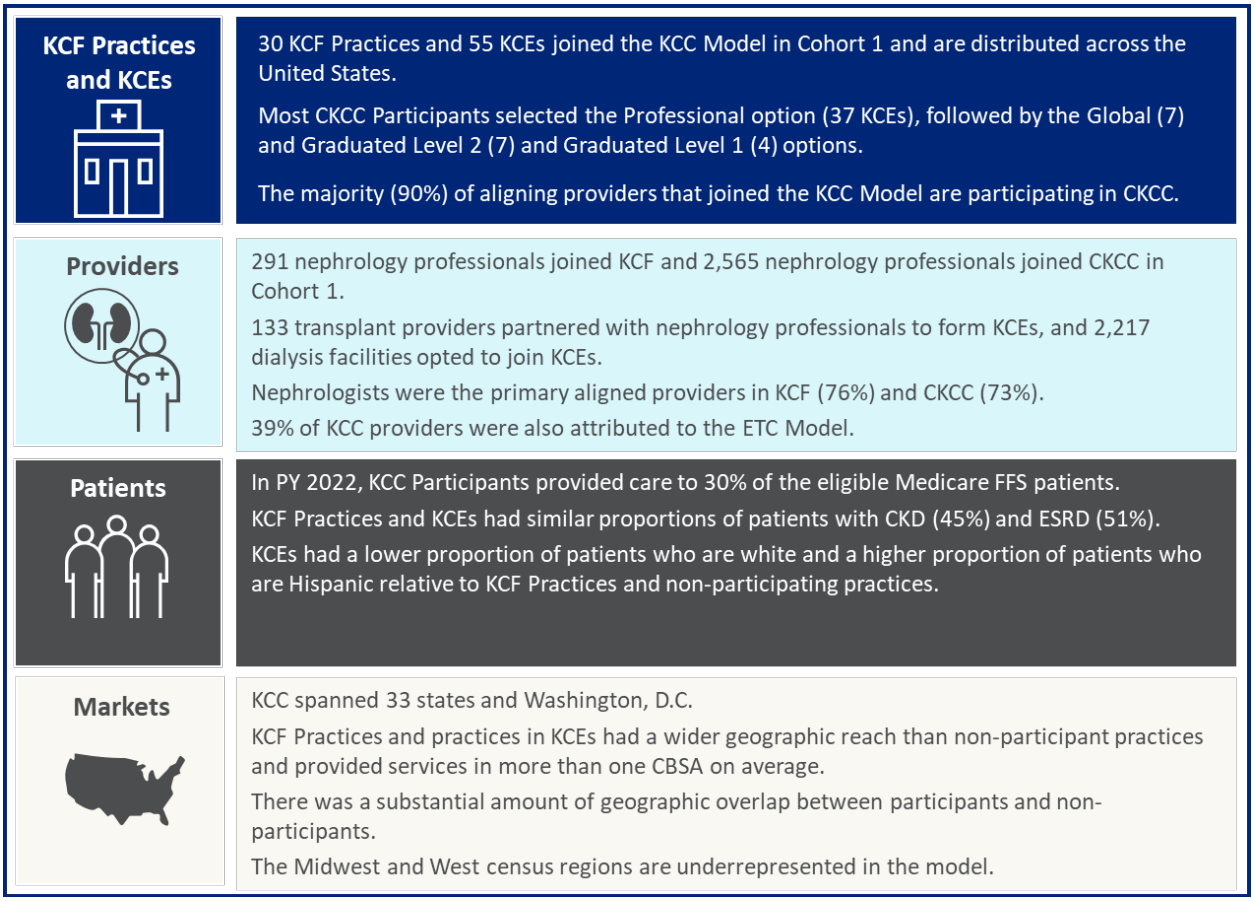
In this section, we describe the characteristics of the patients aligned to KCF Practices and practices in KCEs, the nephrology practices to which they are aligned, and their aligning physicians. We also explore geographic differences between model participants and non-participants and assess the level of balance across various characteristics to provide context for the evaluation. Differences in these characteristics may relate to the decision to participate in KCC, a voluntary model, and we consider these differences in selecting a comparison group to avoid selection bias.

2.1. Key Findings

We highlight the key findings of our participant analysis in **Exhibit 4**. As noted above, the practices and KCEs in the model in PY 2022 were distributed across the United States, with less representation in the West and Midwest. Participants differ not only in which model option they chose but also in terms of practice size, geographic reach, aligned patient demographics, and social determinants of health (SDOH) of aligned patients. For example, KCEs were larger, had a greater geographic reach, and served more patients who were fully dually eligible for Medicare and Medicaid. However, there were also many commonalities, including that most aligning providers under KCF Practices (76%) and KCEs (73%) were nephrologists. Participants treated a third of KCC-eligible Medicare FFS patients in PY 2022.

[9] Centers for Medicare & Medicaid Services. (n.d.). *Kidney Care Choices (KCC) Model.* https://www.cms.gov/priorities/innovation/innovation-models/kidney-care-choices-kcc-model

Exhibit 4. Who Participates in the KCC Model



Note: CBSA = core-based statistical area; CKCC = Comprehensive Kidney Care Contracting; CKD = chronic kidney disease; ESRD = end-stage renal disease; FFS = fee-for-service; KCE = Kidney Contracting Entity; KCF = Kidney Care First.

2.2. Methods

We constructed a practice-level (Taxpayer Identification Number [TIN]-level) dataset with information on KCF Practices, practices in KCEs, and non-participating practices from 2017 to 2019. This period reflects conditions before the start of the model. The data include:

- Specialist type from the Chronic Conditions Data Warehouse (CCW) Medicare Data on Provider Practice and Specialty
- Innovation Center model participation information for each practice and associated National Provider Identifiers from the CCW Master Data Management Eligibility Data
- Market (core-based statistical area [CBSA]-level) characteristics based on the Health Resources and Services Administration's Area Health Resource Files and the CCW Master Beneficiary Summary Files

We compared aggregated KCC-aligned patients with non-KCC patients to understand differences in demographics, SDOH, and kidney disease status at the practice level.[10] We also aggregated county-level characteristics to the Office of Management and Budget (OMB) CBSA market level

[10] **Appendix B, Section B.2**, describes the simulated alignment based on the KCC Model eligibility criteria.

by weighting individual county observations by aligned patient-months. KCC markets were defined as those OMB CBSAs with at least one KCC Model Participant (KCF Practice or a practice in a KCE), whereas non-KCC OMB CBSAs are those with nephrology practices but no KCC Model Participants.[11] To identify provider motivations for joining the model, we conducted a Participant Implementation Survey. The Participant Implementation Survey was an online survey of all active KCF Practices and KCEs, including both Cohorts 1 and 2. We included closed and open-ended questions in the survey and sent it via email. Survey items addressed model design features such as a value-based approach, model outcomes, and potential KCC challenges. Survey analysis examined categorial proportions for categorical items, distributions for items on a Likert scale, and ordered frequencies for rank-based items. Qualitative results were coded to identify common and divergent themes. See **Section 5.2** for a deeper discussion of the survey methods.

2.3. Results

Below we describe participant motivations for joining the model as well as pre-KCC period practice, patient, and market characteristics across KCF Practices and KCEs.[12]

2.3.1. What Were the Characteristics of KCC Participants?

As noted above, the 30 KCF Practices and 55 KCEs that joined the KCC Model in Cohort 1 have practice locations that are distributed across 33 states and Washington, D.C. However, 17 states, most of which are in the West and the more rural parts of the Midwest, do not have any Cohort 1 KCC Participants. **Exhibit 5** shows the location of the KCF (30) and CKCC (227) nephrology practices, with the scale of the circles in the map representing the number of aligning providers in a practice. In PY 2022, KCF Practices had an average of 10 nephrology professionals serving as aligning providers, compared with 11 aligning providers per practice in a KCE.

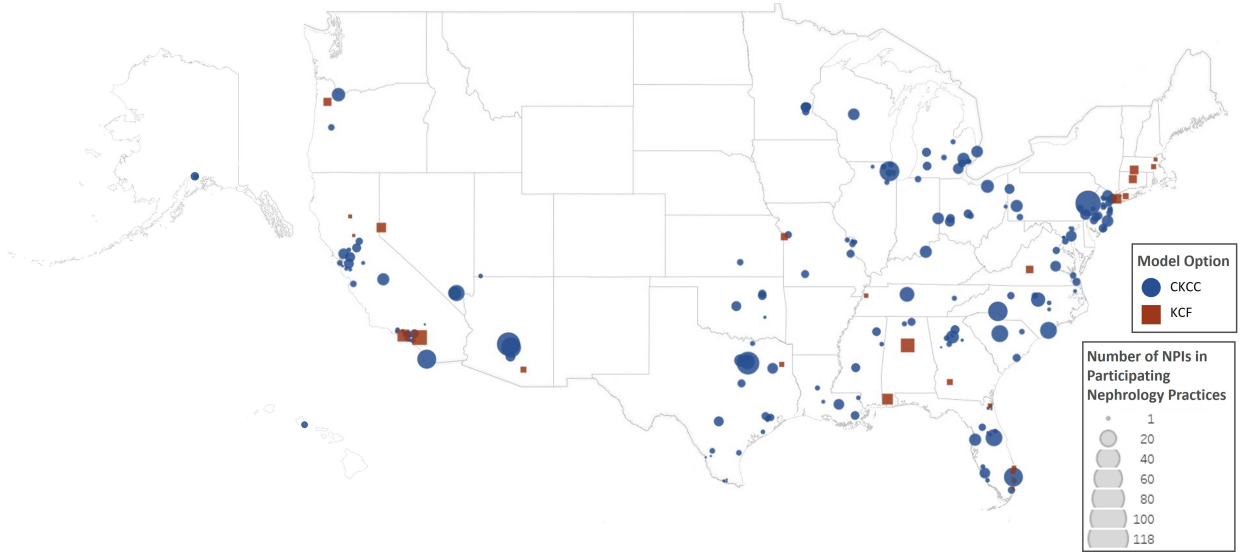
Four new KCF Practices and 50 new KCEs joined the KCC Model in Cohort 2, beginning in PY 2023. In addition, 11 existing KCF Practices and 50 existing KCEs added new practices and aligning providers in PY 2023. However, we focus on Cohort 1 because this report addresses the first year of model performance in PY 2022.

The map in **Exhibit 6** highlights the density of Cohort 1 KCF and CKCC providers and partners, including KCF and CKCC aligning providers as well as CKCC partners such as dialysis facilities and transplant providers. The 291 green crosses and 2,565 blue circles represent KCF and CKCC nephrology professionals, respectively. The 133 blue triangles indicate transplant providers that partnered with nephrology professionals to form KCEs, a model requirement for the CKCC option. The 2,217 orange squares are the optional CKCC dialysis facilities that also formed partnerships with KCEs. Respondents to our Participant Implementation Survey also reported preferred provider relationships with care coordination entities, hospice organizations, home health agencies, dieticians, and ambulatory surgery centers (see **Section 5.3.1**).

[11] Practices/entities can be in multiple CBSAs. When a practice/entity provides services in more than one CBSA, its market characteristics are a weighted average of the characteristics for the CBSAs in which it is providing services.

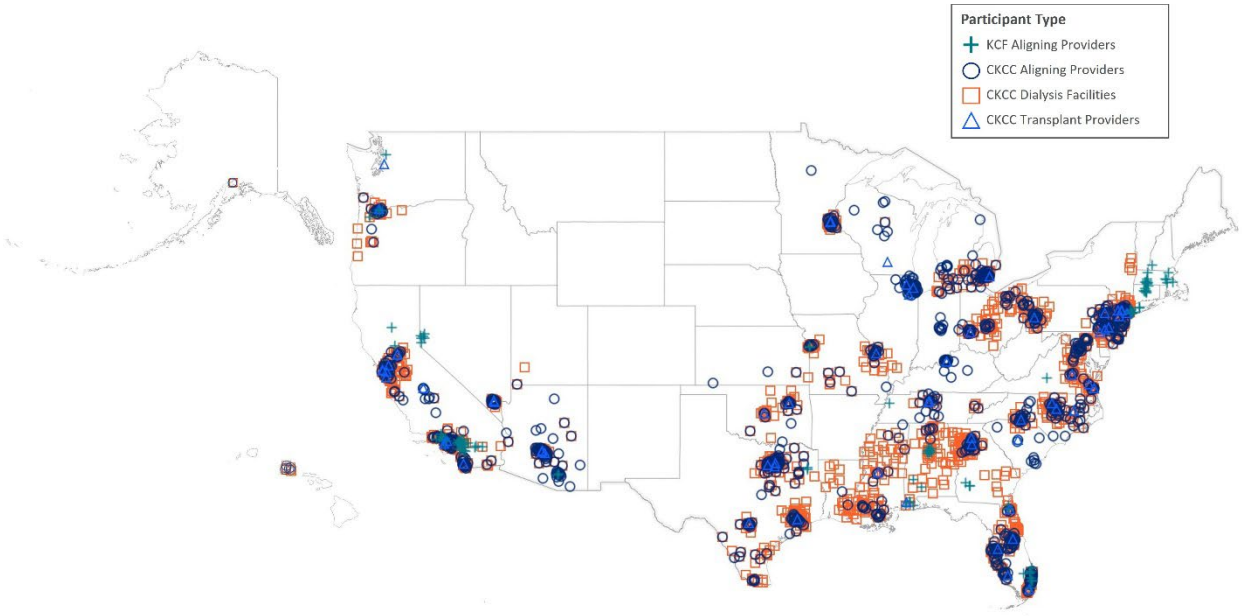
[12] Descriptive statistics are based on Calendar Year 2019. The KCC Model was announced in December of 2019; thus, 2019 values would likely be more predictive of selection into a voluntary model than averaging the characteristics over the entire pre-KCC period.

Exhibit 5. KCC Cohort 1 (Joined in 2022): Location and Size of KCF Practices and Practices That Formed KCEs as of 2019



Notes: Data on KCF Practices and practices in KCEs were based on the Q2 PY 2022 participation list of aligning providers. We used physician ZIP from CKD and ESRD claims submitted by aligning providers to identify a practice's primary ZIP Code (practices often have more than one location). Size of practice is based on the number of NPIs in 2019. CKCC = Comprehensive Kidney Care Contracting; CKD = chronic kidney disease; ESRD = end-stage renal disease; KCE = Kidney Contracting Entity; KCF = Kidney Care First; NPI = National Provider Identifier; PY = performance year; Q = quarter.

Exhibit 6. KCC Cohort 1 (Joined in 2022): Location and Type of PY 2022 Aligning Providers and Partners



Notes: Data on practices in KCEs and KCF Practices were based on the Q2 PY 2022 participation lists of aligning providers, dialysis facility partners, and transplant providers. Physician ZIP was used to identify a provider's ZIP Code. CKCC = Comprehensive Kidney Care Contracting; KCE = Kidney Contracting Entity; KCF = Kidney Care First; PY = performance year; Q = quarter.

2.3.1.1. Why Did Providers Participate in the KCC Model?

Providers joined a KCF Practice or a KCE for various reasons as reported in response to an open-ended question in the Participant Implementation Survey (**Exhibit 7**). There was no predefined set of responses to this question, and participants could write as much or as little as desired in their response. When asked why they joined the KCC Model, some providers, including small practices, reported that they opted to join the model as a KCF Practice for the opportunity to apply the value-based care approach and to improve patient care. A few CKCC Participants also stated that they joined the model because they are interested in value-based design models and that KCC gave them an opportunity to work with others to deliver value-based care. In other cases, the practices had participated previously in a CEC ESRD Seamless Care Organization and wanted to extend that model of care. Some participants believed that participating in a KCE is the best way to deliver comprehensive care to increase transplants and "optimize modality choice." Providers that had previously participated in the CEC Model said that CKCC provided the opportunity to extend the comprehensive care approach upstream to patients with CKD.

Exhibit 7. Reasons Providers Joined the KCC Model

Reason	KCF	CKCC
Opportunity to Apply the Value-Based Care Approach	✓	✓
Desire to Improve Patient Care	✓	✓
Belief That Value-Based Care Is the Future of Kidney Care	✓	
Interest in Building on Practice's Previous Participation in CEC ESRD Seamless Care Organization Model of Care	✓	
Opportunity for Small Practice to Participate in Value-Based Care	✓	
Interest in Value-Based Design Models		✓
Belief That Participation Is the Best Way to Deliver Comprehensive Care to Increase Transplants and "Optimize Modality Choice"		✓
Opportunity to Extend Comprehensive Care Approach Upstream to Patients with CKD after Previous CEC Participation		✓

Note: CEC = Comprehensive End-Stage Renal Disease Care; CKD, chronic kidney disease; ESRD = end-stage renal disease; KCE = Kidney Contracting Entity; KCF = Kidney Care First.

Source: KCC Participant Implementation Survey, The Lewin Group, 2023.

2.3.1.2. What Were the Characteristics of Participating Nephrology Practices?

In 2019, KCF Practices, practices in KCEs, and non-participants varied by practice size, region, and other characteristics (see **Exhibit 8**). KCF Practices were smaller than practices in KCEs in terms of the number of aligning providers and aligned patients. Both KCF Practices and practices in KCEs had more aligning providers and patients than non-participants. KCF Practices and practices in KCEs also had a higher proportion of nephrologists and a lower proportion of internists relative to non-participants. Compared with non-participants, KCF Practices and practices in KCEs both had a larger geographic reach, providing services in more CBSAs. KCF Practices were more likely than KCEs to be in the South, West, and Northwest, with little representation in the Midwest. Practices in KCEs were generally more dispersed geographically, as were non-participants. For all KCEs in CKCC, more than 80% of the practices were in a metropolitan area. Non-participants had a lower percentage of metropolitan practices than KCF Practices and practices in KCEs.

Model overlap is important because it may influence the decision to join KCC or affect a practice's performance under the model. Overlap with ETC Model participants was higher for both KCF Practices and practices in KCEs than for non-participants. Likewise, prior participation in CEC was higher for KCF Practices and practices in KCEs than for non-participants.

Exhibit 8. Average Practice Characteristics by Model Option at Baseline in 2019

Variable		KCF	CKCC	CKCC: Graduated Level 1	CKCC: Graduated Level 2	CKCC: Professional	CKCC: Global	Non-participants
		Mean (n=30)	Mean (n=227)	Mean (n=15)	Mean (n=24)	Mean (n=164)	Mean (n=24)	Mean (n=2,428)
Practice Size	Number of CBSAs	1.5	2.2	2.1	2.1	2.3	1.7	1.4
	Aligning NPIs	7.6	9.5	9.4	11.2	9.6	7.1	3.5
	Aligned Patients	358.7	566.8	556.3	619.0	582.4	414.2	157.7
Provider Specialty	Nephrologists	68.3%	68.5%	64.4%	63.9%	68.4%	76.4%	46.1%
	Internists	7.7%	10.1%	10.6%	12.9%	9.1%	13.8%	17.7%
	NPs	9.0%	13.2%	14.5%	13.3%	14.6%	2.5%	9.6%
Model Overlap	CEC	16.7%	32.6%	66.7%	20.8%	35.4%	4.2%	3.5%
	ETC	47.1%	46.4%	29.5%	47.6%	50.9%	25.2%	38.1%
Practice Region	Northeast	20.0%	18.1%	53.3%	25.0%	16.5%	0.0%	22.5%
	Midwest	3.3%	18.9%	6.7%	50.0%	15.9%	16.7%	17.4%
	South	46.7%	39.6%	40.0%	8.3%	48.2%	12.5%	39.7%
	West	30.0%	23.3%	0.0%	16.7%	19.5%	70.8%	20.4%
Metropolitan Status		90.0%	91.6%	86.7%	100.0%	89.6%	100.0%	83.6%

Notes: Data on practices in KCEs and KCF Practices were based on the Q2 PY 2022 participation lists of aligning providers. Participation data were combined with data from the CCW MD-PPAS, Innovation Center model participation information for the practice and associated NPIs from the CCW MDD, and market (CBSA)-level characteristics based on the HRSA AHRF and the CCW MBSF. Percentage CEC overlap is calculated based on whether an aligning KCC provider also participated in the CEC Model. Percentage ETC overlap is calculated based on whether an aligning KCC provider was also attributed to the ETC Model. As a result, these values measure the percentage overlap of physicians between the models, rather than using a geographically based measure of overlap. AHRF = Area Health Resources Files; CBSA = core-based statistical area; CCW = Chronic Conditions Data Warehouse; CEC = Comprehensive End-Stage Renal Disease Care; CKCC = Comprehensive Kidney Care Contracting; ETC = End-Stage Renal Disease Treatment Choices; HRSA = Health Resources and Services Administration; KCE = Kidney Contracting Entity; KCF = Kidney Care First; MBSF = Master Beneficiary Summary Files; MDD = Master Data Management Eligibility Data; MD-PPAS = Medicare Data on Provider Practice and Specialty; NP = nurse practitioner; NPI = National Provider Identifier; PY = performance year; Q = quarter.

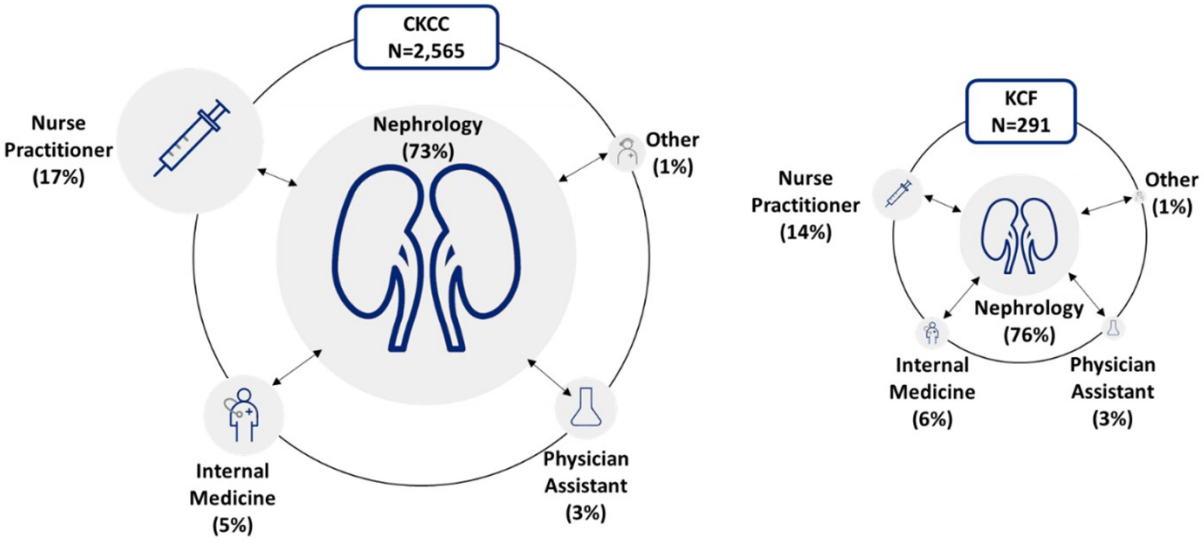
2.3.1.3. How Do Nephrologists Who Participated in the KCF Option Differ from Those Who Participated in the CKCC Option?

The types of providers participating in Cohort 1 KCF Practices and KCEs were similar (see **Exhibit 9**). As expected, the primary aligning providers across KCF Practices and KCEs were nephrologists (76% and 73%, respectively). Nephrology professionals who participated in KCF were also more likely to have a specialty of internal medicine than those who participated in CKCC (6% vs. 5%, respectively). The CKCC option had a higher proportion of nurse practitioners than the KCF option (17% vs. 14%, respectively) but a similar proportion of physician assistants (both 3%).

Most aligning providers (90%) that joined the model participated in KCEs. Although CKCC had more aligning providers overall than KCF, the model options had a similar average practice size in PY 2022. The 55 KCEs included 2,565 aligning providers, for an average of 47 aligning providers per KCE, which can consist of multiple practices. Within KCEs, the 227 individual practices had

an average of 11 aligning providers, and the 30 KCF Practices had an average of 10 providers as of PY 2022.

Exhibit 9. KCC Aligning Provider Specialties and Type in Cohort 1 in PY 2022

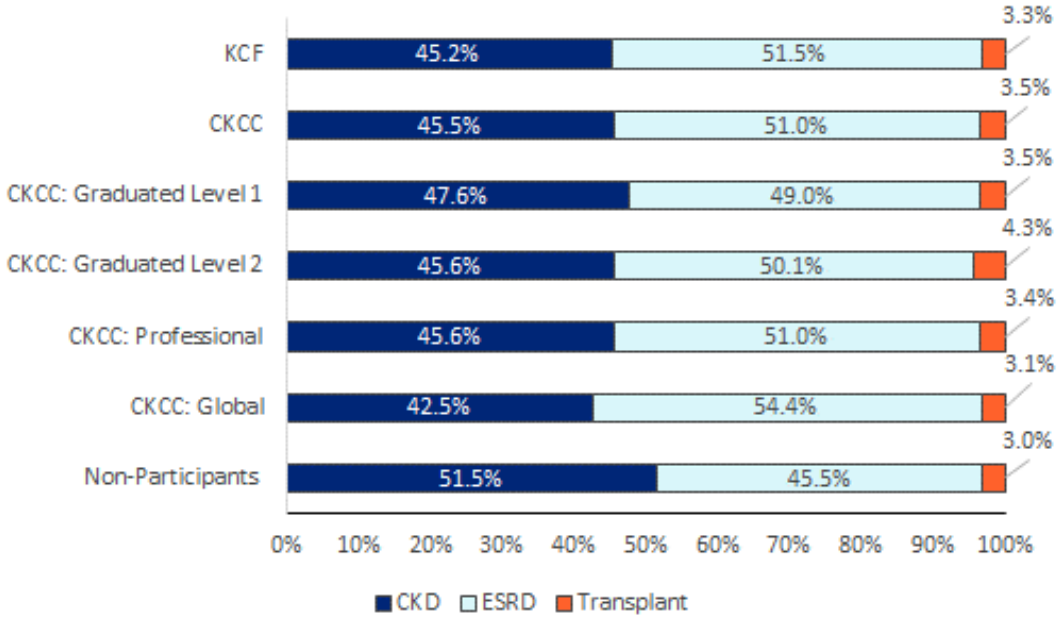


Notes: Data on practices in KCEs and KCF Practices were based on the Q2 PY 2022 participation lists of aligning providers. Participation data were combined with physician specialty data from MD-PPAS. The physician specialty used was the most recent Provider, Enrollment, Chain, and Ownership System specialty reported in MDPPAS for a given aligning provider. CKCC = Comprehensive Kidney Care Contracting; KCF = Kidney Care First; MD-PPAS = Medicare Data on Provider Practice and Specialty; PY = performance year; Q = quarter.

2.3.1.4. What Were the Characteristics of Patients Aligned to Participating Practices?

The distribution of patients by kidney disease status (CKD, ESRD, and transplant) within KCC was similar across model options, as shown in **Exhibit 10**. KCF Practices and KCEs had similar proportions of patients with CKD (45% and 46%, respectively), patients with ESRD (52% and 51% respectively), and transplant patients (3% and 4%, respectively). However, some variation existed within the different CKCC options, with practices in the CKCC Graduated Level 1 KCEs having the highest proportion of patients with CKD among the different options (48%). Practices in the CKCC Graduated Level 2 KCEs had the highest proportion of transplant patients (4%). Non-participants had a higher proportion of patients with CKD (52%) than participants in KCF and CKCC.

Exhibit 10. Patient Kidney Disease Status by Model Option in 2019



Notes: Data on disease status were based on patient alignment data, specifically the patient's disease status as of the patient's first aligned and eligible month in 2019. CKCC = Comprehensive Kidney Care Contracting; CKD = chronic kidney disease; ESRD = end-stage renal disease; KCF = Kidney Care First.

In PY 2022, KCC Participants provided care to 30% of eligible Medicare FFS patients. Patients aligned to the various model options had some similarities and some differences across sociodemographic and geographic characteristics (see **Exhibit 11**). Patients aligned to practices in KCEs and KCF Practices lived in census block groups that had similar income, education, employment, and housing quality based on Area Deprivation Index (ADI) score (47.8 and 48.1, respectively), but the census blocks of patients aligned to non-participants were comparatively more disadvantaged (49.6).[13] Patients aligned to practices in CKCC Global KCEs lived in areas that were less disadvantaged, with an average ADI score of 30.8. Practices in KCEs had a higher proportion of patients with dual eligibility for Medicare and Medicaid with full benefits (32%) relative to KCF Practices (28%) and non-participants (31%). Within the CKCC options, patients aligned to the practices in CKCC Global KCEs had the highest proportion of patients with dual eligibility for Medicare and Medicaid with full benefits at 46%, followed by practices in Graduated Level 2 KCEs at 36%. KCF Practices had the highest proportion of patients with dual eligibility for Medicare and Medicaid with partial benefits (11%) relative to practices in CKCC (8%) and non-participants (9%).

[13] The ADI was developed by researchers at the University of Wisconsin-Madison, School of Medicine and Public Health, and allows for the ranking of census block groups based on socioeconomic disadvantage using percentiles. ADI is calculated based on domains of income, education, employment, and housing quality. A higher ADI score corresponds with living in a more disadvantaged neighborhood. Living in a disadvantaged neighborhood is linked with higher incidence of chronic disease, higher utilization of health services, and shorter life spans. ADI is an important tool to better capture the impact of neighborhood disadvantage on health outcomes. For more information, see https://www.neighborhoodatlas.medicine.wisc.edu/ and https://www.nejm.org/doi/full/10.1056/NEJMp1802313.

The distribution of sex as well as race and ethnicity for aligned patients was similar for KCF Practices and non-participants. The percentage of female patients ranged from 46% for KCF to 48% for non-participants. Non-Hispanic white was also the most common race and ethnicity group, ranging from 47% for CKCC to 54% for KCF. The next most predominant race and ethnicity group was Black or African American at around 25%, followed by Hispanic at about 15%. Vascular access placement (fistula and graft) rates were also similar between patients in these two groups. In contrast, practices in CKCC had a slightly lower proportion of white and a higher proportion of Hispanic patients than KCF Practices and non-participants. Practices in CKCC also had lower levels of fistula and graft vascular access placement.

Exhibit 11. Average Aligned Patient Characteristics by Model Option in 2019

Variable		KCF	CKCC	CKCC: Graduated Level 1	CKCC: Graduated Level 2	CKCC: Professional	CKCC: Global	Non-participants
		Mean (n=30)	Mean (n=227)	Mean (n=15)	Mean (n=24)	Mean (n=164)	Mean (n=24)	Mean (n=2,428)
Patient SDOH	Average ADI Score	48.1	47.8	47.6	50.3	50.0	30.8	49.6
	Dually Eligible (full benefits)	27.7%	31.5%	24.2%	35.9%	29.3%	46.4%	31.1%
	Dually Eligible (partial benefits)	11.1%	7.7%	4.9%	3.9%	9.1%	3.5%	8.5%
Patient Demographics	Female	46.0%	46.7%	50.3%	45.4%	46.8%	44.8%	47.5%
	Average Years of Age	69.3	69.3	71.7	67.6	69.2	70.5	69.8
	Non-Hispanic White	53.8%	47.3%	62.8%	43.9%	47.8%	37.5%	52.0%
	Black or African American	26.3%	26.1%	24.8%	36.4%	26.4%	14.8%	24.9%
	Hispanic	13.2%	17.2%	4.5%	9.7%	17.6%	29.7%	13.8%
	Asian or Pacific Islander	3.5%	6.0%	3.2%	5.9%	5.0%	14.7%	5.6%
	Other Race	0.90%	1.1%	0.51%	1.7%	0.95%	2.2%	1.1%
Vascular Access (ESRD only)	Fistula	58.6%	58.1%	52.5%	57.4%	60.3%	47.7%	56.4%
	Graft	17.3%	16.7%	15.2%	20.2%	16.7%	13.9%	16.0%

Notes: Data on practices in KCEs and KCF Practices were based on the Q2 PY 2022 participation lists of aligning providers. Participation data were combined with data from the CCW MD-PPAS, Innovation Center model participation information for the practice and associated NPIs from the CCW MDD, and market (CBSA)-level characteristics based on the HRSA AHRF and the CCW MBSF. Race and ethnicity information was obtained from the MBSF using the Research Triangle Institute (RTI) race code, with "Unknown Race" omitted. Practices with no aligned patients with ESRD were excluded. ADI = Area Deprivation Index; AHRF = Area Health Resources Files; CBSA = core-based statistical area; CCW = Chronic Conditions Data Warehouse; CKCC = Comprehensive Kidney Care Contracting; ESRD = end-stage renal disease; KCE = Kidney Contracting Entity; KCF = Kidney Care First; MBSF = Master Beneficiary Summary Files; MDD = Master Data Management Eligibility Data; MD-PPAS = Medicare Data on Provider Practice and Specialty; NPI = National Provider Identifier; PY = performance year; Q = quarter; SDOH = social determinants of health.

2.3.2. What Were the Characteristics of the Markets in Which KCC Providers Participated?

Our assessment of market (that is, CBSA-level) characteristics included provider type and specialty, patient and market demographics, and SDOH for KCF Practices, practices in KCEs, and non-participants (see **Exhibit 12**). Practices in KCEs had more dialysis facilities in their market on average (20) than non-participants (19) and KCF Practices (15). Within the CKCC options, practices in Graduated Level 1 KCEs provided services in markets with the highest average number of dialysis facilities (36), followed by practices in Graduated Level 2 KCEs (29) and practices in Global KCEs (23), while practices in Professional KCEs had the fewest (18). Practices in KCEs operated in markets with the highest number of short-term acute care hospitals (3) and the lowest number of long-term acute care hospitals (1). The number of transplant hospitals in the market ranged from an average of three for KCF Practices to five for practices in Graduated Level 1 KCEs. Likewise, the number of nephrology practices in the market ranged from 55 for KCF Practices to 136 for practices in Graduated Level 1 KCEs. The number of specialists in the market also varied across model participants and non-participants, but they are quite similar in terms of the characteristics of the patient population in the market such as the proportion of patients enrolled in Medicare Advantage plans.[14]

Practices in KCEs tended to be in markets with larger populations, and those in Graduated Level 1 or 2 were also in more densely populated markets with older residents relative to the other options and non-participants. Practices in Global KCEs were in markets with lower proportions of individuals who are non-Hispanic white (38%) and Black or African American (9%) and higher proportions of individuals who are Hispanic (33%) and Asian or Pacific Islander (16%). Practices in Global KCEs were also located in markets with the highest median income. KCF Practices, practices in KCEs, and non-participants had similar rates of other economic and educational SDOH measures.

In future years, we may further examine characteristics associated with the different levels of risk under the model.

[14] Since 2021, Medicare patients with ESRD have been allowed to enroll in MA plans due to the 21st Century Cures Act. If participants and non-participants come for markets with important differences in the share of ESRD patients in MA, that may reflect differences in the underlying FFS population in those markets—for instance, if patients with ESRD who decide to enroll in MA differ from those with Medicare FFS coverage. We will continue to monitor the balance in patient composition in the market.

Exhibit 12. Health Care Market Characteristics by Model Option in 2019

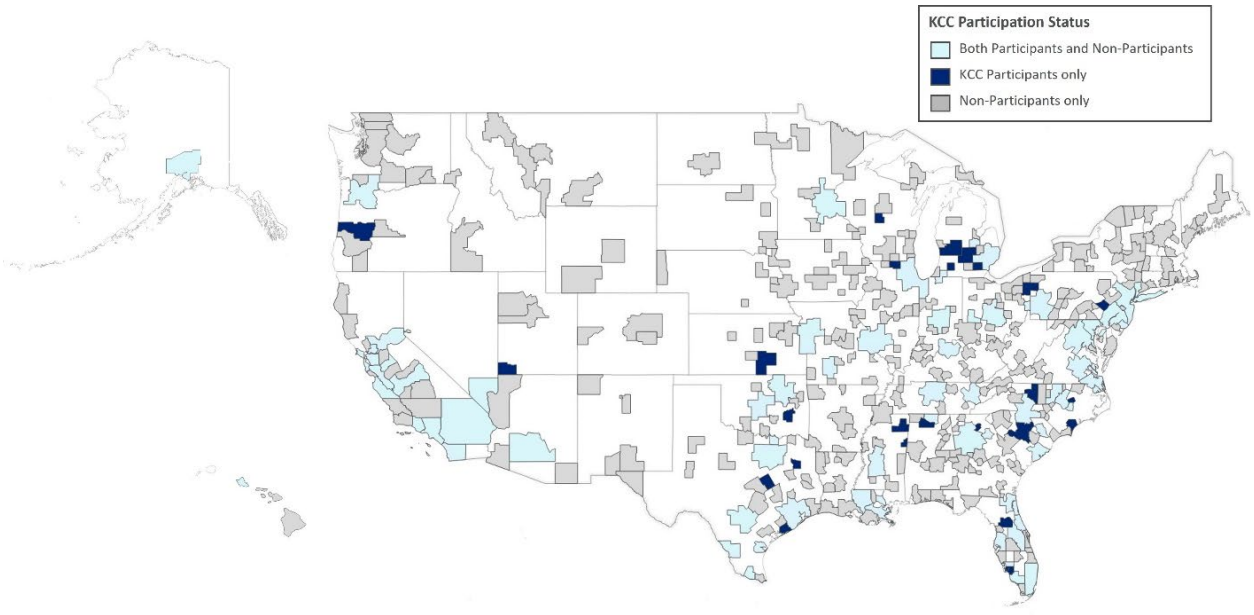
Variable		KCF	CKCC	CKCC: Graduated Level 1	CKCC: Graduated Level 2	CKCC: Professional	CKCC: Global	Non-participants
		Mean (n=30)	Mean (n=227)	Mean (n=15)	Mean (n=24)	Mean (n=164)	Mean (n=24)	Mean (n=2,428)
Health Care Market	Dialysis Facilities	15.2	20.6	35.6	29.0	17.6	23.3	18.8
	Short-Term Acute Care Hospitals	2.2	3.4	3.4	2.9	3.1	5.5	3.0
	Long-Term Acute Care Hospitals	1.0	0.8	1.7	1.3	0.7	0.3	0.8
	Transplant Hospitals	2.5	3.4	5.4	4.5	3.0	3.7	3.1
	Nephrology Practices	54.8	74.4	135.5	93.7	64.5	84.3	70.3
	Medicare Providers	15,669.6	21,522.0	37,937.4	28,063.1	18,835.2	23,081.0	19,860.4
Specialists in the Market	Transplant Surgeons	3.3	5.4	10.0	8.0	4.7	4.8	5.0
	Nephrologists	130.8	194.2	327.1	241.3	169.4	233.4	176.0
	Internists	1,349.5	1,796.7	3,131.0	2,331.3	1,535.3	2,214.1	1,661.1
	Nurse Practitioners	1,540.6	1,917.6	3,098.3	2,536.4	1,741.6	1,764.0	1,779.2
Patients in the Market	Dually Eligible (full or partial benefits)	19.2%	18.7%	15.5%	18.3%	18.0%	26.0%	18.3%
	Patients with ESRD	1.1%	1.3%	1.2%	1.1%	1.3%	1.4%	1.2%
	Female Patients	53.2%	53.4%	54.0%	54.0%	53.3%	53.1%	53.2%
	Medicare Advantage	39.1%	39.0%	39.0%	42.4%	37.8%	43.8%	38.3%
Market Demographics and SDOH	Total Population	4,058,368	5,716,576	8,692,125	6,648,948	5,026,879	7,637,412	5,149,502
	Population Density	1,990.1	3,360.3	7,494.1	5,215.5	2,860.5	2,336.7	3,162.6
	Median Years of Age	37.9	36.7	38.4	38.8	36.4	35.2	37.2
	Non-Hispanic White	53.2%	51.2%	59.0%	59.7%	51.1%	38.1%	56.1%
	Black or African American	14.5%	15.0%	18.2%	15.7%	15.5%	8.6%	14.0%
	Hispanic	23.1%	21.5%	12.8%	12.7%	21.9%	32.5%	18.8%
	Asian or Pacific Islander	5.4%	8.2%	6.8%	8.6%	7.2%	16.2%	7.0%
	Other Race	3.8%	4.1%	3.2%	3.4%	4.2%	4.6%	4.0%

Variable		KCF	CKCC	CKCC: Graduated Level 1	CKCC: Graduated Level 2	CKCC: Professional	CKCC: Global	Non-participants
		Mean (n=30)	Mean (n=227)	Mean (n=15)	Mean (n=24)	Mean (n=164)	Mean (n=24)	Mean (n=2,428)
Economic SDOH	Median Income	$65,432	$71,504	$69,729	$75,258	$69,310	$83,849	$69,039
	Unemployment Rate	3.7%	3.8%	3.6%	3.6%	3.9%	4.0%	3.8%
	Poverty Rate	13.0%	12.1%	12.1%	11.0%	12.4%	11.1%	12.5%
Educational SDOH	Less Than High School Diploma	9.2%	9.2%	9.0%	7.9%	9.1%	11.0%	9.1%
	High School Diploma or More	56.3%	55.1%	58.3%	59.4%	54.4%	53.2%	55.9%
	Four or More Years of College	19.2%	20.3%	21.8%	22.7%	19.7%	21.7%	19.7%

Notes: Data on practices in KCEs and KCF Practices were based on the Q2 PY 2022 participation lists of aligning providers. Participation data were combined with data from the CCW MD-PPAS, Innovation Center model participation information for the practice and associated NPIs from the CCW MDD, and market (CBSA)-level characteristics based on the HRSA AHRF and the CCW MBSF. The numerator for educational SDOH statistics is based on people 25 years of age or older, whereas the denominator is based on total population. AHRF = Area Health Resources Files; CBSA = core-based statistical area; CCW = Chronic Conditions Data Warehouse; CKCC = Comprehensive Kidney Care Contracting; HRSA = Health Resources and Services Administration; KCE = Kidney Contracting Entity; KCF = Kidney Care First; MBSF = Master Beneficiary Summary Files; MDD = Master Data Management Eligibility Data; MD-PPAS = Medicare Data on Provider Practice and Specialty; NPI = National Provider Identifier; PY = performance year; Q = quarter; SDOH = social determinants of health.

In **Exhibit 13**, we show the CBSAs that include only KCC Model Participants, those that include only non-participants, and those with both. Although a small number of CBSAs had only participants, many CBSAs had both participants and non-participants. Non-participants were geographically more dispersed and more highly represented in the Midwest and West. KCF Practices and practices in KCEs provided nephrology services to patients living in 761 out of 939 CBSAs as of PY 2022.

Exhibit 13. Location of CBSAs with Participant and Non-participant Overlap



Notes: Data on practices in KCEs and KCF Practices were based on the Q2 PY 2022 participation list of aligning providers. Physician ZIP from CKD and ESRD claims submitted by aligning providers was used to identify a practice's primary OMB CBSA (practices often have more than one location). CBSA = core-based statistical area; CKD = chronic kidney disease; ESRD = end-stage renal disease; KCE = Kidney Contracting Entity; KCF = Kidney Care First; OMB = Office of Management and Budget; PY = performance year; Q = quarter.

2.4. Discussion

Unlike the mandatory, randomized participation in the ETC Model, the KCC Model relies on voluntary participation. Therefore, it is crucial to understand the characteristics of participating providers (and their markets) as well as patients aligned to the model to minimize bias in the evaluation. Understanding participant mix is necessary to:

- Design a valid evaluation strategy (for instance, Which characteristics should be adjusted for or matched in quantitative analyses?)
- Interpret results (for example, How concerned should we be about selection bias?)
- Evaluate equity concerns (for example, If the models prove to have a positive influence on patient care, does the pattern of participation suggest that certain groups of patients are less likely to access those improvements?)
- Assess model scalability and barriers to scalability (for instance, If small, rural providers did not voluntarily participate, would the model results apply to them if they were required to join, and should resources be targeted to them to help them participate successfully?)

This assessment of participants in the model's first cohort allows us to begin to understand these issues. For many of the characteristics evaluated, differences between KCF Practices, practices in KCEs, and non-participants were modest. However, several potentially consequential differences did emerge.

First, we identified structural differences that may affect the model's scalability. Model participants—even in the KCF option, which was intended to be more accessible to individual practices—were notably larger than non-participants. Model participants also operated in areas with larger and denser populations. As such, there may be limits the model's scalability, and potential improvements in care delivery driven by the model may be less accessible for patients in rural and less densely populated areas.

Second, KCC Model participation was positively associated with prior CEC Model participation and with physician-level participation in the ETC Model. Thus, KCC may be less scalable to participants without model experience. This finding also suggests a robust evaluation strategy is needed to minimize the potential for selection bias in the findings (for instance, DiD satisfying parallel trends assumptions; effective matching of participating providers).

Third, sociodemographic factors such as ADI scores and percentage of Black or African American patients and non-Hispanic white patients varied modestly across most model participant groups and non-participants; however, ADI and the percentage of Black or African American patients were both notably lower in areas where CKCC Global participants operated. This discrepancy may simply reflect the relatively small number of CKCC Global practices (n=24), but the differences were large enough to warrant monitoring. If the outcomes ultimately associated with that option differ from those of other model options, we will need to consider how this variation affects access to benefits of the model.

3. What Were the Impacts of the KCC Model?

A core component of the KCC evaluation is assessing changes in health care use, cost, and quality to determine whether the model is achieving its intended impacts. We use Medicare claims and other data sources to understand shifts that may be occurring due to the model's incentives, comparing measures from the pre-KCC period and the KCC intervention period for model participants relative to a matched comparison group. In this section, we present quantitative findings of the preliminary impacts of the KCC Model in its first performance year, illustrating results for nearly 50 measures related to dialysis modality, transplantation, QoC, utilization, and Medicare payments.

3.1. Key Findings

The KCC Model had several early impacts in PY 2022. Key findings are summarized in **Exhibit 14**. The KCC Model increased the use of PD, the predominant home dialysis modality. Home dialysis training, a key step to dialyzing at home, increased for the CKCC group. The CKCC option also increased the rate of kidney transplant waitlisting. Neither the KCF nor the CKCC options affected kidney transplants in the first model year. In addition, the KCC Model did not affect the use of acute care hospitalization services, total Medicare payments, or net Medicare savings or losses. Changes in dialysis payments corresponded to changes in modality. For example, PD payments increased in the KCF option relative to the comparison group. Finally, the CKCC option increased Optimal ESRD Starts, a KCC quality measure tied to payments.

Exhibit 14. KCC Model Impacts

Dialysis Care	Peritoneal dialysis, the predominant form of home dialysis, increased by 26% for KCF and 8% for CKCC relative to the comparison groups in the first year of the model. Home dialysis training increased 32% for CKCC. In-center dialysis decreased 4% for KCF.
Transplantation	Kidney transplant waitlisting increased by 11% for CKCC relative to the comparison group, driven by an increase in the active status waitlisting. There was no impact on kidney transplants overall for either model option or for living or deceased donor or preemptive transplants.
Utilization & Cost	There were no impacts on hospitalizations, ED visits, or readmissions for KCF or CKCC. The KCC Model did not impact Total Medicare Parts A & B payments. It also did not result in net savings or losses to Medicare. KCF peritoneal dialysis PPPM payments increased 23% relative to the comparison group. Total dialysis payments for CKCC increased modestly by 1%.
Quality of Care	Optimal ESRD Starts increased 16% for CKCC but were unchanged for KCF. KCF decreased AV fistula use by 9% and increased AV graft use by 20% relative to the comparison group. KCC had no impact on complication-related hospitalizations for patients with CKD or ESRD.

Notes: AV = arteriovenous; CKCC = Comprehensive Kidney Care Contracting; CKD = chronic kidney disease; ED = emergency department; ESRD = end-stage renal disease; KCF = Kidney Care First; PPPM = per patient per month.

3.2. Methods

Our mixed-methods evaluation examined a variety of outcomes that participation in the KCC Model could influence. The selection of outcomes was driven by the logic model (see **Exhibit 3**), developed to describe potential pathways of effects. Themes developed in the 2 days of discussions with the PAG further informed the selection of outcomes and interpretation of results. The PAG comprised a total of 15 patients. The panel included people with either CKD (not on dialysis) or ESRD (on dialysis or with a kidney transplant). We selected participants based on their experience with kidney disease care and engagement in patient advocacy activities. Four key themes emerged from the PAG discussions, as outlined in the box to the right. Each of these themes relates to one of more of the measured outcomes we describe in this section. See **Appendix A** for a description of the PAG methods.

Key Themes from the PAG Discussion:

1. *Insufficient kidney disease education*
2. *Gaps in modality education and selection*
3. *Need for improved access to transplants*
4. *Recognition of care partner burden*

Our evaluation used a difference-in-differences (DiD) approach to estimate impacts of the KCC Model on key outcomes, listed in **Exhibit 15**, relative to the comparison groups. DiD is a statistical method that quantifies the impact of the model by comparing changes in risk-adjusted outcomes for KCC patients with changes in outcomes for similar patients in the comparison group, before and after KCC implementation. This approach controls for patient-, practice-, and market-level differences between the KCC and comparison populations. It also minimizes biases from time-invariant differences between the KCC and comparison populations and controls for secular trends that are common to both the treatment and comparison groups. We constructed separate comparison groups for KCF and CKCC Participants and estimated separate DiD regressions. The comparison groups consisted of patients from non-participating practices matched to CKCC or KCF participating practices based on key market and practice characteristics, including sociodemographic and clinical composition of the patients they served. For primary outcome measures, to obtain an overall estimate of the impact of the KCC Model, we took a post-estimation weighted average of the KCF and CKCC DiD estimates.

The DiD analyses used Medicare Parts A & B enrollment and claims data from January 2017 to December 2022, in combination with other program, provider, and market data sources.[15,16] We divided the period of analysis into pre-KCC, transition, and intervention periods. The pre-KCC period for participants that joined KCC in January 2022 was January 2017 through December 2019. The pre-KCC period was followed by a 2-year transition period from January 2020 through December 2021 to (1) account for the delayed start of the model and (2) prevent changes in health

[15] Transplant measures are based on waitlisting and transplant data from 2017–2022 files. See **Appendix B** for a description of the SRTR Data.

[16] The data reported here have been supplied by the Hennepin Healthcare Research Institute (HHRI) as the contractor for the Scientific Registry of Transplant Recipients (SRTR). 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 of or interpretation by the SRTR or the U.S. Government. The SRTR data system includes data on all donor, wait-listed candidates, and transplant recipients in the US, submitted by the members of the Organ Procurement and Transplantation Network (OPTN). The Health Resources and Services Administration (HRSA), U.S. Department of Health and Human Services provides oversight to the activities of the OPTN and SRTR contractors. This evaluation was submitted to a functioning institutional review board (IRB) and determined IRB exempt.

care utilization and spending due to the Coronavirus disease 2019 Public Health Emergency from affecting baseline values. We describe the DiD methodology, including data sources, outcome definitions, methods for identifying comparison populations and any applied exclusion criteria, and statistical models, in **Appendix B**. We discuss the evaluation's statistical power to detect impacts in **Appendix C**.

DiD impact estimates are reported as the change in the value of the outcome measure among KCC patients relative to the comparison group and in terms of the relative percent change of the outcome measures compared with their pre-KCC period averages. We estimated linear regression models using ordinary least squares for most outcomes. For a subset of payment outcomes with a large proportion of zero payments, we estimated two-part models (see **Appendix B**). For most utilization and QoC outcomes, we measured the KCC impact as the change in the percentage of patients using a service or treatment in a given month. For two utilization outcomes, outpatient dialysis sessions and CKD QCP list services, we assessed differential changes in the number of services per month. For transplant outcomes, we measured the change in the probability of a transplant per 1,000 patient-months.

We report the statistical significance of all results. Detailed results are in **Appendix B, Exhibits B-17 – B-19**. KCC focuses on improving QoC and health outcomes in addition to reducing unnecessary health care utilization and payments through the coordination of care. The model encourages participants to implement patient-centered care redesign approaches that promote comprehensive and coordinated care delivery and improved access to services, such as Kidney Disease Patient Education Services, kidney transplantation, skilled nursing facility and hospice care, and telehealth services.

In this report, we present our DiD analysis of 49 measures of utilization, Medicare costs, and quality, as shown in **Exhibit 15**. Utilization measures include a range of measures of dialysis modality as well as hospitalizations, readmissions, and ED visits. Measures of cost include Total Medicare Parts A & B payments and payments for several key Medicare Parts A & B services, including dialysis. In addition, we examined Part D costs. QoC measures include metrics most relevant to patients with CKD, patients with ESRD, or patients with CKD or ESRD along with waitlisting and transplant measures. We also conducted DiD analyses of patient experience of care among in-center dialysis patients as measured by the ICH CAHPS Survey (see **Section 4**).

Exhibit 15. KCC Model Evaluation DiD Measures

Domain	Evaluation Measure

Utilization	**Dialysis Modality Measures**
	▪ Number of outpatient dialysis sessions in a given month
	▪ Percentage of patients receiving home dialysis in a given month
	  • Percentage of patients receiving home hemodialysis (HD) in a given month
	  • Percentage of patients receiving home peritoneal dialysis (PD) in a given month
	▪ Percentage of patients receiving in-center HD in a given month
	▪ Percentage of patients receiving nursing facility dialysis in a given month
	▪ Percentage of patients receiving home dialysis training in a given month

	Hospitalization Measures
	▪ Percentage of patients with at least one acute care hospitalization in a given month
	  • Percentage of patients with at least one readmission in a given month
	▪ Percentage of patients with at least one emergency department (ED) visit in a given month
	  • Percentage of patients with at least one ED visit without hospitalization in a given month

Domain	Evaluation Measure
Cost per Patient per Month (PPPM)	▪ Total Medicare Parts A & B (excluding payments for all services included in the CKD Quarterly Capitated Payment [QCP]) ▪ Total Medicare Part A • Acute care hospitalization – Readmission • Institutional post-acute care (PAC) • Home health ▪ Total Medicare Part B • Hospital outpatient • Evaluation and management • CKD QCP services* ▪ Total dialysis • Home dialysis – Home HD – Home PD ▪ Part D Drug
Quality of Care	**CKD Measures** ▪ Optimal ESRD Starts, Consensus-Based Entity #2594 ▪ Cardiovascular medication (statin) use ▪ Hypertension medication use ▪ Diabetes medication (SGLT2) use ▪ Diabetes medication (Metformin) use ▪ CKD progression medication use ▪ Testing/labs ▪ CKD QCP list services
	ESRD Measures ▪ Percentage of patients with ESRD who started dialysis without prior nephrology care ▪ Percentage of patients with at least one hospitalization for vascular access complications in a given month ▪ Percentage of patients with at least one hospitalization for ESRD complications (that is, volume depletion, hyperpotassemia, fluid overload, heart failure, and pulmonary edema) in a given month ▪ Arteriovenous (AV) fistula use: percentage of adult patients in a given month who had a fistula ▪ AV graft use: percentage of adult patients in a given month who had an AV graft
	CKD and ESRD Measures ▪ Phosphate binder adherence ▪ Percentage of patients with an ED encounter or hospital admission for hyperkalemia ▪ Percentage of patients with an ED encounter or hospital admission for fluid overload
	Transplantation Measures ▪ Percentage of patients on the transplant waitlist • Percentage of patients on the transplant waitlist with active status • Percentage of patients on the transplant waitlist with inactive status ▪ Transplants • Deceased donor transplants • Living donor transplants ▪ Preemptive transplants

Notes: All measures were analyzed at the patient-month level except for the glomerular filtration rate (GFR) testing measure, which was analyzed at the quarterly level. Medicare payments were standardized to remove the effects of Medicare's geographic wage, teaching, and other payment adjustments. *Not included in Total Parts A & B or Total B.

We present estimates for the two KCC Model options. The statistical power to detect impacts varied by model option and outcome (see **Appendix C**). The number of participants and patients provides reasonable confidence that the analysis would detect modest impacts on Medicare service use and costs for all patients. For example, the analyses were sufficiently powered to detect a 10% difference in total Medicare payments for the KCF group and a 4% difference for the CKCC group in PY 2022. Due to the difference in the number of participants, the analysis could detect more modest impacts for CKCC than for KCF.

3.3. Results

The final sample for the entire study period consisted of 293,491 KCC patients (269,911 in CKCC and 23,580 in KCF) and 138,264 comparison patients (120,267 comparison CKCC patients and 17,997 comparison KCF patients). The analytic samples included all the eligible and aligned monthly patient observations between January 2017 and December 2022. Across KCC Participants and the comparison group, patients were similar in terms of demographic and clinical characteristics. Both KCC and comparison populations were around 46% female and averaged around 70 years of age. Compared with KCF Participants, KCF comparison patients were more likely to be non-Hispanic white (56% and 62%). Compared with CKCC Participants, CKCC comparison patients were less likely to be non-Hispanic white (55% and 51%) (see **Appendix B, Exhibits B-11** and **B-12**).

The proportion of patients first aligned with CKD was higher than the proportion first aligned with ESRD for both KCF and CKCC (56% and 55% patients with CKD, respectively) and the comparison groups (59% and 53% patients with CKD, respectively). Less than 1% of patients were aligned as transplant recipients in both KCF and CKCC as well as in the comparison groups.[17] Higher proportions of CKCC patients were aligned to a practice located in ETC Hospital Referral Regions (HRRs) (43%) than in the comparison group (26%). The opposite was true for KCF patients; a lower proportion of KCF patients were aligned to a practice located in an ETC HRR (17%) than patients in the matched KCF comparison group (35%). Higher proportions of both KCF and CKCC patients (28% and 50% for KCF and CKCC, respectively) were aligned through a provider that previously participated in CEC than patients in the comparison groups (7% and 6% for the KCF comparison group and the CKCC comparison group, respectively).

3.3.1. What Was the Impact of the KCC Model on Utilization and Cost?

Below we describe results from analyses of the KCC Model's impact on health care utilization and cost. Evaluating the impact of the KCC Model on patient utilization of dialysis modalities and hospital services provides insights into how the model incentivizes care and coordination across practices and providers.

3.3.1.1. What Were the Impacts on Dialysis Utilization and Modality?

Dialysis utilization. Outpatient dialysis sessions are routine, non-emergency dialysis sessions for patients with ESRD that take place in a dialysis center. We expect the KCC Model to improve

[17] *Aligned* refers to the evaluation team's simulated alignment. We consider both the status at a patient's first alignment month during the analysis period as well as the patient's time-varying alignment.

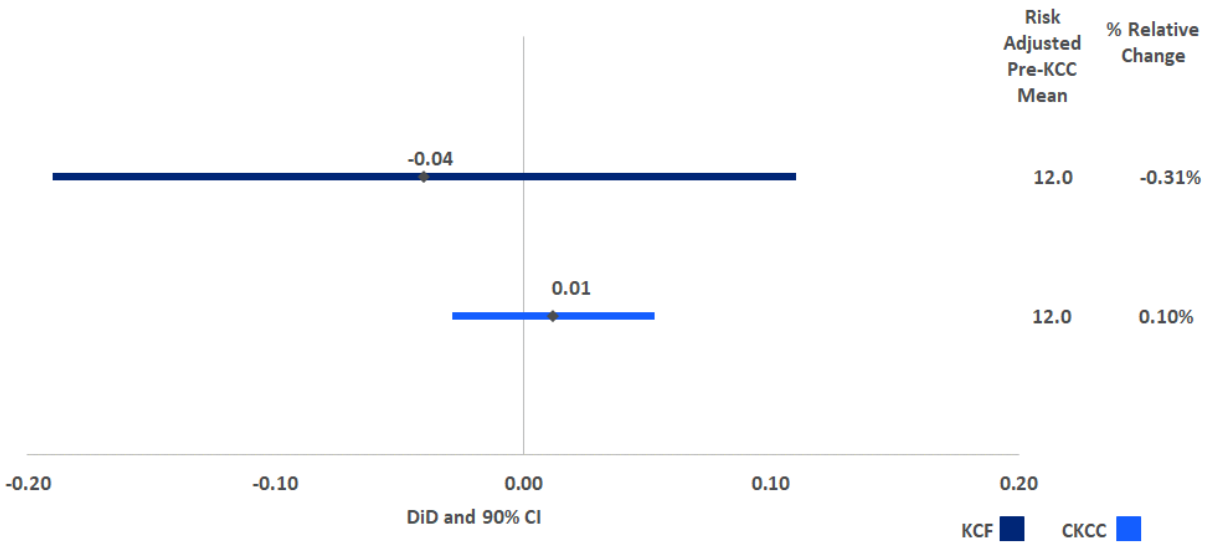
dialysis adherence, so we anticipate increases in the number of outpatient dialysis sessions per month for patients with ESRD aligned to the model.

Potential Impacts | The KCC Model could increase the number of outpatient dialysis sessions per month by improving care management and, in turn, adherence to dialysis.

Findings | There were no early impacts of the KCC Model on the number of outpatient dialysis sessions per month.

Overall, the KCC Model did not have a statistically significant impact on the number of outpatient dialysis sessions per month for patients with ESRD. The number of outpatient dialysis sessions remained relatively stable between the KCF and CKCC groups and the comparison groups (see **Appendix B, Exhibits B-18** and **B-19**). The KCF option led to a relative decrease of 0.04 outpatient dialysis sessions per month (see **Exhibit 16**). The CKCC option led to a relative increase of 0.01 outpatient dialysis sessions per month. Both the KCF and CKCC estimated impacts are modest, less than one-half of a percent of the pre-KCC means, and not statistically significant.

Exhibit 16. Impact of KCF and CKCC on the Number of Outpatient Dialysis Sessions



Notes: Denominator includes patients with ESRD. Pre-KCC period is January 2017–December 2019. KCF and CKCC impact estimates were obtained from separate DiD regression models with separate comparison groups. The DiD impact estimate reflects the difference in the risk-adjusted mean outcome for patients in the KCF or CKCC group in PY 2022 with the pre-KCC period relative to the same difference over time for patients in the comparison group. Bars represent the 90% CI. The percent relative change is the proportion of the estimated DiD impact estimate relative to the KCF or CKCC group risk-adjusted pre-KCC mean. Significance of the DiD impact estimate is indicated next to each estimate, where * implies significance at the 10% level, ** at the 5% level, and *** at the 1% level assuming a two-tailed test. † indicates that statistical trends tests detected differential trends between the KCC Model option and comparison groups during the pre-KCC period. CI = confidence interval; CKCC = Comprehensive Kidney Care Contracting; DiD = difference-in-differences; KCF = Kidney Care First; PY = performance year.

Dialysis modality. One theme of the PAG discussions was the gaps in dialysis modality education and selection for patients with kidney disease. A key model goal that relates to this theme is to increase the rate of home dialysis among patients with ESRD. We examined whether the use of home dialysis and in-center dialysis changed under the model. Based on the model's incentives, we expect home dialysis use to increase among patients aligned to the KCC Model and use of in-center HD to decrease. Additionally, a key step for patients with ESRD to dialyze at home is the receipt of home dialysis training. We also expect the KCC Model to increase the receipt of home dialysis training. In **Exhibit 17**, we present KCF and CKCC impact estimates on dialysis modality and home dialysis training for patients with ESRD.

> *"No one ever mentioned anything about options. The few times I saw a nephrologist each time … you know, they sent me to their [in-center] dialysis clinic."*
>
> *– Patient Advisory Group Participant*

Potential Impacts | By providing incentives for home dialysis, the KCC Model could increase the use of home dialysis and home dialysis training and decrease the use of in-center dialysis.

Findings | In aggregate, the KCC Model increased the use of home dialysis. The CKCC option increased home dialysis training, and the KCF option decreased the use of in-center dialysis.

Overall, rates of home dialysis increased over the study period for both the KCC groups and the comparison groups. However, the KCC Model increased the proportion of patients with ESRD dialyzing at home across both model options more than the comparison groups. KCF increased the proportion of patients receiving home dialysis in a given month by 2.1 percentage points ($p \leq 0.05$). This statistically significant relative increase amounts to 20% of the pre-KCC mean. CKCC increased the proportion of patients receiving home dialysis in a given month by 0.76 percentage points. This relative increase amounts to 7% of the pre-KCC mean and is not statistically significant. In aggregate, the KCC Model led to a statistically significant increase in home dialysis utilization of 0.88 percentage points ($p \leq 0.05$) (see **Appendix B, Exhibit B-17**).[18]

Most home dialysis patients dialyze via PD rather than HD. We expect the KCC Model to affect home dialysis primarily through PD, as the dominant home dialysis modality. Rates of PD utilization increased for patients with ESRD in the KCC groups and the comparison groups over time (see **Appendix B, Exhibits B-18** and **B-19**). Overall, the KCC Model increased PD utilization relative to the comparison groups. KCF increased the proportion of patients receiving PD in a given month by 2.3 percentage points ($p \leq 0.05$). This statistically significant relative increase represents about 26% of the pre-KCC mean. CKCC increased the proportion of patients receiving PD in a given month by 0.74 percentage points ($p \leq 0.10$). This statistically significant relative increase represents about 8% of the pre-KCC mean.

Across both options, the KCC Model did not affect home HD utilization (see **Exhibit 17**) relative to the comparison groups. The proportion of patients with ESRD receiving home HD in a given

[18] Aggregate KCC Model estimates were calculated as a post-estimation weighted average of the individual KCF and CKCC option impact estimates. See **Appendix B** for more details.

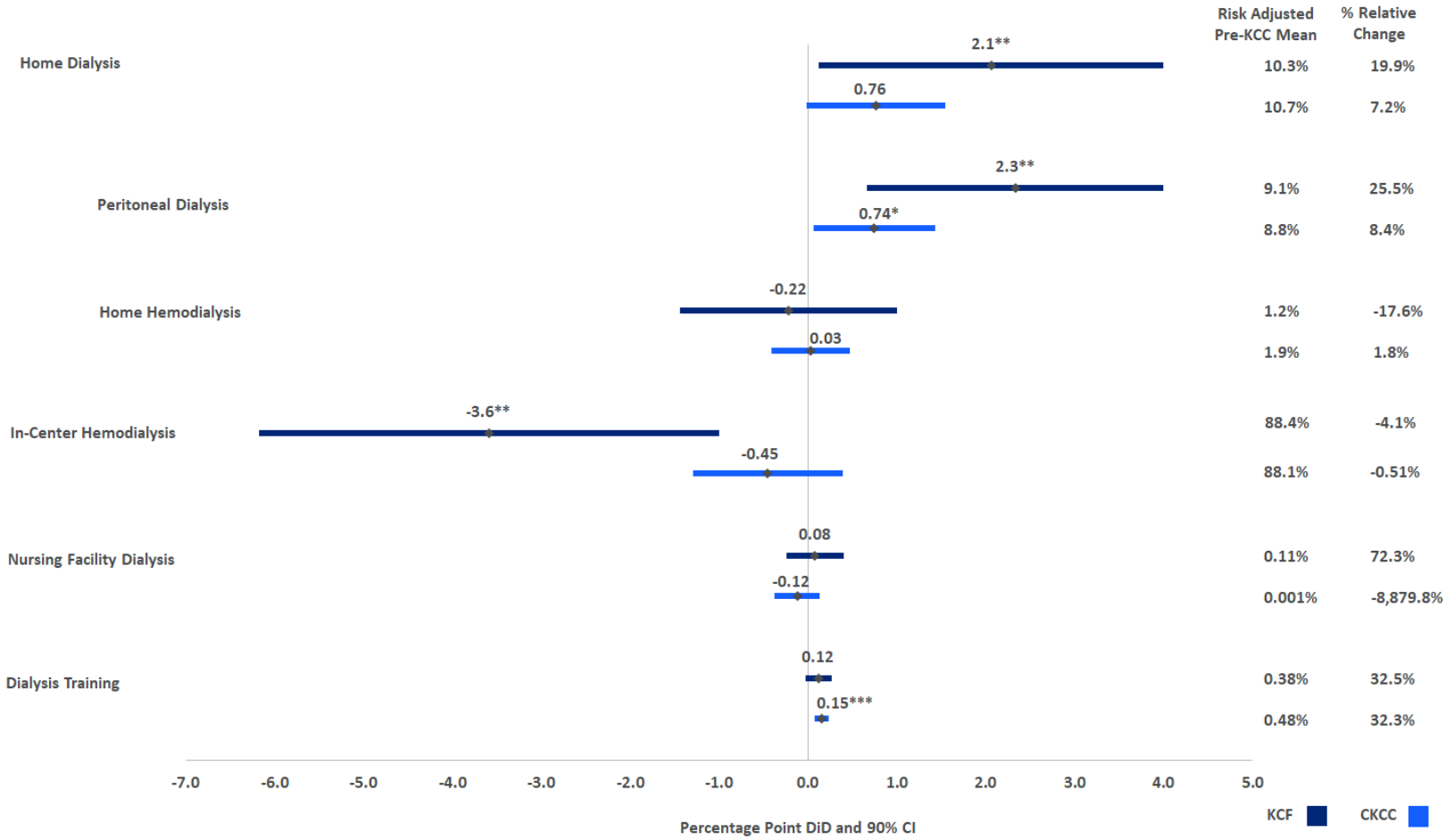
month increased in both the KCC options and the comparison groups (see **Appendix B**, **Exhibits B-18** and **B-19**). The rate of home HD increased slightly more over time for patients in the KCF comparison group than patients in the KCF group, resulting in a decrease of 0.22 percentage points in the likelihood of receiving home HD in a given month for patients in the KCF group. This relative reduction represents about 18% of the pre-KCC mean and is not statistically significant. The CKCC option increased the likelihood of home HD by 0.03 percentage points. This relative increase represents less than 2% of the pre-KCC mean and is not statistically significant.

The proportion of patients with ESRD with in-center HD decreased for the KCC groups and the comparison groups between the pre-KCC period and PY 2022 (see **Appendix B, Exhibits B-18** and **B-19**). The KCF option decreased the proportion of patients with in-center HD in a given month by 3.6 percentage points ($p \leq 0.05$). This statistically significant relative reduction represents about 4% of the pre-KCC mean. The CKCC option decreased the proportion of patients with in-center HD in a given month by 0.45 percentage points. This relative reduction represents about 0.5% of the pre-KCC mean and is not statistically significant. In aggregate, these impacts amounted to a non-statistically significant decrease in the proportion of KCC patients receiving in-center HD by 0.73 percentage points (see **Appendix B**, **Exhibit B-17)**.

Across both model options and their comparison groups, utilization of nursing facility dialysis was low. The KCC Model did not have a statistically significant impact on the proportion of patients receiving nursing facility dialysis in a given month in either option relative to the comparison groups.

Home dialysis training is necessary for patients to be able to dialyze in their homes. To achieve the goal of increased home dialysis among patients with ESRD, we expect the KCC Model to also increase the proportion of patients receiving home dialysis training. Although, on average, less than 1% of patients with ESRD received home dialysis training in a given month, rates of home dialysis training increased over time across all groups (see **Appendix B**, **Exhibits B-18** and **B-19**). KCF increased the proportion of patients who received dialysis training in a given month by 0.12 percentage points. This relative increase represents about 33% of the pre-KCC mean and is not statistically significant. CKCC increased the proportion of patients who received dialysis training in a given month by 0.15 percentage points ($p \leq 0.01$). This statistically significant relative increase represents about 32% of the pre-KCC mean.

Exhibit 17. Impact of KCF and CKCC on Dialysis Utilization and Modality



Notes: Denominator includes patients with ESRD. Pre-KCC period is January 2017–December 2019. KCF and CKCC impact estimates were obtained from separate DiD regression models with separate comparison groups. The DiD impact estimate reflects the difference in the risk-adjusted mean outcome for patients in the KCF or CKCC group in PY 2022 with the pre-KCC period relative to the same difference over time for patients in the comparison group. Bars represent the 90% CI. The percent relative change is the proportion of the estimated DiD impact estimate relative to the KCF or CKCC group risk-adjusted pre-KCC mean. Significance of the DiD impact estimate is indicated next to each estimate, where * implies significance at the 10% level, ** at the 5% level, and *** at the 1% level assuming a two-tailed test. † indicates that statistical trends tests detected differential trends between the KCC Model option and comparison groups during the pre-KCC period. Home dialysis includes PD and home HD modalities.
CI = confidence interval; CKCC = Comprehensive Kidney Care Contracting; DiD = difference-in-differences; HD = hemodialysis; KCF = Kidney Care First; PD = peritoneal dialysis; PY = performance year.

3.3.1.2. What Were the Impacts on Hospitalizations?

Hospitalizations, readmissions, and ED visits are common among patients with kidney disease. By improving care coordination and care management, we expect the KCC Model to lead to decreases in acute care hospitalizations, hospital readmissions, and ED visits. Impacts of the KCF and CKCC options on hospital utilization measures are shown in **Exhibit 18**.

Potential Impacts | The KCC Model could reduce the share of patients with acute care hospitalizations, hospital readmissions, and ED visits through better care management.

Findings | There were no early impacts of the KCC Model on acute care hospitalizations, hospital readmissions, and ED visits.

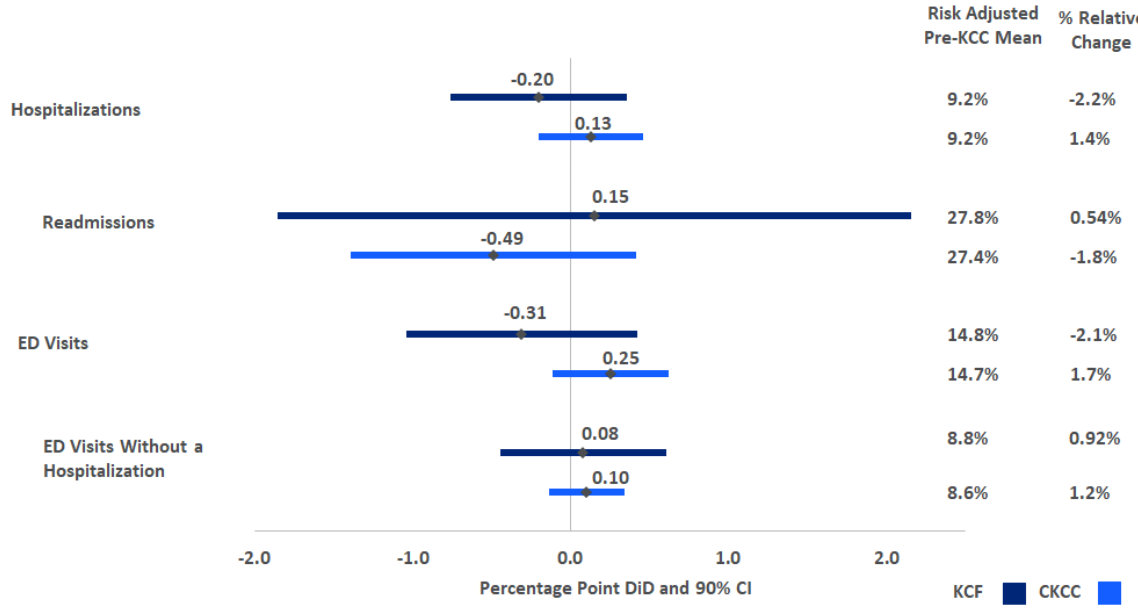
Acute care hospitalizations. Overall, the KCC Model did not affect the proportion of patients with an acute care hospitalization in a given month. The hospitalization rate decreased over time for patients in both the CKCC and KCF options and their comparison groups, for which there was no relative difference. KCF decreased the proportion of patients with a hospitalization by about 2% of the pre-KCC mean, and this impact was not statistically significant. CKCC increased the proportion of patients with a hospitalization by less than 2% of the pre-KCC mean, and this impact was not statistically significant. In aggregate, the KCC Model did not have an impact on the hospitalization rate (see **Appendix B, Exhibit B-17**).

Hospital readmissions. Across both model options, the KCC Model did not have a statistically significant impact on the proportion of patients with a hospital readmission relative to the comparison groups. The estimated aggregate impact was a reduction of 0.42 percentage points and was not statistically significant (see **Appendix B, Exhibit B-17**).

Emergency department visits. The KCC Model also did not affect the likelihood of an ED visit in either the KCF or the CKCC options. In aggregate, the KCC Model led to a non-statistically significant increase in the proportion of patients with an ED visit with or without hospitalization in a given month by 0.20 percentage points. We also analyzed the impact of the KCC Model on the proportion of patients with an ED visit that did not lead to a hospitalization in a given month. Overall, the KCC Model did not affect the proportion of patients with an ED visit without hospitalization (see **Appendix B, Exhibit B-17**). While not statistically significant in our main specification, the CKCC impact estimate was sensitive to the inclusion of large participating practices for which it was difficult to find comparable comparison matches.[19] We will continue to monitor this potential unintended consequence and seek to understand which patients or practices the model is affecting in future annual evaluation reports.

[19] After excluding CKCC practices (and their matched comparators) that were larger in terms of number of aligned patient-months in 2019 than the largest comparison practice, the CKCC option impact on the percentage of patients with an outpatient ED visit in a given month was a statistically significant increase of 0.32 percentage points relative the comparison group. See **Appendix B** for more details.

Exhibit 18. Impact of KCF and CKCC on Utilization



Notes: Denominator includes patients with CKD, ESRD, or transplant. Pre-KCC period is January 2017–December 2019. KCF and CKCC impact estimates were obtained from separate DiD regression models with separate comparison groups. The DiD impact estimate reflects the difference in the risk-adjusted mean outcome for patients in the KCF or CKCC group in PY 2022 with the pre-KCC period relative to the same difference over time for patients in the comparison group. Bars represent the 90% CI. The percent relative change is the proportion of the estimated DiD impact estimate relative to the KCF or CKCC group risk-adjusted pre-KCC mean. Significance of the DiD impact estimate is indicated next to each estimate, where * implies significance at the 10% level, ** at the 5% level, and *** at the 1% level assuming a two-tailed test. † indicates that statistical trends tests detected differential trends between the KCC Model option and comparison groups during the pre-KCC period. Readmissions are restricted to the subsample of patient-months with an index hospitalization stay. CI = confidence interval; CKCC = Comprehensive Kidney Care Contracting; DiD = difference-in-differences; ED = emergency department; KCF = Kidney Care First; PY = performance year.

3.3.1.3. What Were the Impacts on Health Care Costs?

We analyzed several measures of costs in key areas where we would potentially see the largest changes according to the logic model. KCC participants receive financial incentives to increase home dialysis, increase transplants, and improve quality. As a result, care changes implemented by providers may also reduce payments for hospitalizations, readmissions, and ED visits, while we may see an increase in office visits and preventive care payments.

To understand whether KCC had an impact on Medicare payments in PY 2022, we examined Medicare Parts A & B standardized payments, excluding payments for CKD QCP services.[20] This measure reflects average Medicare payments across patients with FFS coverage in a given month for Medicare Parts A & B services. We also separately examined major payment components to identify the source of any observed changes in overall payments. We defined separate payment categories for Medicare Parts A & B services, including hospitalizations, readmissions,

[20] The KCC Model replaces typical FFS payments with a capitated payment for services included on the CKD QCP list, so participants experience a price change that is not reflected in the comparison group, which would pose a potential bias to our impact estimates. As a sensitivity analysis, we also examined the effects of the KCF and CKCC options on Total Medicare Parts A & B payments, including payments for CKD QCP services. For both the KCF and CKCC options, estimated impacts were similar in magnitude and statistical significance when payments for CKD QCP services were included compared with when these payments were excluded. These results are provided in **Appendix B, Exhibits B-18** and **B-19**.

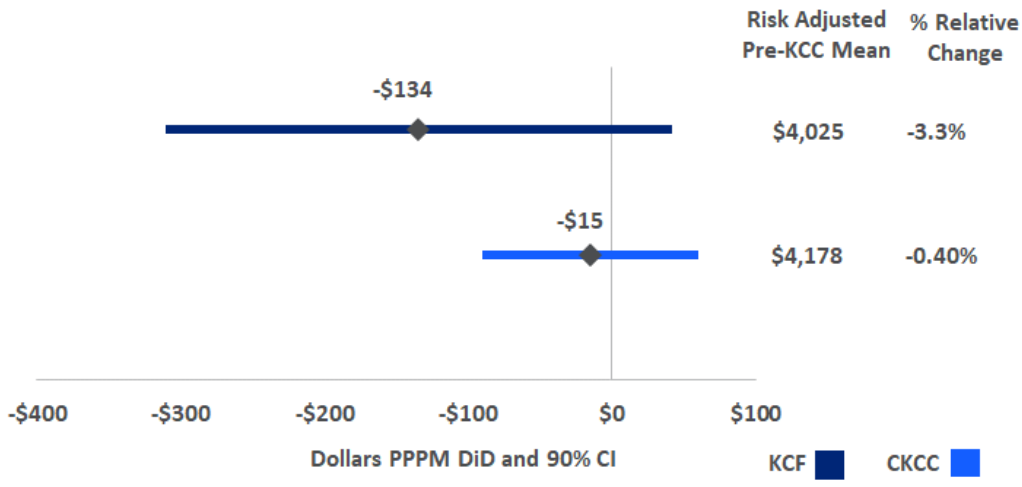
institutional post-acute care (PAC), home health, outpatient services, office visits, and dialysis care. The impacts of the KCC Model on Medicare payments across the continuum of care are generally consistent with the changes in dialysis modality utilization described above. The KCC Model increased home dialysis and decreased in-center HD, with no significant changes to other measures of health care utilization, including hospitalizations or ED visits.

Potential Impacts | The KCC Model could reduce total Medicare payments by shifting patients toward home dialysis modalities and decreasing avoidable hospitalizations or ED visits through improved care management.

Findings | There were no early impacts of the KCC Model on Total Medicare Parts A & B payments.

Total payments. Total Medicare payments per patient per month (PPPM) increased over time for patients in both the CKCC and KCF options and their comparison groups but increased relatively faster for the comparison groups (see **Appendix B, Exhibits B-18** and **B-19**). The result was a relative decrease in PPPM payments of $134 for patients in KCF, although this difference was not statistically significant (see **Exhibit 19**). This relative reduction represents about 3% of the average PPPM Medicare payments for KCF patients in the pre-KCC period of $4,025. Medicare payments were estimated to be $15 lower PPPM relative to the comparison group due to CKCC. This estimated difference is less than one-half of a percent of the pre-KCC mean of $4,178 and is not statistically significant. In aggregate, these decreases amounted to a small and not statistically significant decrease in payments of $26 PPPM due to the KCC Model.

Exhibit 19. Impact of KCF and CKCC on Total Medicare Parts A & B Payments



Notes: Denominator includes patients with CKD, ESRD, or transplant. Pre-KCC period is January 2017–December 2019. KCF and CKCC impact estimates were obtained from separate DiD regression models with separate comparison groups. The DiD impact estimate reflects the difference in the risk-adjusted mean outcome for patients in the KCF or CKCC group in PY 2022 with the pre-KCC period relative to the same difference over time for patients in the comparison group. Bars represent the 90% CI. The percent relative change is the proportion of the estimated DiD impact estimate relative to the KCF or CKCC group risk-adjusted pre-KCC mean. Significance of the DiD impact estimate is indicated next to each estimate, where * implies significance at the 10% level, ** at the 5% level, and *** at the 1% level assuming a two-tailed test. † indicates that statistical trends tests detected differential trends between the KCC and comparison groups during the pre-KCC period. The outcome measure Total Medicare Parts A & B payments does not include payments for services on the CKD QCP list. CI = confidence interval; CKCC = Comprehensive Kidney Care Contracting; DiD = difference-in-differences; KCF = Kidney Care First; PPPM = per patient per month; PY = performance year.

We also examined the subcomponents of total payments to understand whether the KCF or CKCC options affected Medicare Part A and Part B payments separately.

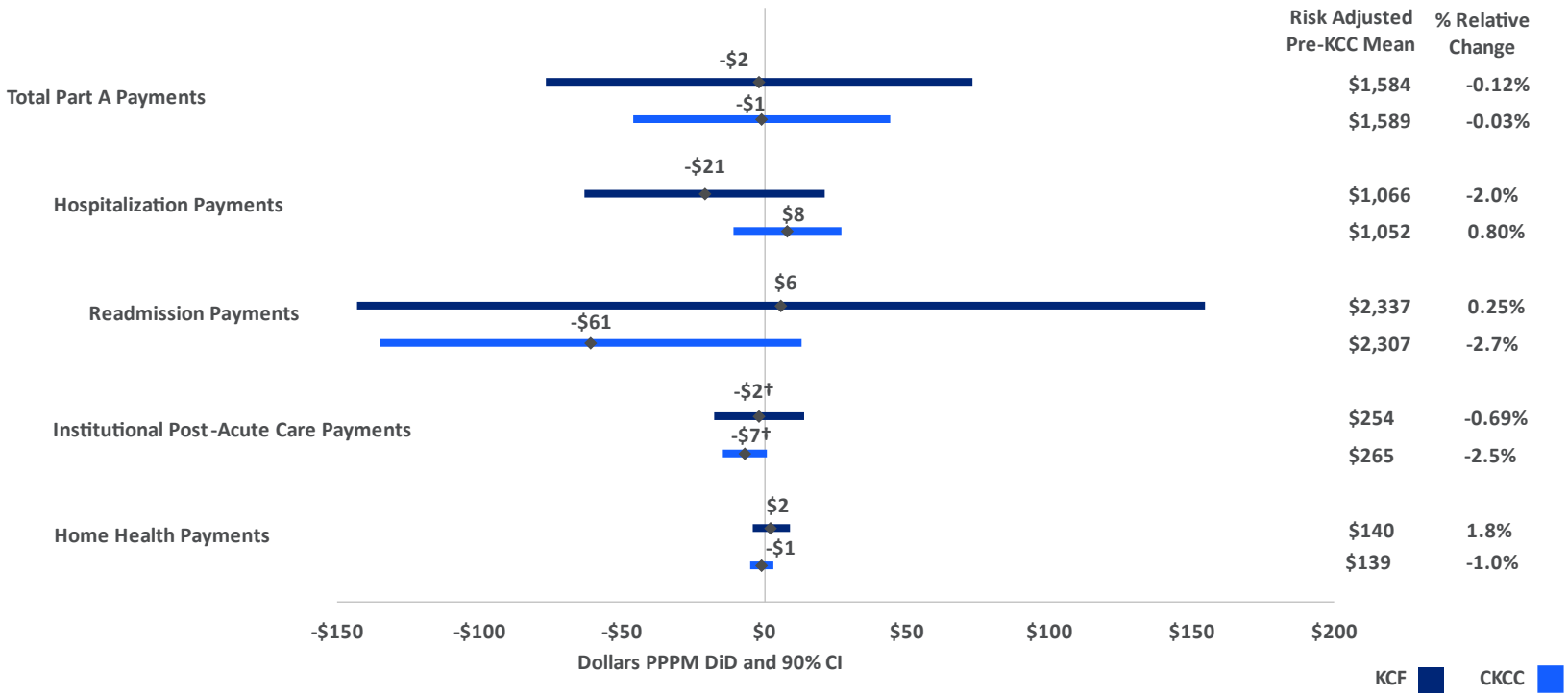
Total Part A payments. Care changes implemented by providers participating in the KCC Model may reduce hospitalizations, readmissions, and ED visits, and we expect decreases in utilization to also correspond to decreases in Part A payments. Overall, the KCC Model did not have a statistically significant impact on total Medicare Part A payments. Total Part A payments PPPM decreased over time in both the KCF and CKCC groups and the comparison groups (see **Appendix B, Exhibits B-18** and **B-19**). The KCF option lowered total Part A payments PPPM by $2 (see **Exhibit 20**). This relative reduction represents less than one-half of a percent of the average Part A Medicare payments for KCF patients of $1,584 PPPM in the pre-KCC period and is not statistically significant. Total Part A payments were $1 lower PPPM due to CKCC relative to the comparison group. This estimated difference is less than one-half of a percent of the pre-KCC mean of $1,589 and is not statistically significant.

The individual subcomponents of Part A payments shed light on where change might be occurring. Overall, the KCC Model did not have a statistically significant impact on hospitalization payments PPPM. Patients in the KCF option experienced a relative decrease in hospitalization payments of $21 PPPM (2% of the pre-KCC mean of $1,066) that is not statistically significant. Patients in the CKCC option had a relative increase in hospitalization payments of $8 PPPM. This relative increase in hospitalization payments represents less than 1% of the pre-KCC mean of $1,052 and is not statistically significant.

Additionally, the KCC Model did not have a statistically significant impact on readmission payments PPPM. Patients in the KCF option had a relative increase in readmission payments of $6 PPPM. This estimated difference is less than one-half of a percent of the pre-KCC mean of $2,337 and is not statistically significant. On the other hand, patients in the CKCC option had a relative decrease in readmission payments of $61 PPPM. This relative reduction in readmission payments represents less than 3% of the pre-KCC mean and is not statistically significant.

Patients in the KCC Model options had a non-statistically significant relative reduction in institutional PAC payments. Patients in the KCF option experienced a reduction, although not statistically significant, in institutional PAC payments of $2 PPPM (0.7% of the pre-KCC mean). Patients in the CKCC option had a non-statistically significant relative reduction in institutional PAC payments of $7 PPPM (3% of the pre-KCC mean). However, data from the pre-KCC period indicated that patients aligned to the KCF and CKCC groups and their respective comparison groups were on differential trends for this outcome, so we cannot be confident that this result is causal without additional evidence; thus, the result should be interpreted with caution. Patients in the KCC groups also had modest differences in home health payments PPPM relative to the comparison groups in PY 2022. There was a non-statistically significant increase of $2 PPPM (2% of the pre-KCC mean) in home health payments for the KCF option relative to the comparison group. Patients in the CKCC option had a non-statistically significant decrease of $1 PPPM (1% of the pre-KCC mean) in home health payments relative to the comparison group.

Exhibit 20. Impact of KCF and CKCC on Total Part A Payments and Components



Notes: Denominator includes patients with CKD, ESRD, or transplant. Pre-KCC period is January 2017–December 2019. KCF and CKCC impact estimates were obtained from separate DiD regression models with separate comparison groups. The DiD impact estimate reflects the difference in the risk-adjusted mean outcome for patients in the KCF or CKCC group in PY 2022 with the pre-KCC period relative to the same difference over time for patients in the comparison group. Bars represent the 90% CI. The percent relative change is the proportion of the estimated DiD impact estimate relative to the KCF or CKCC group risk-adjusted pre-KCC mean. Significance of the DiD impact estimate is indicated next to each estimate, where * implies significance at the 10% level, ** at the 5% level, and *** at the 1% level assuming a two-tailed test. † indicates that statistical trends tests detected differential trends between the KCC and comparison groups during the pre-KCC period. Readmission payments are restricted to the sub-sample of patient-months with an index hospitalization stay. Each DiD impact estimate is estimated via a two-part model as described in **Appendix B**. CI = confidence interval; CKCC = Comprehensive Kidney Care Contracting; DiD = difference-in-differences; KCF = Kidney Care First; PPPM = per patient per month; PY = performance year.

Total Part B payments. Care changes implemented by providers participating in the KCC Model may increase preventive care services, outpatient office visits, and home dialysis utilization. We expect these changes to lead to increases in E/M payments and payments for outpatient services. Total Part B payments PPPM increased over time in both the KCF and CKCC groups and the comparison groups (see **Appendix B, Exhibits B-18** and **B-19**). For the KCF option, total Part B payments were $101 lower PPPM relative to the comparison group ($p \leq 0.10$) (see **Exhibit 21**). This statistically significant relative reduction represents about 4% of the pre-KCC mean of $2,458 PPPM. However, data from the pre-KCC period indicated that patients aligned to KCF Practices and matched comparison practices were on differential trends for this outcome, so we cannot be confident that this result is causal without additional evidence; thus, the result should be interpreted with caution.[21] Total Part B payments are estimated to be $5 lower PPPM due to the CKCC option relative to the comparison group. This estimated impact amounts to only 0.19% of the pre-KCC mean and is not statistically significant.

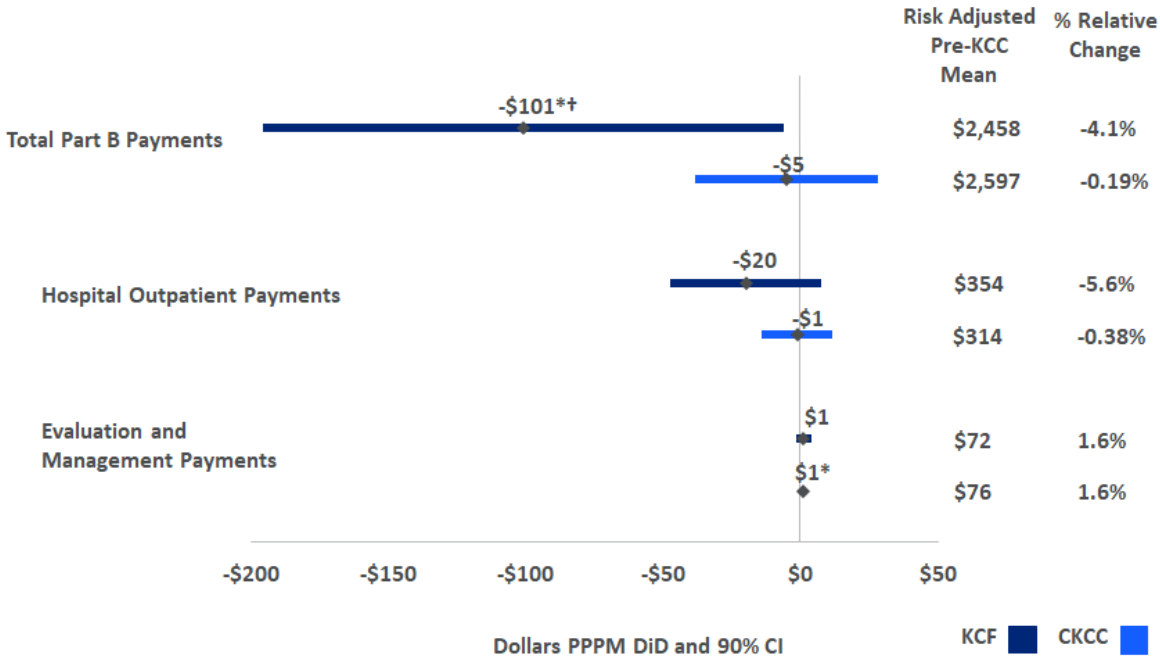
We analyzed the subcomponents of Part B payments along two domains: outpatient and evaluation payments for all patients in the analytic samples and dialysis-related payments for patients with ESRD. Overall, KCC did not affect hospital outpatient payments PPPM relative to the comparison groups. Patients in the KCF option had a relative decrease of $20 PPPM compared with the comparison group. This relative reduction in PPPM payments represents about 6% of the pre-KCC mean of $354 and is not statistically significant. Patients in the CKCC option had a relative decrease of $1 PPPM. This relative reduction represents less than half a percent of the pre-KCC period mean of $314 and is not statistically significant.

We observed modest increases in E/M payments PPPM for KCC Model patients relative to patients in the comparison groups. Patients in the KCF option had a non-statistically significant $1 PPPM relative increase (2% of the pre-KCC mean). Similarly, we found a modest, but statistically significant, $1 increase in E/M payments PPPM for the CKCC group relative to the comparison group ($p \leq 0.10$). This relative increase represents about 2% of the pre-KCC mean of $76 PPPM.[22]

[21] We also inspected the unadjusted trends graph visually and compared trends between the KCF group and the comparison group but observed no evident differences. The coefficient on the differential trend in the pre-KCC period, although significant, equaled –$2.85. This suggests that something other than the KCC Model may have caused a change in the participant or comparison group at the same time as the model, and therefore, the estimate may not accurately reflect a causal relationship.

[22] We also analyzed the effects of the CKCC and KCF options on Medicare payments on CKD QCP list services separately. The estimated impacts are $3 and $1 PPPM for the KCF and CKCC options, respectively. These results are presented in **Appendix B, Exhibits B-18** and **B-19**.

Exhibit 21. Impact of KCF and CKCC on Total Part B Payments and Non-Dialysis Payment Components



Notes: Denominator includes patients with CKD, ESRD, or transplant. Pre-KCC period is January 2017–December 2019. KCF and CKCC impact estimates were obtained from separate DiD regression models with separate comparison groups. The DiD impact estimate reflects the difference in the risk-adjusted mean outcome for patients in the KCF or CKCC group in PY 2022 with the pre-KCC period relative to the same difference over time for patients in the comparison group. Bars represent the 90% CI. The percent relative change is the proportion of the estimated DiD impact estimate relative to the KCF or CKCC group risk-adjusted pre-KCC mean. Significance of the DiD impact estimate is indicated next to each estimate, where * implies significance at the 10% level, ** at the 5% level, and *** at the 1% level assuming a two-tailed test. † indicates that statistical trends tests detected differential trends between the KCC and comparison groups during the pre-KCC period. Impact estimates for total Part B payments come from a linear DiD model, whereas impact estimates for E/M payments and hospital outpatient payments are estimated using a two-part model, as described in **Appendix B**. E/M payments do not include payments for services on the CKD QCP list. CI = confidence interval; CKCC = Comprehensive Kidney Care Contracting; CKD QCP = Chronic Kidney Disease Quarterly Capitated Payment; DiD = difference-in-differences; E/M = evaluation and management; KCF = Kidney Care First; PPPM = per patient per month; PY = performance year.

What Were the Impacts on Dialysis Payments?

The KCC Model includes direct payment incentives to increase the use of home dialysis, likely leading to changes in overall dialysis payments, since total home dialysis payments tend to be lower than total in-center HD payments. The traditional Medicare payment structure pays providers a monthly capitation payment that creates an incentive that favors in-center HD. The Home Dialysis True-Up (HDTU), a bonus payment made to KCC Model Participants for patients who receive home dialysis, is meant to remove the in-center dialysis bias that exists under the traditional monthly capitation payment structure.[23] Thus, changes in dialysis modality use due to the KCC Model may lead to changes in Medicare payments PPPM. In **Exhibit 22**, we present DiD estimates of the KCF and CKCC options' impacts on total dialysis payments and dialysis modality payments PPPM, not including the HDTU, for patients with ESRD.

[23] See the KCC Model Performance Year 2023 Request for Applications: https://www.cms.gov/priorities/innovation/media/document/kcc-py23-rfa

Potential Impacts | If the KCC Model increases use of home dialysis and adherence to in-center hemodialysis, both home and total dialysis payments could increase. However, if KCC patients shift away from in-center dialysis and toward home dialysis, it could lead to reduced total dialysis payments.

Findings | The CKCC option increased total dialysis payments. The KCF option increased home dialysis payments, driven by PD payments.

Total dialysis payments consist of payments for both home dialysis and in-center HD. Total dialysis payments PPPM increased over time in the KCC and comparison groups (see **Appendix B, Exhibits B-18** and **B-19**). The KCF option had a non-statistically significant reduction in total dialysis payments of $49 PPPM, which represents less than 2% of the pre-KCC mean of $2,811 PPPM. Statistical testing of data from the pre-KCC period indicated that total dialysis payments PPPM in the KCF and comparison groups were on differential trends for this outcome, so we cannot be confident that this result is causal without additional evidence; thus, the result should be interpreted with caution.[24] The CKCC option led to a statistically significant increase in total dialysis payments of $28 PPPM ($p \leq 0.05$). Although statistically significant, this relative increase is modest, amounting to 1% of the pre-KCC mean of $2,818 PPPM.

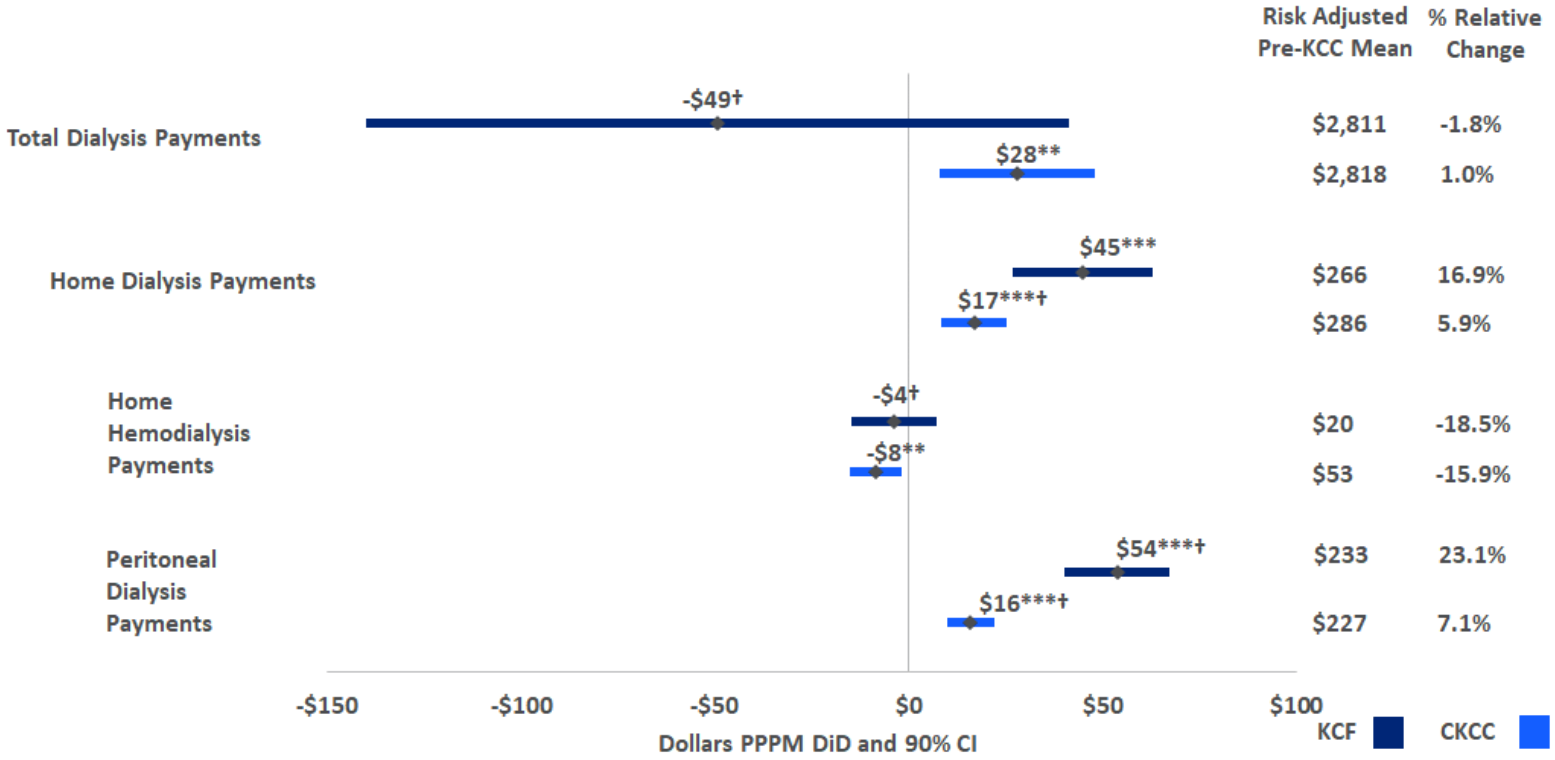
The KCF option led to a statistically significant increase in home dialysis payments by $45 PPPM ($p \leq 0.01$; 17% of the pre-KCC mean). This increase in home dialysis payments among the KCF group relative to the comparison group is driven by a statistically significant increase in PD payments of $54 PPPM ($p \leq 0.01$; 23% of the pre-KCC mean). The KCF option did not have a statistically significant impact on home HD payments relative to the comparison group. For both of these outcomes, pre-KCC data indicated that the KCF groups and comparison groups were on differential trends, so we cannot be confident that these results are causal without additional evidence; thus, the results should be interpreted with caution.[25, 26] Dialysis modality payment outcomes, as evaluated, do not include HDTU payments, which are paid as a lump sum during reconciliation. On average, home dialysis payments, without HDTU, are lower than in-center payments. Increases in the proportion of patients using a lower-cost modality could decrease total dialysis expenditures relative to the comparison group.

[24] Because total dialysis payments did not pass the statistical testing of the parallel trends assumption for the KCF group, we also inspected the unadjusted trends graph visually and compared trends between the KCF group and the comparison group but observed no evident differences. The coefficient on the differential trend in the pre-KCC period equaled –$3.70. This suggests that something other than the KCC Model may have caused a change in the participant or comparison group at the same time as the model, and therefore, the estimate may not accurately reflect a causal relationship.

[25] We also inspected the unadjusted trends graph in PD payments visually and compared trends between the KCF group and the comparison group but observed no evident differences. The coefficient on the differential trend in the pre-KCC period equaled $0.88. This suggests that something other than the KCC Model may have caused a change in the participant or comparison group at the same time as the model, and therefore, the estimate may not accurately reflect a causal relationship.

[26] We also inspected the unadjusted trends graph in home HD payments visually and compared trends between the KCF group and the comparison group but observed no evident differences. The coefficient on the differential trend in the pre-KCC period equaled –$0.53. This suggests that something other than the KCC Model may have caused a change in the participant or comparison group at the same time as the model, and therefore, the estimate may not accurately reflect a causal relationship.

Exhibit 22. Impact of KCF and CKCC on Total Dialysis Payments and Home Dialysis Payments



Notes: Denominator includes patients with ESRD. Pre-KCC period is January 2017–December 2019. KCF and CKCC impact estimates were obtained from separate DiD regression models with separate comparison groups. The DiD impact estimate reflects the difference in the risk-adjusted mean outcome for patients in the KCF or CKCC group in PY 2022 with the pre-KCC period relative to the same difference over time for patients in the comparison group. Bars represent the 90% CI. The percent relative change is the proportion of the estimated DiD impact estimate relative to the KCF or CKCC group risk-adjusted pre-KCC mean. Significance of the DiD impact estimate is indicated next to each estimate, where * implies significance at the 10% level, ** at the 5% level, and *** at the 1% level assuming a two-tailed test. † indicates that statistical trends tests detected differential trends between the KCC and comparison groups during the pre-KCC period. Total dialysis payments were estimated using a linear DiD regression model, while home dialysis payments, home HD payments, and PD payments were estimated using a two-part model, as described in **Appendix B**. Total dialysis payments include payments for all in-center and home dialysis services. Most patients with ESRD receive in-center rather than home dialysis in a given month. Home dialysis payments include both home HD and PD payments. CI = confidence interval; CKCC = Comprehensive Kidney Care Contracting; DiD = difference-in-differences; ESRD = end-stage renal disease; HD = hemodialysis; KCF = Kidney Care First; PD = peritoneal dialysis; PPPM = per patient per month; PY = performance year.

The CKCC option led to a statistically significant increase in home dialysis payments of $17 PPPM (p≤0.01; 6% of the pre-KCC mean). This increase in home dialysis payments among the CKCC group relative to the comparison group was driven by a statistically significant increase in PD payments of $16 PPPM (p≤0.01; 7% of the pre-KCC mean). Data from the pre-KCC period, however, indicated that home dialysis PD payments for the CKCC and comparison groups were on differential trends for this outcome, so we cannot be confident that this result is causal without additional evidence; thus, the result should be interpreted with caution.[27]

What Were the Net Savings to Medicare?

The KCC Model did not result in statistically significant net savings or losses to Medicare in the first performance year of the model. The model includes multiple payment mechanisms that may influence total Medicare payments in both the short and long term.

Reductions in spending are incentivized through shared savings, high performers pool payments, and Performance-Based Adjustments, given quality thresholds are met. The HDTU and KTB are additional Medicare payments that in the long term may lead to decreased payments associated with in-center dialysis use for patients who receive transplants or select home dialysis.

Another KCC payment mechanism is the CKD QCP. The CKD QCP is a lump-sum prospective payment made in lieu of FFS payments for a specific set of E/M services billed by nephrology professionals. The CKD QCP incentivizes diagnosis and management of patients with CKD to delay the progression to ESRD, which could reduce payments in the long run. As such, this component may be costly in the short run with the goal to reduce expenditures over time.

Potential Impacts | The KCC Model could result in net savings (losses) to the Medicare program if it leads to payment reductions that exceed (fall short of) what CMS pays to participants for incentives under the model.

Findings | The KCC Model did not result in statistically significant net savings or losses to Medicare in PY 2022.

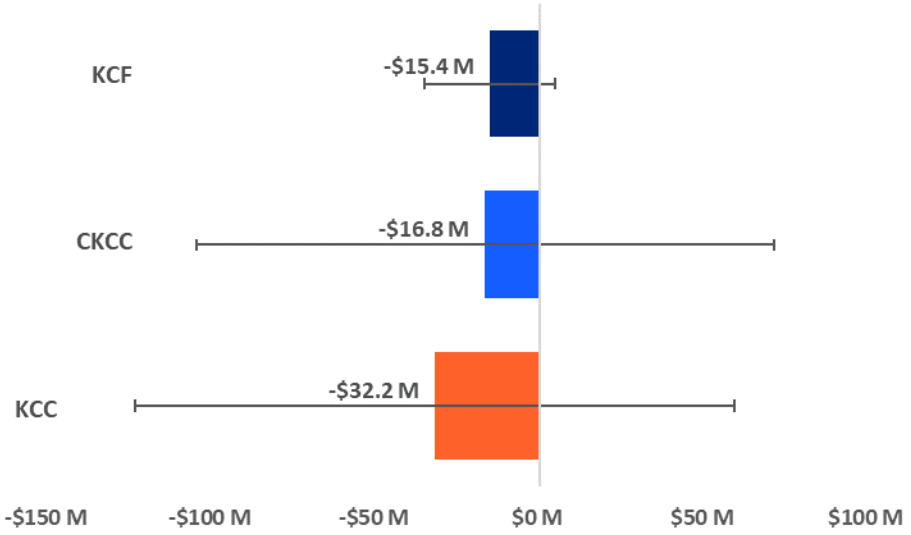
We estimated net impacts to Medicare by calculating the difference between the estimated changes in payments for Total Medicare Parts A & B services and the costs of the KCC Model. The KCC Model had a non-statistically significant aggregate change in Total Medicare Parts A & B payments (that is, gross savings) of –$32 million (90% confidence interval [CI]: –$123 million, $57 million) (see **Exhibit 23**).[28] The CKCC model option accounted for –$17 million (90% CI: –

[27] Because home dialysis and PD payments did not pass the statistical testing of the parallel trends assumption for the CKCC group, we inspected the unadjusted trends graph visually and compared trends between the CKCC and the comparison groups but observed no evident differences. Additionally, the coefficient on the difference in the pre-KCC period, although significant, equaled $0.44 for home dialysis payments and $0.30 for PD payments.

[28] This amount excludes services in the CKD QCP list billed by nephrology professionals and does not account for financial reconciliation payments between participants and CMS.

$104 million, $71 million) and the KCF option accounted for –$15 million (90% CI: –$35 million, $5 million).[29]

Exhibit 23. Impact of the KCC Model on Total Medicare Parts A & B Payments (Gross Savings)



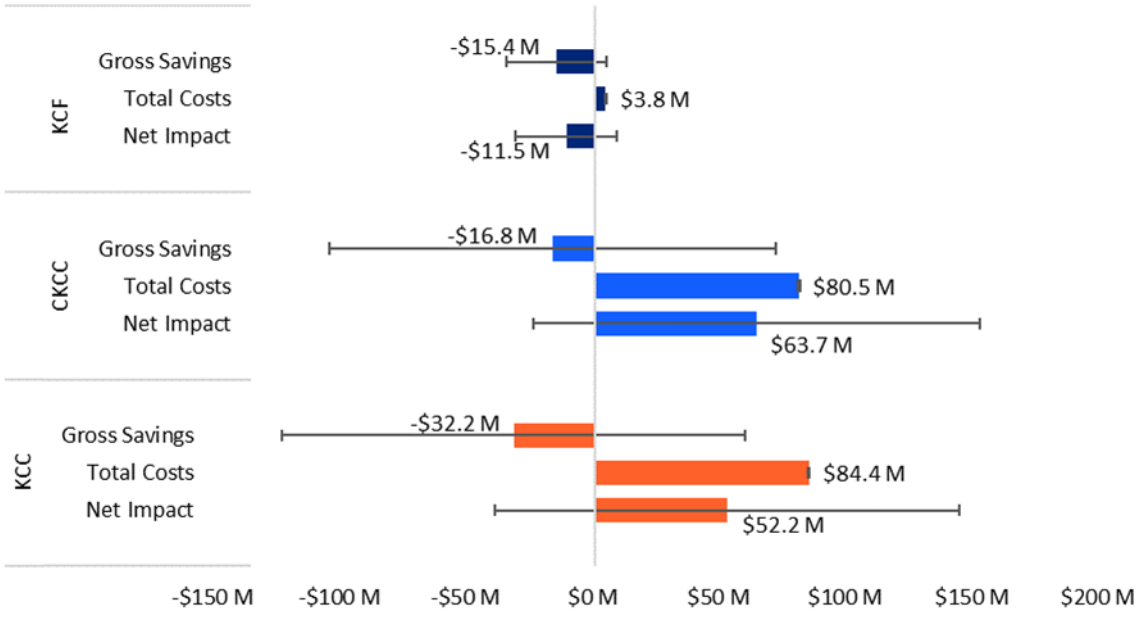
Notes: Bars represent the 90% CI. Significance of the DiD impact estimate is indicated next to each estimate, where * implies significance at the 10% level, ** at the 5% level, and *** at the 1% level assuming a two-tailed test. † indicates that statistical trends tests detected differential trends between the KCC and comparison groups during the pre-KCC period. Impact estimates are multiplied by patient-months, which were provided by the implementation contractor to obtain aggregate, annual estimates. CI = confidence interval; CKCC = Comprehensive Kidney Care Contracting; DiD = difference-in-differences; KCF = Kidney Care First; M = million.

Payments that CMS made to participants throughout PY 2022 and during financial reconciliation amounted to $100 million. The CKD QCP ($52 million) served as the largest component of the payments. The CKD QCP replaces FFS payments for a select set of E/M services (for example, outpatient office visits, see **Exhibit B-2** for full list) from nephrology professionals for patients with CKD. The cost to CMS due to KCC is the difference between the CKD QCP paid amount and the estimated FFS amount for these services, or $36 million (90% CI: $35 million, $36 million). To calculate the net impact of the model on Medicare, we also accounted for all other payments made from CMS to participants, including shared savings and losses ($26 million), the high performers pool payments ($20 million), and HDTU payments ($2 million). Together, these components, including payments for the CKD QCP net of estimated FFS payments absent the model, estimated model costs totaled $84 million.

We did not find statistically significant net savings to Medicare under the KCC Model in PY 2022. The non-statistically significant estimate indicates aggregated net losses of $52 million (90% CI: –$37 million, $141 million), or $44 PPPM (see **Exhibit 24**). Although not statistically significant, the KCF model option resulted in an estimated $12 million in savings (90% CI: –$8 million, $31 million). Conversely, we found non-statistically significant net losses to Medicare of $64 million (90% CI: –$23 million, $151 million) for the CKCC model option.

[29] See **Appendix B.6.4** for a detailed calculation of net impacts.

Exhibit 24. Net Impact of the KCC Model on Medicare Savings and Costs



Notes: Bars represent the 90% CI. Significance of the DiD impact estimate is indicated next to each estimate, where * implies significance at the 10% level, ** at the 5% level, and *** at the 1% level assuming a two-tailed test. † indicates that statistical trends tests detected differential trends between the KCC and comparison groups during the pre-KCC period. Impact estimates are multiplied by patient-months, which were provided by the implementation contractor to obtain aggregate, annual estimates. CI = confidence interval; CKCC = Comprehensive Kidney Care Contracting; DiD = difference-in-differences; KCF = Kidney Care First; M = million.

3.3.2. What Were the Impacts of the KCC Model on Quality of Care?

In addition to assessing changes in utilization and cost, we investigated whether the model affected QoC based on measures that apply specifically to patients with CKD, patients with ESRD, or both patient populations (see "Quality of Care" section in **Exhibit 15**). We examined several measures related to how patients with CKD prepare for the progression to ESRD, the medications they are prescribed, and their laboratory tests. For patients with ESRD, we examined outcomes such as improved care prior to the start of ESRD, ESRD-related hospitalizations, and medication adherence.

3.3.2.1. What Were the Impacts on Quality of Care for Patients with Advanced Chronic Kidney Disease?

A major goal of the KCC Model is to promote patient education and choice in the dialysis modality selection process, with the expectation of growth in home dialysis modalities and decreased reliance on in-center HD. To be successful, providers must focus on early, pre-ESRD education to support decision-making for home dialysis or preemptive transplants. This was also a theme of the PAG discussions. In addition, robust partnerships with vascular access surgeons and transplant providers are key to

> *"I would say, as soon as somebody is diagnosed with kidney disease, they should [be] learning about what may happen … rather than waiting to pass from [Stage] four to five…and that's pretty much what happened to me, and I'm somebody who I thought was pretty medically informed."*
>
> *– Patient Advisory Group Participant*

establishing surgical access prior to starting dialysis and evaluation for transplant, respectively. We assessed the impact of the KCC Model on Optimal ESRD Starts, medication use, quarterly glomerular filtration rate (GFR) testing, and the frequency of services covered by the CKD QCP. We expect that through financial incentives, the KCC Model will increase Optimal ESRD Starts. Similarly, through the focus on patient education, we anticipate that the KCC Model will increase the use of medications that slow the progression of CKD and the proportion of patients receiving quarterly GFR testing, a key aspect of monitoring the progression to ESRD for patients with CKD Stage 4 or 5.

Potential Impacts | The financial incentives and focus on patient education under the KCC Model could result in increases in Optimal ESRD Starts, improved use of medications, and increases in the proportion of patients with CKD receiving testing and labs.

Findings | The CKCC option increased Optimal ESRD Starts. We found no early impacts of the KCC Model on medication use or testing and labs for patients with CKD.

We found no evidence of improvement or decline across most measures related to QoC. However, one notable finding was that the KCC Model increased Optimal ESRD Starts, driven exclusively by the CKCC option. The Optimal ESRD Starts measure is one of the KCC quality measures that is tied to payment. The measure assesses the ability of health care providers to prepare and appropriately educate patients with CKD Stage 4 or 5 about renal replacement therapy options to avoid unplanned dialysis starts. The measure score is the percentage of new (incident) adult patients with ESRD who have a planned start to treatment, which is defined by one of the following events occurring: (1) receiving a preemptive kidney transplant, (2) initiating chronic dialysis on a home dialysis modality (PD or home HD), or (3) initiating outpatient in-center HD via an arteriovenous (AV) fistula or graft. Success with Optimal ESRD Starts will decrease the number of patients starting in-center HD with a tunneled catheter, a pathway associated with higher morbidity and cost.

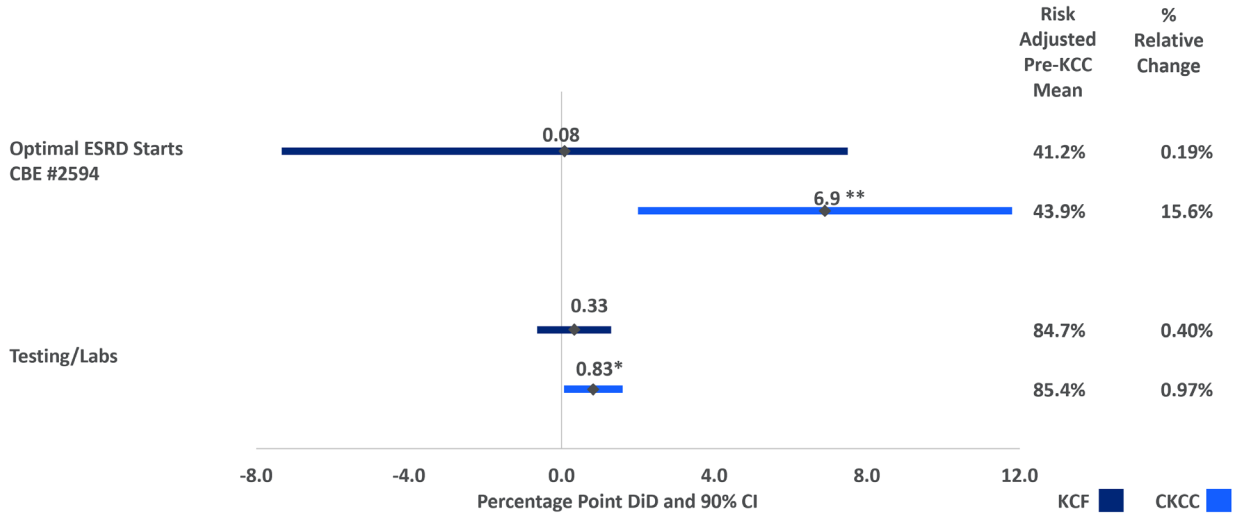
Optimal ESRD Starts (Consensus-Based Entity #2594). The KCC Model had a positive impact on Optimal ESRD Starts but only for patients in the CKCC option (see **Exhibit 25)**. The impact due to the KCF option was 0.08 percentage points (less than 1% of the pre-KCC mean) and not statistically significant. For the CKCC option, the proportion of patients who experienced an optimal ESRD start increased over time for both model participants and the comparison group (see **Appendix B, Exhibit B-19**). However, the increases in the CKCC option were greater than in the comparison group, resulting in a statistically significant increase due to CKCC of 6.9 percentage points ($p \leq 0.05$; 16% of the pre-KCC mean). The impact was driven primarily by increases in both home dialysis and vascular access in the CKCC group.

Medications. We found no evidence of impacts on key medication use among patients with CKD in the KCC Model. We examined four classes of medications: (1) angiotensin-converting enzyme (ACE) inhibitors/angiotensin receptor blockers (ARBs), (2) sodium-glucose cotransporter-2 (SGLT2) inhibitors, (3) HMG-CoA reductase inhibitors (statins), and (4) metformin. The first two groups of medications have been demonstrated to slow down kidney disease progression, and statins reduce cardiovascular morbidity; therefore, increased use would be anticipated in patients

with CKD. Metformin is contraindicated in advanced CKD and was included as a measure of medication safety. We provide a detailed discussion of the results in **Appendix B**.

Testing/labs. Patients with CKD Stage 4 or 5 are at increased risk of progression to ESRD and require more frequent monitoring of kidney function. This is particularly true in the context of avoiding unplanned starts for dialysis and referral for preemptive kidney transplant evaluation. Many treatment decisions are based on GFR thresholds (for example, transplant evaluation at GFR of 20 ml/min), so knowledge of a patient's GFR trajectory is important in timely modality education, vascular access planning, and surgical referrals. We evaluated the proportion of patients who have a laboratory test done (for instance, basic metabolic profile, comprehensive metabolic profile, or serum creatinine) that would allow for calculation of GFR. We observed slight decreases in the rate of quarterly laboratory testing for KCC patients and the comparison group between the pre-KCC period and PY 2022 (see **Exhibits C-18** and **C-19**). Patients in the KCF option and the comparison group experienced similar declines, leading to a non-statistically significant relative change of 0.33 percentage points in PY 2022. Notably, we found slight decreases in the rate of quarterly laboratory testing for patients in the CKCC and comparison groups but less of a decrease for the CKCC group. This difference amounts to a relative increase under CKCC in PY 2022 of 0.83 percentage points ($p \leq 0.10$), which is about 1% of the pre-KCC mean and is statistically significant.

Exhibit 25. Impact of KCF and CKCC on Quality of Care for Patients

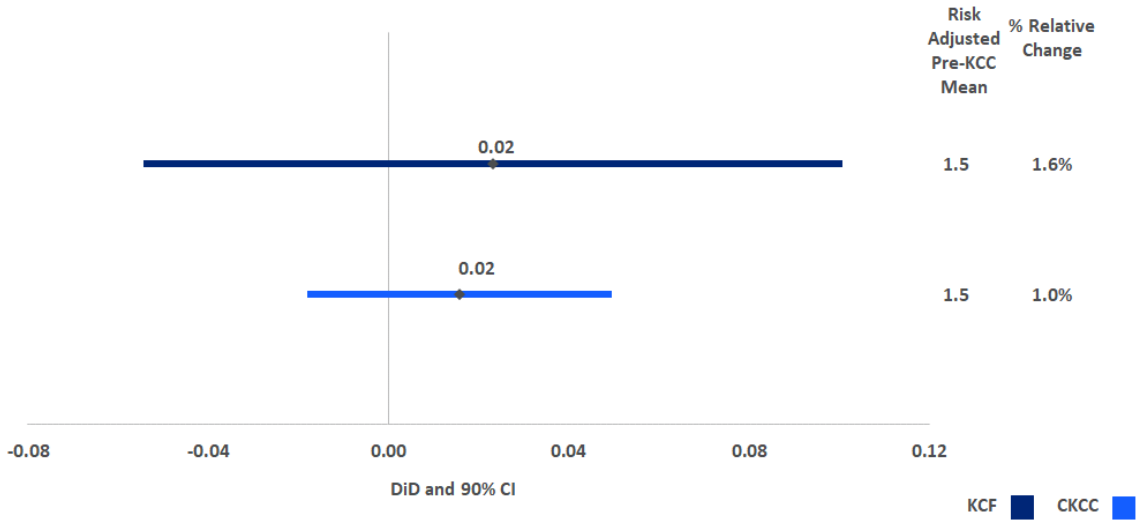


Notes: For the Optimal ESRD Starts Measure, the denominator includes patients with ESRD. For the testing/labs measure, the denominator includes patients with CKD. Pre-KCC period is January 2017–December 2019. KCF and CKCC impact estimates were obtained from separate DiD regression models with separate comparison groups. The DiD impact estimate reflects the difference in the risk-adjusted mean outcome for patients in the KCF or CKCC group in PY 2022 with the pre-KCC period relative to the same difference over time for patients in the comparison group. Bars represent the 90% CI. The percent relative change is the proportion of the estimated DiD impact estimate relative to the KCF or CKCC group risk-adjusted pre-KCC mean. Significance of the DiD impact estimate is indicated next to each estimate, where * implies significance at the 10% level, ** at the 5% level, and *** at the 1% level assuming a two-tailed test. † indicates that statistical trends tests detected differential trends between the KCC and comparison groups during the pre-KCC period. CBE = Consensus-Based Entity; CI = confidence interval; CKCC = Comprehensive Kidney Care Contracting; CKD = chronic kidney disease; DiD = difference-in-differences; ESRD = end-stage renal disease; KCF = Kidney Care First; PY = performance year.

CKD QCP services. We also analyzed the impact of the KCC Model on the number of CKD QCP services PPPM. This is an aggregate measure of CKD QCP services provided by nephrology and non-nephrology professionals. Unlike under traditional FFS, the CKD QCP is meant to give nephrology professionals up-front, predictable payments aimed to assist in the care management of patients with CKD which may increase the utilization of these services; however, because nephrology professionals are paid a fixed amount, independent of the number of services delivered, they might limit the number of services provided or reported and invest in other care management that would not be reflected by this measure. Thus, depending on which pattern prevails, we could observe decreases or increases in this aggregate measure.[30]

Overall, the KCC Model did not affect the number of CKD QCP list services per month in PY 2022 (see **Exhibit 26**).

Exhibit 26. Impact of KCF and CKCC on CKD QCP Services



Notes: Denominator includes patients with CKD. Pre-KCC period is January 2017–December 2019. KCF and CKCC impact estimates were obtained from separate DiD regression models with separate comparison groups. The DiD impact estimate reflects the difference in the risk-adjusted mean outcome for patients in the KCF or CKCC group in PY 2022 with the pre-KCC period relative to the same difference over time for patients in the comparison group. Bars represent the 90% CI. The percent relative change is the proportion of the estimated DiD impact estimate relative to the KCF or CKCC group risk-adjusted pre-KCC mean. Significance of the DiD impact estimate is indicated next to each estimate, where * implies significance at the 10% level, ** at the 5% level, and *** at the 1% level assuming a two-tailed test. † indicates that statistical trends tests detected differential trends between the KCC and comparison groups during the pre-KCC period. CI = confidence interval; CKCC = Comprehensive Kidney Care Contracting; CKD QCP = Chronic Kidney Disease Quarterly Capitated Payment; DiD = difference-in-differences; KCF = Kidney Care First; PY = performance year.

3.3.2.2. What Were the Impacts on Quality of Care for Patients with ESRD?

The KCC Model could affect QoC for patients with ESRD in several ways. Higher-quality care due to the model could lead to better patient outcomes, such as improved care prior to the start of ESRD, lower rates of infection, lower ESRD-related hospitalizations, and better medication

[30] Future reports may consider decomposition of CKD QCP services to disentangle potential impacts across nephrology and non-nephrology providers.

adherence. In PY 2022, we found that the model did not affect ESRD-related hospitalizations and had mixed impacts on the use of AV fistula and grafts for dialysis patients.

Potential Impacts | By incentivizing higher-quality care and better care coordination, the KCC Model could increase nephrology care prior to the start of ESRD, improve medication adherence, and increase the use of AV fistulas and grafts for dialysis. The model could decrease the rate of ESRD-related hospitalizations.

Findings | The KCF option decreased the proportion of patients dialyzing with a fistula. There were no early impacts of the KCC Model on the proportion of patients with ESRD with prior nephrology care or the rate of ESRD-related hospitalizations.

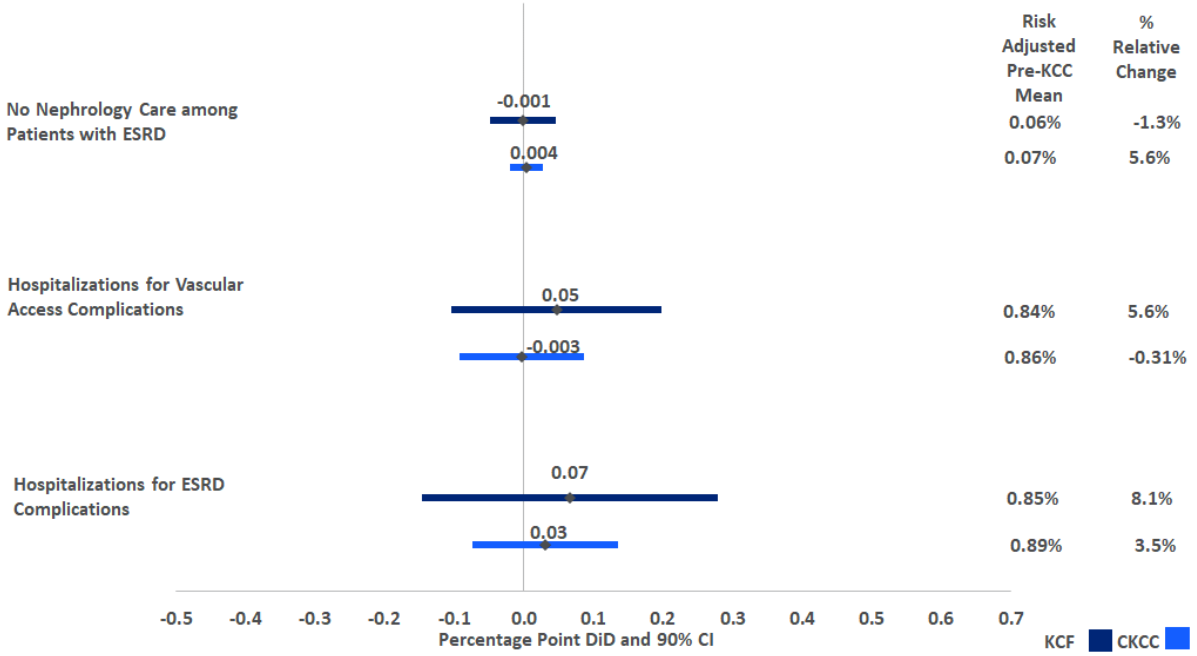
To assess the extent to which KCC participants focused on improving pre-dialysis care, we investigated the impact of the model on the proportion of patients who received nephrology care prior to the start of dialysis.[31] Lack of prior nephrology care before starting dialysis is associated with a lower likelihood of home dialysis and preemptive transplant waitlisting. Because providers in the KCC Model are incentivized to provide robust CKD care, we expect the KCC Model to decrease the proportion of patients with ESRD who begin dialysis without prior nephrology care.

In PY 2022, the KCC Model had no impact on the percentage of patients with ESRD who started dialysis without prior nephrology care (see **Exhibit 27**). The proportion of patients with ESRD in the KCF option who began dialysis without prior nephrology care decreased by 0.001 percentage points relative to the comparison group (about 1% of the pre-KCC mean) and is not statistically significant. The proportion of patients with ESRD in the CKCC option who began dialysis without prior nephrology care increased by 0.004 percentage points relative to the comparison group. This relative increase amounts to about 6% of the pre-KCC mean and is not statistically significant.

Infections and infection-related hospitalizations often occur in chronic dialysis patients with tunneled catheters for vascular access. Changes in vascular access are one way in which KCC participants could improve the QoC of their dialysis patients and lead to reduced hospitalizations. In its first performance year, the KCC Model did not affect the proportion of patients with a hospitalization due to vascular access complications. ESRD complications such as hyperkalemia, fluid overload, and pulmonary edema occur when patients miss or shorten dialysis treatments or cannot adequately manage their diet and fluid intake. Care redesign due to the KCC Model could result in fewer occurrences of these complications and higher QoC. For both KCF and CKCC, hospitalizations for ESRD complications increased by 0.07 and 0.03 percentage points, respectively, relative to the comparison groups; the increases represent 8% and 4%, respectively, of the pre-KCC means and are not statistically significant.

[31] A patient with ESRD was considered to have no prior dialysis care if their first vascular access type was not a graft or fistula and if they did not have select services, such as treatment by a nephrologist, treatment by a kidney dietician, or receipt of erythropoietin before the start of dialysis.

Exhibit 27. Impact of KCF and CKCC on Quality of Care for Patients with ESRD



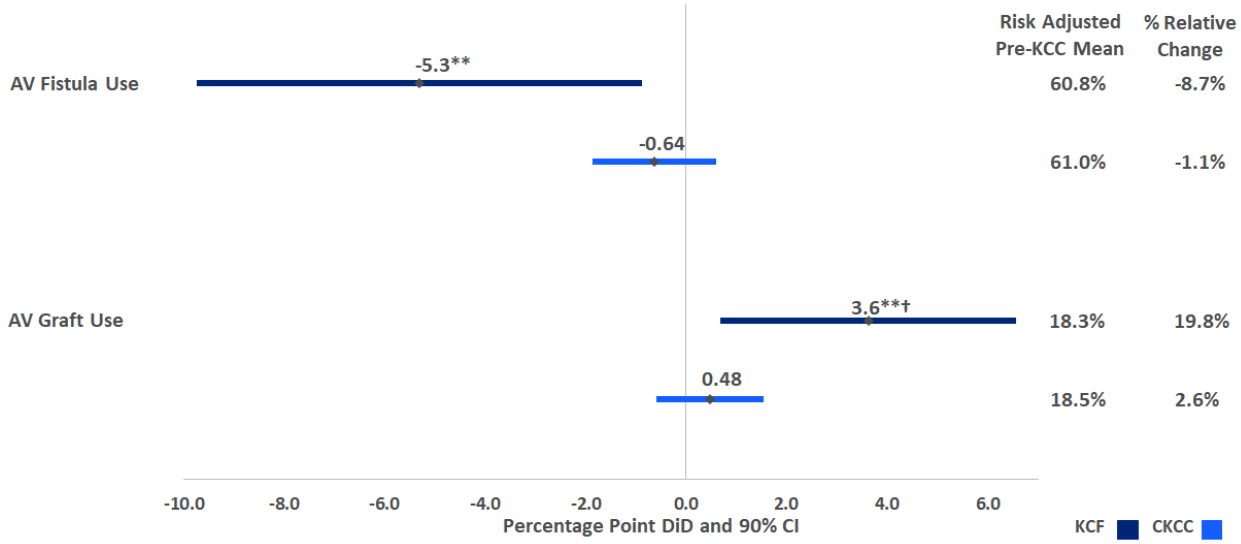
Notes: Denominator includes patients with ESRD. Pre-KCC period is January 2017–December 2019. KCF and CKCC impact estimates were obtained from separate DiD regression models with separate comparison groups. The DiD impact estimate reflects the difference in the risk-adjusted mean outcome for patients in the KCF or CKCC group in PY 2022 with the pre-KCC period relative to the same difference over time for patients in the comparison group. Bars represent the 90% CI. The percent relative change is the proportion of the estimated DiD impact estimate relative to the KCF or CKCC group risk-adjusted pre-KCC mean. Significance of the DiD impact estimate is indicated next to each estimate, where * implies significance at the 10% level, ** at the 5% level, and *** at the 1% level assuming a two-tailed test. † indicates that statistical trends tests detected differential trends between the KCC and comparison groups during the pre-KCC period. CI = confidence interval; CKCC = Comprehensive Kidney Care Contracting; DiD = difference-in-differences; ESRD = end-stage renal disease; KCF = Kidney Care First; PY = performance year.

As described above, increased use of AV fistulas or AV grafts is one way in which KCC Participants could improve the QoC of their dialysis patients and reduce costs due to infections and infection-related hospitalizations. AV fistula use decreased in both the KCC and comparison groups between the pre-KCC period and PY 2022 (see **Appendix B, Exhibits B-18** and **B-19**). Patients with ESRD in the KCF option had a statistically significant relative reduction in AV fistula use of 5.3 percentage points ($p \leq 0.05$) (see **Exhibit 28**). This relative decrease amounts to about 9% of the pre-KCC mean. Reductions in fistula or graft use without corresponding increases in catheter use do not necessarily imply a decrease in quality. We will continue to monitor these measures, in addition to the use of catheters, in future annual evaluation reports. Patients with ESRD in the CKCC option experienced a 0.64 percentage point decrease in fistula use. This relative reduction amounts to about 1% of the pre-KCC mean and is not statistically significant.

AV graft use also decreased among the CKCC and comparison groups between the pre-KCC period and PY 2022 but increased for the KCF group over the same period (see **Appendix B, Exhibits B-18** and **B-19**). Patients in the KCF group experienced a statistically significant relative increase in AV graft use of 3.6 percentage points ($p \leq 0.05$), as shown in **Exhibit 28**. This relative increase represents about 20% of the pre-KCC mean. However, data from the pre-KCC period indicate that the KCF and comparison groups were on differential trends for this outcome, so we

cannot be confident that this result is causal without additional evidence; thus, the result should be interpreted with caution.[32] Patients with ESRD in the CKCC option experienced a 0.48 percentage point increase in AV graft use. This relative change represents about 3% of the pre-KCC mean and is not statistically significant.

Exhibit 28. Impact of KCF and CKCC on Fistula and Graft Use



Notes: Denominator includes patients with ESRD. Pre-KCC period is January 2017–December 2019. KCF and CKCC impact estimates were obtained from separate DiD regression models with separate comparison groups. The DiD impact estimate reflects the difference in the risk-adjusted mean outcome for patients in the KCF or CKCC group in PY 2022 with the pre-KCC period relative to the same difference over time for patients in the comparison group. Bars represent the 90% CI. The percent relative change is the proportion of the estimated DiD impact estimate relative to the KCF or CKCC group risk-adjusted pre-KCC mean. Significance of the DiD impact estimate is indicated next to each estimate, where * implies significance at the 10% level, ** at the 5% level, and *** at the 1% level assuming a two-tailed test. † indicates that statistical trends tests detected differential trends between the KCC and comparison groups during the pre-KCC period. AV= arteriovenous; CI = confidence interval; CKCC = Comprehensive Kidney Care Contracting; DiD = difference-in-differences; KCF = Kidney Care First; PY = performance year.

3.3.2.3. What Were the Impacts on Quality of Care for Patients with Advanced CKD or ESRD?

We also assessed the impact of the KCF and CKCC options on phosphate binder adherence, which could reflect the quality of kidney care education. Phosphate binder adherence is important for minimizing bone disease in patients with advanced CKD or ESRD, and education helps remind patients of the importance of taking their pills as prescribed. Through higher-quality kidney care patient education due to the KCC Model, we expect phosphate binder adherence to increase. Additionally, we expect that through higher-quality care, hospitalizations due to fluid overload and hyperkalemia, a condition caused by high potassium, will decrease.

[32] We inspected the unadjusted trends graph visually and compared trends between the KCF and the comparison groups but observed no evident differences. Additionally, the coefficient on the difference in the pre-KCC period, although significant, equaled 0.11 percentage points. This suggests that something other than the KCC Model may have caused a change in the participant or comparison group at the same time as the model, and therefore, the estimate may not accurately reflect a causal relationship.

Potential Impacts | Through improved patient education and higher-quality care under the model, KCC could increase phosphate binder adherence and decrease hospitalizations due to hyperkalemia and fluid overload.

Findings | There were no early impacts of the KCC Model on phosphate binder adherence or hospitalizations due to hyperkalemia or fluid overload.

We measured phosphate binder adherence by assessing whether the proportion of days covered by a phosphate binder prescription was more than 80% in a month for patients with at least two prescriptions per year.[33] Overall, the KCC Model did not affect phosphate binder adherence. The KCF option reduced phosphate binder adherence relative to the comparison group by 0.77 percentage points (see **Exhibit 29**). This relative change represents less than 2% of the pre-KCC mean and is not statistically significant. The CKCC option increased phosphate binder adherence by 0.13 percentage points. This relative change represents less than 0.5% of the pre-KCC mean and is not statistically significant.[34]

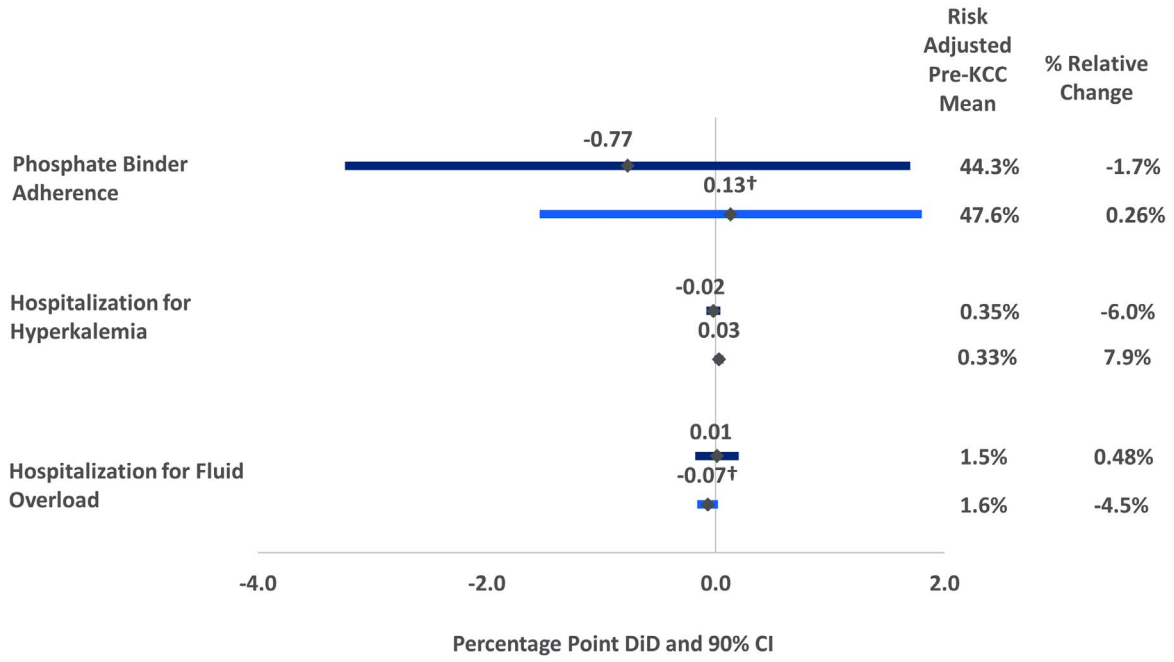
The overall rate of ED encounters or hospitalizations with a primary diagnosis of hyperkalemia (high potassium) was low for KCC patients and patients in the comparison groups (see **Appendix B, Exhibits B-18** and **B-19)**.[35] Rates of hospitalizations due to hyperkalemia decreased slightly over time for both the KCF and comparison groups, leading to no statistically significant differential change. Similarly, there were no statistically significant differences due to the CKCC option relative to the comparison group. Finally, although provider strategies to better manage fluid balance could reduce acute care utilization related to fluid overload, the KCC Model did not affect these rates of hospitalization.

[33] We restricted the analysis to patients who were eligible for Medicare Part D coverage at the time of the prescription fill and the following months covered by that supply.

[34] Data from the pre-KCC period indicated that the CKCC and comparison group were not following parallel trends for this outcome. The coefficient on the difference in the pre-KCC period is small, although significant, and equaled 0.06 percentage points.

[35] Development of hyperkalemia occurs most commonly when there is excessive potassium intake relative to removal and can lead to potentially fatal arrhythmias.

Exhibit 29. Impact of KCF and CKCC Impacts on QoC Outcomes for Patients with CKD or ESRD



Notes: Denominator includes patients with CKD or ESRD. Pre-KCC period is January 2017–December 2019. KCF and CKCC impact estimates were obtained from separate DiD regression models with separate comparison groups. The DiD impact estimate reflects the difference in the risk-adjusted mean outcome for patients in the KCF or CKCC group in PY 2022 with the pre-KCC period relative to the same difference over time for patients in the comparison group. Bars represent the 90% CI. The percent relative change is the proportion of the estimated DiD impact estimate relative to the KCF or CKCC group risk-adjusted pre-KCC mean. Significance of the DiD impact estimate is indicated next to each estimate, where * implies significance at the 10% level, ** at the 5% level, and *** at the 1% level assuming a two-tailed test. † indicates that statistical trends tests detected differential trends between the KCC and comparison groups during the pre-KCC period. All three outcome measures are restricted to patients with ESRD or CKD. The phosphate binder adherence measure is restricted to patients who had at least two prescription fills for phosphate binders per year and were eligible for Medicare Part D coverage at the time of the prescription fill and the following months covered by that supply. CI = confidence interval; CKCC = Comprehensive Kidney Care Contracting; CKD = chronic kidney disease; DiD = difference-in-differences; ESRD = end-stage renal disease; KCF = Kidney Care First; PY = performance year; QoC = quality of care.

3.3.2.4. What Were the Impacts on Kidney Transplant Waitlisting Rates?

Although not directly incentivized in the model, transplant waitlisting is a required step prior to deceased donor transplantation and occurs in most cases before living donor transplantation. As a result, participants in the model may work to increase waitlisting in hopes of eventually increasing the rate of transplantation. Nephrology practices can plausibly increase waitlisting by properly educating patients about the transplant option, referring patients for transplant evaluation, maintaining patients' optimal health status to improve candidacy for transplantation, and assisting with the completion of testing for the evaluation process or maintenance on the waitlist. We present the impact estimates of the KCF and CKCC options on transplant waitlisting in **Exhibit 30**.

Potential Impacts | The KCC Model could increase the rate of kidney transplant waitlisting by promoting transplant education, increasing referrals for transplant evaluation, and incentivizing providers to better prepare patients for transplantation.

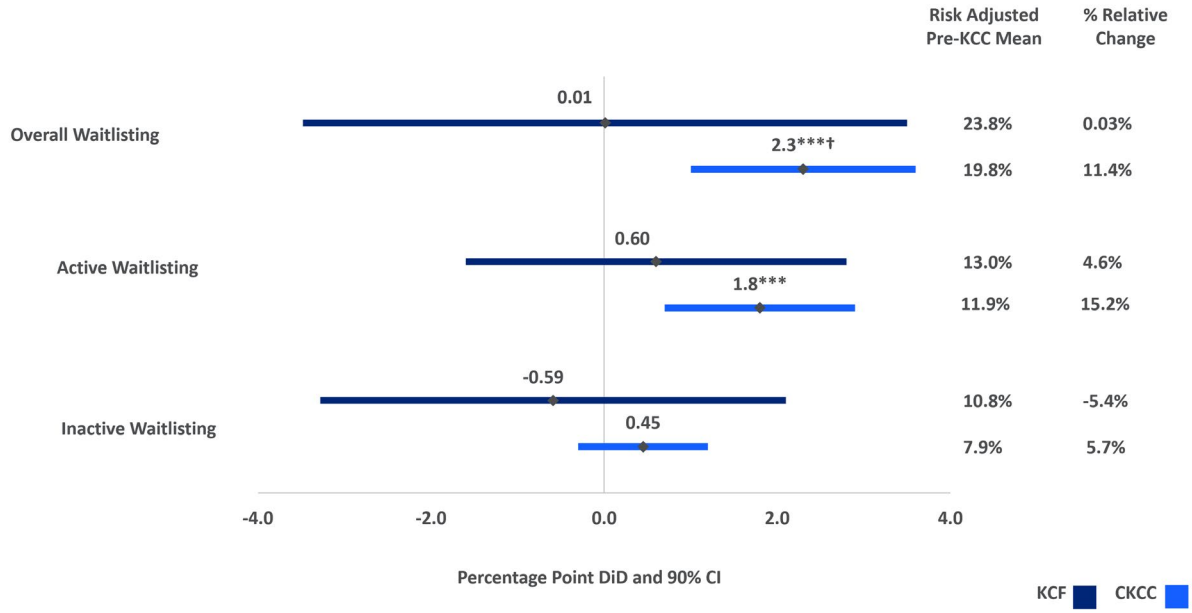
Findings | The KCC Model increased the proportion of patients on the kidney transplant waitlist. This impact was driven by the CKCC option.

Overall, the KCC Model increased the proportion of patients on the transplant waitlist, and this impact was driven by the CKCC option. The proportion of patients on the transplant waitlist decreased between the pre-KCC period and PY 2022 in both the KCF and matched comparison groups (see **Appendix B, Exhibit B-18**). KCF did not have a statistically significant impact on overall waitlisting. In both the CKCC and comparison groups, the share of patients with CKD Stage 5 and patients with ESRD on the transplant waitlist decreased from the pre-KCC period to PY 2022 (see **Appendix B, Exhibit B-19**). We identified a more modest decrease in overall waitlisting in the CKCC option relative to the comparison group, which translated into a relative increase in overall waitlisting of 2.3 percentage points ($p \leq 0.01$). This statistically significant increase represents about 11% of the pre-KCC mean. However, data from the pre-KCC period indicated that patients aligned to CKCC and matched comparison group practices were on differential trends for this outcome, so we cannot be confident that this result is causal without additional evidence; thus, the result should be interpreted with caution.[36]

Decomposing overall waitlisting into active and inactive waitlisting provides additional insight into the KCC Model's impact. Active waitlisting status is particularly important because it means patients are deemed suitable for immediate transplantation once an organ becomes available and is a requirement for organ offers to be made, whereas inactive waitlisting status reflects a typically temporary state of unsuitability for transplantation during which no organ offers will be made. The KCF option did not have a statistically significant impact on the proportion of patients on the waitlist with active status in PY 2022 (see **Exhibit 30**). However, we identified a statistically significant increase of 1.8 percentage points in the proportion of CKCC patients on the transplant waitlist with active status relative to the comparison group ($p \leq 0.01$). This increase represents about 15% of the pre-KCC mean. The difference between the CKCC and comparison groups reflects a smaller reduction in waitlisting for the CKCC group from the pre-KCC period to PY 2022. This relative increase in active waitlisting could have been accomplished through the identification and referral of new candidates ready for transplantation, maintenance of active waitlist status, and the conversion of waitlisted patients from inactive status to active status. Future qualitative analyses will aim to better understand what is driving the difference in waitlisting rates among KCC participants versus non-participants.

[36] We also inspected the unadjusted trends graph visually and compared trends between the CKCC group and the comparison group but observed no evident differences. The coefficient on the differential trend in the pre-KCC period, although significant, equaled 0.05 percentage points. This suggests that something other than the KCC Model may have caused a change in the participant or comparison group at the same time as the model, and therefore, the estimate may not accurately reflect a causal relationship.

Exhibit 30. Impact of KCF and CKCC on Kidney Transplant Waitlisting



Notes: Denominator includes patients with ESRD or CKD Stage 5. Pre-KCC period is January 2017–December 2019. KCF and CKCC impact estimates were obtained from separate DiD regression models with separate comparison groups. The DiD impact estimate reflects the difference in the risk-adjusted mean outcome for patients in the KCF or CKCC group in PY 2022 with the pre-KCC period relative to the same difference over time for patients in the comparison group. Bars represent the 90% CI. The percent relative change is the proportion of the estimated DiD impact estimate relative to the KCF or CKCC group risk-adjusted pre-KCC mean. Significance of the DiD impact estimate is indicated next to each estimate, where * implies significance at the 10% level, ** at the 5% level, and *** at the 1% level assuming a two-tailed test. † indicates that statistical trends tests detected differential trends between the KCC and comparison groups during the pre-KCC period. All three outcome measures are restricted to patients with ESRD or CKD. Active waitlisting and inactive waitlisting are subcomponents of overall waitlisting. CI = confidence interval; CKCC = Comprehensive Kidney Care Contracting; CKD = chronic kidney disease; DiD = difference-in-differences; ESRD = end-stage renal disease; KCF = Kidney Care First; PY = performance year.

3.3.2.5. What Were the Impacts on Living and Deceased Donor Kidney Transplants?

We examined the impact of the KCC Model on kidney transplant measures, including overall transplants, deceased donor transplants, living donor transplants, and preemptive transplants. The model incentivizes kidney transplantation through several mechanisms. First, this may occur through measures that encourage cost constraint (such as the total costs of care assessment in the CKCC model), as care of transplant patients is less costly than dialysis care, once beyond the initial transplant surgery period. Second, this may occur through the Optimal ESRD Starts quality measure, which includes preemptive transplants (which are frequently living donor transplants) as one of its components. Finally, the model includes the Kidney Transplant Bonus, which pays up to $15,000 per transplant over a 3-year period, dependent on ongoing transplant graft survival. These payments are made to the KCF Practice or KCE, where KCEs must distribute at least 20% to participants who are transplant providers and an additional 20% to participants who are nephrologists/nephrology practices. Nephrology practices can contribute to increasing rates of transplantation in a variety of ways: increasing in waitlisting, particularly active waitlisting (as described in **Section 3.3.2.4**); providing living donor transplant education and assistance with identification of living donors; encouraging transplant centers to potentially improve organ availability through paired kidney donation; expanding organ acceptance criteria; and performing

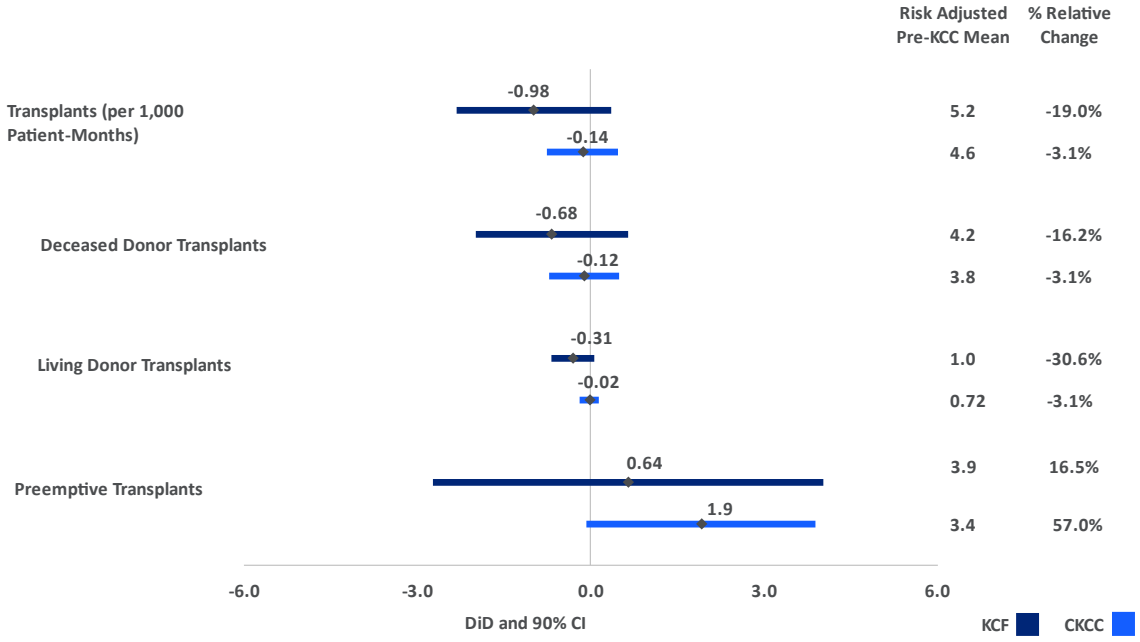
human leukocyte antigen-incompatible transplants. We present the KCF and CKCC impact estimates on transplants in **Exhibit 31**.

Potential Impacts | Through quality and payment mechanisms, including the Kidney Transplant Bonus, the KCC Model could increase kidney transplant rates.

Findings | There were no early impacts of the KCC Model on the rate of kidney transplants.

The KCC Model did not affect the rate of kidney transplants overall. We observed an increase in the absolute rate of overall transplantation among patients with CKD Stage 5 and patients with ESRD from the pre-KCC period to PY 2022 in both the KCC and comparison groups (see **Appendix B, Exhibits B-18** and **B-19**). However, the DiD estimate demonstrated a relative decrease of 0.98 transplants per 1,000 patient-months for KCF Participants versus non-participants over the study period, which was not statistically significant. Similarly, the DiD estimate demonstrated a relative decrease of 0.14 transplants per 1,000 patient-months between the CKCC option and the comparison group, which was not statistically significant.

Exhibit 31. Impact of KCF and CKCC on Transplants per 1,000 Patient-Months



Notes: For the transplants, deceased donor transplants, and living donor transplants measures, the denominator includes patients with ESRD or CKD Stage 5. For the preemptive transplants measure, the denominator includes patients with CKD Stage 5. Pre-KCC period is January 2017–December 2019. KCF and CKCC impact estimates were obtained from separate DiD regression models with separate comparison groups. The DiD impact estimate reflects the difference in the risk-adjusted mean outcome for patients in the KCF or CKCC group in PY 2022 with the pre-KCC period relative to the same difference over time for patients in the comparison group. Bars represent the 90% CI. The percent relative change is the proportion of the estimated DiD impact estimate relative to the KCF or CKCC group risk-adjusted pre-KCC mean. Significance of the DiD impact estimate is indicated next to each estimate, where * implies significance at the 10% level, ** at the 5% level, and *** at the 1% level assuming a two-tailed test. † indicates that statistical trends tests detected differential trends between the KCC and comparison groups during the pre-KCC period. All three outcome measures are restricted to patients with ESRD or CKD. CI = confidence interval; CKCC = Comprehensive Kidney Care Contracting; CKD = chronic kidney disease; DiD = difference-in-differences; ESRD = end-stage renal disease; KCF = Kidney Care First; PY = performance year.

The KCC Model also broadly did not affect the subcomponents of overall transplants: deceased donor transplants, living donor transplants, and preemptive transplants. The rate of deceased donor transplants and the rate of living donor transplants increased over time for patients in the KCC Model and the comparison groups.

Notably, the rate of preemptive transplants increased over time between the pre-KCC period and PY 2022 for the KCF and CKCC options and the comparison groups. KCF increased the rate of preemptive transplants by 0.64 per 1,000 patient-months. This relative increase represents about 17% of the pre-KCC mean for the KCF group and is not statistically significant. We observed an increase of 1.9 transplants per 1,000 patient-months in the CKCC group relative to the comparison group. This relative increase represents about 57% of the pre-KCC mean and is nearly statistically significant (p=0.11). This early signal with preemptive transplantation was most prominent among the CKCC option, which mandates partnership with a transplant provider and may reflect activities done in collaboration with transplant centers. An effect on transplantation rates may become more evident with additional PYs of the KCC Model.

The absence of statistically significant impacts on transplant measures observed in the first year of the KCC Model is unsurprising given the generally long interval between waitlisting and transplantation, which is often several years. Similarly, other potential processes that nephrology practices could use to increase transplants, such as assisting with living donor identification or working with transplant centers to better use organs, may take time to have an effect. Strategies deployed by nephrology practices will be explored further in future qualitative analyses.

3.4. Discussion

During the first year of the model, for many outcomes—including Total Medicare Parts A & B payments, net savings or losses to Medicare, hospitalizations, the use of selected medications, and transplantation rates—the KCC Model showed no statistically significant effect. However, we observed early effects for several outcomes.

Higher use of home dialysis modalities is a major model objective. In the KCF model option, overall home dialysis and PD rates increased. In the CKCC model option, PD rates increased, and the increase in overall home dialysis was almost significant. Increased access to transplantation is another major model objective. Although transplantation rates did not change differentially for participants relative to non-participants in year one, waitlisting, a precursor of most transplants, did grow substantially in CKCC and was driven by an increase in patients with active status on the waitlist. This effect may have been limited to CKCC due to the model option's mandated partnership with transplant providers. These partnerships may facilitate better communication between nephrology practices and transplant centers, which is often cited as a barrier to waitlisting by nephrology practices.[37] In addition, practices participating in CKCC tend to be larger than those in KCF and may be better resourced to put in place systematic processes (for instance, care navigators) to improve waitlisting. We will continue to explore these potential underlying

[37] Waterman, A. D., Peipert, J. D., Goalby, C. J., Dinkel, K. M., Xiao, H., & Lentine, K. L. (2015). Assessing transplant education practices in dialysis centers: Comparing educator reported and Medicare data. *Clinical Journal of the American Society of Nephrology, 10*(9), 1617–1625. https://doi.org/10.2215/CJN.09851014

mechanisms with participants in site visits in the coming evaluation year and report our findings in the second annual evaluation report.

There were also several suggestive findings where the estimated impact would be clinically meaningful but the effect narrowly missed statistical significance. These included a reduction in Total Medicare Parts A & B payments of more than 3% in KCF and a 1.9 percentage point absolute (57% relative) increase in preemptive transplantation in CKCC. We will monitor each of these suggestive findings in future annual evaluation reports to determine whether the accumulation of more data and experience in the model ultimately confirms the effects as significant.

Our findings on the net impacts to Medicare should be considered in the context of certain limitations. Given the wide confidence intervals, it is important to use caution when interpreting the estimates. Although the estimates suggest the model may have had a potential net loss of $52 million in PY 2022, we do not have the statistical power to differentiate this estimate from zero (that is, we do not find net savings or losses). Further, the estimation of net savings only includes estimates of short-term effects and payments—that is, those made during PY 2022 and the corresponding reconciliation period—but the model's mechanisms have longer time horizons. The KTB and the performance-based adjustment on the CKD QCP and the ESRD Adjusted Monthly Capitated Payment for KCF Practices are not included in the net impact estimate because the payments for these bonuses do not begin until PY 2023. In addition, the KTB and HDTU incentivize kidney transplantation and home dialysis, respectively, and may reduce future costs by reducing in-center dialysis and related complications after the up-front bonus payment. Although the CKD QCP appears to be a large cost of the model, the intent was for providers to invest in care coordination with the overall goal of delaying disease progression. These types of investments may need more than one performance year to begin making a meaningful difference.

Although Medicare makes additional payments to participants (including the KTB and Performance-Based Adjustment), delayed disease progression, higher transplant success rates, and greater risk sharing through CKCC risk track graduation can support reductions in payments. In future model years, we will assess whether the model delayed progression to ESRD, which could indicate savings from the CKD QCP. We are also conducting a survey of patient quality of life, which may provide evidence of impacts not observable in claims (for example, increased productivity from use of home dialysis rather than in-center dialysis). Further, as we observe more performance periods, we will have greater statistical power to detect savings.

Overall, the KCC Model showed some promising effects in its first year. In future evaluation reports, we will attempt to not only confirm whether these early trends continued but also assess whether other trends become apparent as more data accrue and participants gain more experience with the model. Some outcomes apply primarily to specific patient groups (for example, those just starting dialysis or those eligible for a transplant), and it may require multiple years of data to have sufficient samples to detect differences. Other outcomes may take multiple years of intervention to change, particularly if major changes in staffing, communication and coordination across providers, or technology are required. Similarly, we may gain sufficient statistical power to pursue new subgroup analyses as more data accrue. For example, the current quantitative analyses do not distinguish between the different shared savings/risk options within the CKCC model option. We will monitor the number of patients aligned to KCEs in each risk track to assess when such

subgroup analyses may become feasible, but the ability to distinguish between the tracks also depends how much effect sizes vary across tracks, which cannot be projected at this time.

Finally, another area of interest will be potential interactions between the voluntary KCC Model and the mandatory ETC Model. Important model goals such as increasing home dialysis and transplantation overlap across the models. Given the PAG's emphasis on the importance of early, repeated, and multipronged modality education efforts, the inclusion of patients with CKD Stage 4 or 5 in the KCC Model may enhance the opportunities of providers jointly participating in ETC to affect those outcomes. Similarly, the ETC Model's health equity incentives may enhance the effectiveness of KCC Participants that care for populations with a high prevalence of patients with dual eligibility for Medicare and Medicaid and patients receiving the Part D low-income subsidy. These issues can be explored quantitatively by comparing outcomes of KCC-aligned patients in ETC and non-ETC areas for historically underserved populations relative to other populations.

4. Did the KCC Model Affect Beneficiary Experience of Care (ICH CAHPS and PAM)?

A central focus of the KCC Model is promoting patient education and choice in dialysis modality. As a result, the model may improve patients' experiences and outcomes by empowering them to better manage their care and engage in shared decision-making with providers. In addition, the model's financial incentives for providers may enhance the quality of care that patients receive and encourage better provider communication. However, the model could also negatively affect patient experience or outcomes if it moves patients toward a treatment option that does not align with their needs. As part of the KCC evaluation for PY 2022, we used two patient survey instruments to evaluate whether the model is improving, maintaining, or adversely affecting patient experiences and outcomes.

To assess the impact of the KCC Model on self-reported experiences with dialysis care, we used the ICH CAHPS survey. Although the survey does not include patients with CKD or patients who receive home dialysis, it provides insight into the experience of the largest group of patients with ESRD, those who receive in-center HD. The survey addresses topics such as the kidney doctor's compassion and caring as well as their communication on key issues such as treatment options, transplant eligibility, and PD.

We used the Patient Activation Measure (PAM) survey to assess changes in patient activation, or the extent to which an individual is willing and able to take actions to manage their own health care. The PAM survey allowed us to examine the impacts of the KCC Model for patients in all stages of kidney disease (CKD, ESRD, and transplant). The PAM survey is a KCC Model quality measure that is tied to financial incentives for both KCF Practices and KCEs.

4.1. Key Findings

We summarize key findings from our analysis of ICH CAHPS and PAM survey results in **Exhibit 32**. Although patients' experience of care did not change for most ICH CAHPS measures, we found that an increase in exposure to the KCC Model was associated with a higher share of patients discussing PD with their kidney doctor. PAM scores increased between the first and last survey, suggesting that patient activation improved, but this result should be considered in the context of certain limitations, as discussed later in this section.

Exhibit 32. Patient Experience of Care: ICH CAHPS and PAM

ICH CAHPS 	An increase in KCC Model exposure, or dose, was associated with a higher percentage of patients having discussions with their kidney doctor about peritoneal dialysis relative to patients at facilities with no exposure. In-center dialysis patients' experience of care did not change from the pre-KCC to the KCC period for eight out of nine measures evaluated.
PAM 	KCC-aligned patients were more willing and able to take actions to manage their own health care between the first to last PAM survey for both the KCF and CKCC model options.

Note: CKCC = Comprehensive Kidney Care Contracting; ICH CAHPS, In-Center Hemodialysis Consumer Assessment of Healthcare Providers and Systems; KCF = Kidney Care First; PAM, Patient Activation Measure.

4.2. Methods

4.2.1. In-Center Dialysis Experience of Care

We used the ICH CAHPS Survey to examine the effect of the KCC Model on experience of care among patients dialyzing in center. Although a key goal of the model is to increase use of home dialysis and transplantation, ICH CAHPS does not capture information from patients about these modes of care. However, the survey does provide insight into the experiences of the largest group of patients with ESRD, those who dialyze in center, and can be used to learn about the discussions those patients are having with their nephrologists around treatment options, including transplantation and home dialysis.

ICH CAHPS is a vendor-fielded survey administered to a sample of in-center HD patients. Our analysis used data from existing ICH CAHPS Survey responses. We analyzed nine publicly reported ICH CAHPS measures that fall into three categories:

- **Global rating measures**: rating of kidney doctors, dialysis center staff, and dialysis center
- **Composite measures**: nephrologists' communication and caring, quality of dialysis center care and operations, and providing information to patients
- **Additional measures addressing other components of quality** (based on individual survey responses): kidney doctor had discussions about right treatment for beneficiary, beneficiary received an explanation for why they were not eligible for a kidney transplant, and kidney doctor had discussions about PD with the beneficiary

We used "top box" scores, which reflect the highest level of satisfaction for the nine measures derived.[38] Responses categorized as top box include a 9 or 10 on a scale of 0 (worst) to 10 (best) on the global rating measures and responses of "always" or "yes" on the composite scores and individual survey items. The measures were adjusted for patient-mix factors, and the impact analyses included additional adjustments for facility and market characteristics.

To assess the change in scores from the pre-KCC to the KCC intervention period, we estimated two separate impact models for each measure. Using two estimation methods allowed us to capture patients aligned to both model options (KCF and CKCC) and to account for the fact that ICH CAHPS is administered to patients at dialysis facilities who may or may not be aligned to the KCC Model, as explained below.

The first model implemented a DiD design and identified treatment based on dialysis facilities that formed partnerships with KCEs within the CKCC model option. KCEs have the option, but are not required, to form partnerships with dialysis facilities. In PY 2022, 43 out of 55 KCEs had a dialysis facility partner, totaling 2,217 dialysis facilities. Of the total partnerships, 1,243 (56%) dialysis facilities (43 KCEs) had sufficient ICH CAHPS Survey responses and data necessary for risk adjustment to be included in the analysis. The comparison group consisted of non-partnered dialysis facilities that treated aligned and eligible comparison group patients (based on the matched analytic sample). Among all non-KCE dialysis facilities, 2,303 had sufficient ICH CAHPS Survey

[38] "Top box" is a label used in ICH CAHPS research to describe the most positive responses.

responses and data necessary for risk adjustment.[39] A limitation of this approach is it assumes that patients who receive dialysis at a KCE dialysis facility are aligned to the KCC Model and receive the plurality of their care at that facility.

In the second model, we leveraged a dose–response design, which allowed us to assess whether a higher "dose" of the KCC Model (that is, the proportion of patient-months aligned to the KCC Model at a given dialysis facility) affected survey responses. The main advantage of this approach is that it allows us to explicitly model the fact that not all patients who dialyze at a KCE-partnered facility are aligned to the CKCC option and, likewise, that some patients aligned to the CKCC option do not receive the plurality of their dialysis care from a CKCC partner dialysis facility. Additionally, the first method (DiD) relies on partnerships to identify treatment, which is a CKCC-specific model aspect. The dose–response method allows us to include any and all KCC exposure, including patients aligned to KCF Practices, which cannot partner with dialysis facilities under the KCC Model according to model rules. For the main dose–response analysis, to maintain comparability of results across each method, we measured KCC "dose" in the pre-KCC period as the percentage of CKCC-aligned patients who dialyze at a given facility based on where the patient receives the plurality of their care.[40] Among all dialysis facilities that had sufficient ICH CAHPS Survey responses for inclusion in the analysis and that were not missing risk-adjusters, 545 had a dose of 0%, including 54 CKCC partner dialysis facilities. A total of 3,002 dialysis facilities had a dose greater than 0%, including 1,189 CKCC partner dialysis facilities.

We performed both analyses at the facility-survey-wave level and included dialysis facilities with ICH CAHPS Survey data during the pre-KCC period (spring 2017–fall 2019 survey waves) and in PY 2022 (spring 2022–fall 2022). **Appendix D** includes detailed definitions of the global ratings, individual survey questions, and composite score measures and their corresponding interpretation, as well as a description of the study population, descriptive statistics, and analytic methods.

4.2.2. Patient Activation

We measured patient activation under the KCC Model using the PAM survey. PAM was not developed for use in any specific population. PAM surveys are scored on a 100-point scale corresponding to one of four activation levels that reflect patients' attitudes, motivators, and behaviors.[41] Individuals at the lowest level of activation are limited in their ability to manage their own health due to knowledge and skill gaps. Individuals with high activation exhibit proactive

Levels of Patient Activation in the PAM Survey

Level 1: Disengaged and overwhelmed

Level 2: Becoming aware, but still struggling

Level 3: Taking action

Level 4: Maintaining behaviors and pushing further

[39] To ensure patient confidentiality, the ICH CAHPS data received for this analysis had already applied rules suppressing facility results when there were 10 or fewer respondents in a given period. We also required that a facility have at least two waves of survey responses, one in the pre-KCC period and one in PY 2022.

[40] KCF-aligned patients represent roughly 7% of the total KCC dosage calculation. Estimates from a dose–response model with KCF- and CKCC-aligned patients are robust to the impacts presented. A comparison of dose-response model results is included in **Appendix D**.

[41] Insignia Health. (n.d.). *Patient Activation Measure® (PAM®)*. https://memberconnect.phreesia.com/rs/753-LZD-147/images/PAYER%20-%201%20pager%20-%20Patient%20Activation%20Measure%20-%20PAM%20UK.pdf

health behaviors and are resilient to stress and life changes. Previous studies validating PAM scores note that a four-point improvement is considered a minimal clinically significant difference.[42,43] This measure captures how well Medicare patients in the KCC Model understand and can therefore manage their CKD and ESRD.

To examine the effect of the KCC Model on patient activation, we calculated the risk-adjusted mean difference in PAM scores between the first and last PAM survey taken by patients aligned to KCEs and KCF Practices in 2022.[44] An important limitation of the PAM results is that we could not implement a DiD approach because PAM survey data are not available for the comparison groups of non-participants. Therefore, any change in PAM survey scores should not be interpreted as causal to the KCC Model.

We completed descriptive statistics for patients included and excluded from our PAM survey analysis, focusing on whether any patient subgroup by race or ethnicity, age, dual eligibility, disease status, or KCC Model option was more likely to be excluded from or not respond to the PAM survey analysis. Additionally, we used descriptive statistics to examine potential patterns in survey modality (self-reported or administered by care partner) among patient subgroups. In **Appendix E**, we describe the data sources, study population, and analytic methods and include exhibits providing descriptive statistics by the patient subgroups.

The inclusion criteria for our main analysis, to assess the effect of participation in the KCC Model on patient activation scores, mirrored the KCC Quality Measure inclusion criteria. Specifically, the analysis includes aligned KCC patients who had (1) completed two PAM surveys at least 4 months apart in PY 2022 and (2) did not score a PAM level of 4 (high patient activation) at the time of their first survey (N=78,778 surveys). We performed several sensitivity analyses, including an analysis of unadjusted mean survey score differences, an analysis that included patients with Level 4 activation at baseline (first survey) (N=81,524), and an analysis that excluded all outlier surveys from our patient population (N=52,632 surveys). All regression results are summarized in **Appendix E, Exhibit E-11.**

4.3. Results

Drivers of change within the KCC Model include increased patient education and care coordination as well as enhanced person-centered care and shared decision-making. Thus, we might expect to see improved patient experiences for patients aligned to the model. In addition, the model could lead to improvements in patient activation, an intended outcome of KCC.

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[42] Hibbard, J. H., & Tusler, M. (2007). Assessing activation stage and employing a "next steps" approach to supporting patient self-management. *The Journal of Ambulatory Care Management, 30*(1), 2–8. https://doi.org/10.1097/00004479-200701000-00002

[43] Fowles, J. B., Terry, P., Xi, M., Hibbard, J., Bloom, C. T., & Harvey, L. (2009). Measuring self-management of patients' and employees' health: Further validation of the Patient Activation Measure (PAM) based on its relation to employee characteristics. *Patient Education and Counseling, 77*(1), 116–122. https://doi.org/10.1016/j.pec.2009.02.018

[44] Patient-level covariates used in the risk adjustment included patient race and ethnicity, sex, age, dual eligibility at the time the survey was completed, original reason for Medicare entitlement, patient hierarchical condition category (HCC) score, and chronic disease indicators, including hypertension, diabetes, and several types of cancer. Participant-level covariates included participant geography and KCC Model option (KCF or CKCC).

Potential Impacts | KCC could result in improved patient experiences with in-center HD as well as improved patient activation through the model's emphasis on enhanced patient education, care coordination, and person-centered care.

Findings | Patient experiences with in-center HD were not affected for most measures evaluated, except that an increase in the presence of the KCC Model was associated with a higher percentage of patients discussing PD with their kidney doctor. Patient activation improved in PY 2022 for KCC-aligned patients, but we could not attribute this improvement directly to the model.

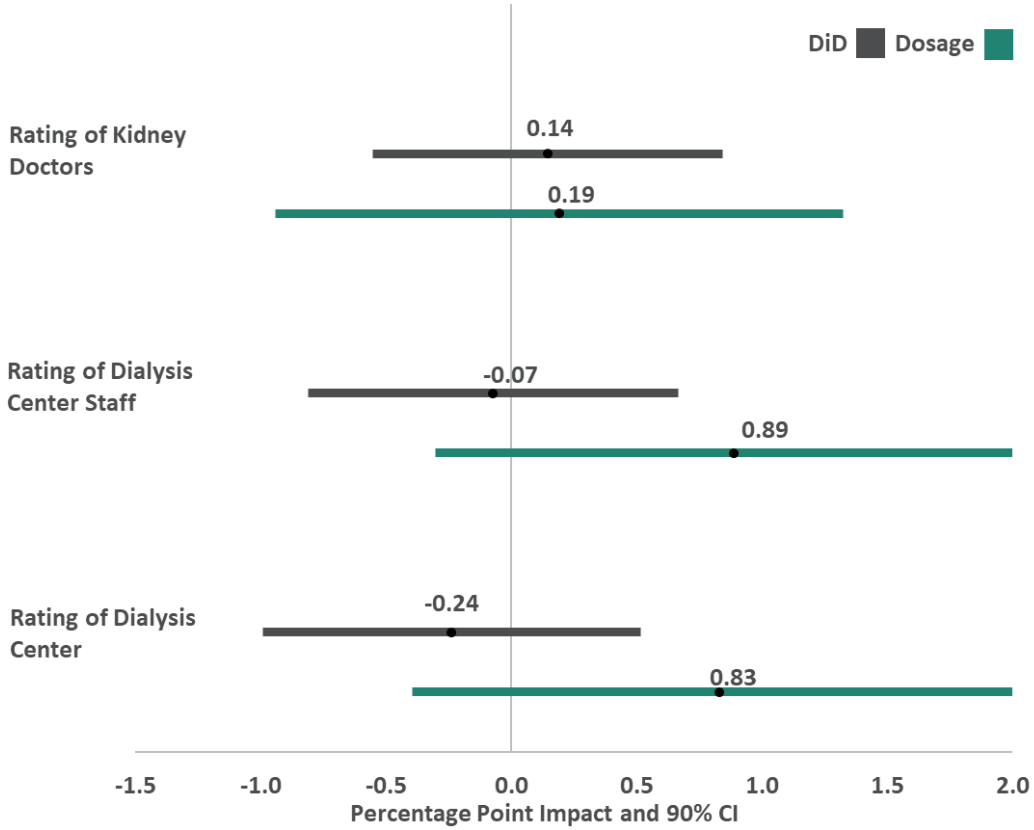
4.3.1. In-Center Dialysis Experience of Care

Overall, with both estimation methods, there was limited evidence that the KCC Model affected patients' experience of care from the pre-KCC to the KCC intervention period relative to the comparison group or dialysis facilities with a KCC "dose" as measured by the ICH CAHPS Survey.[45] For both estimation methods, we found no statistically significant impact of the KCC Model in PY 2022 for the three global rating measures or three composite score measures (see **Exhibits 33** and **34**, respectively). Although reduced quality is a potential concern in any model intended to lower the total cost of care in a vulnerable population, we did not anticipate such an effect given that the existing ESRD Quality Incentive Program (QIP), which includes ICH CAHPS, incentivizes all dialysis facilities to prioritize quality of care and patient experience regardless of their participation in the KCC Model.

For one of three individual survey items evaluated, we found that a higher dose of the KCC Model was associated with a statistically significant increase in the percentage of patients who responded that they have discussed PD with their kidney doctor (2.1 percentage points; $p \leq 0.01$) (see **Exhibit 35**). This result is consistent with a model design feature that incentivizes providers to increase engagement with patients about home dialysis options where appropriate.

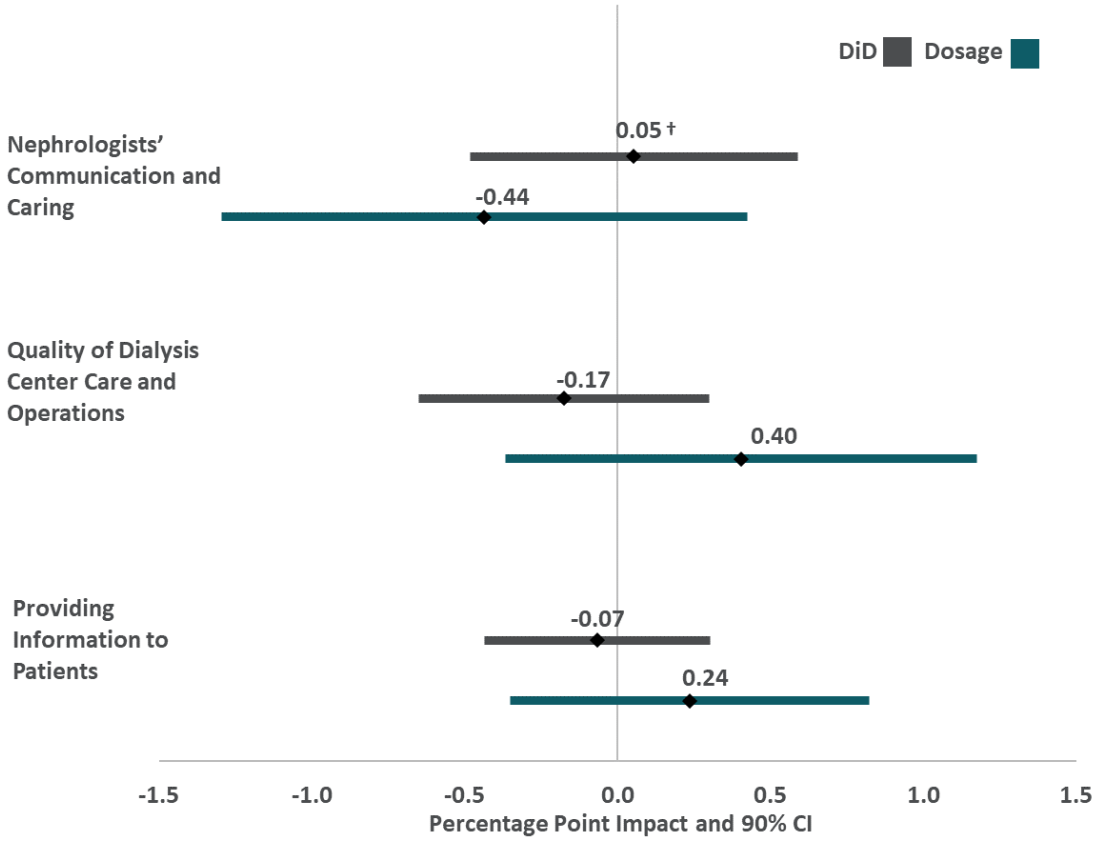
[45] Survey response rates may affect our interpretation of these results. Consequently, we cannot assess whether the observed results are representative of the larger proportion of patients who did not respond.

Exhibit 33. Impact Estimates for In-Center Hemodialysis Patient Experience of Care, Global Ratings



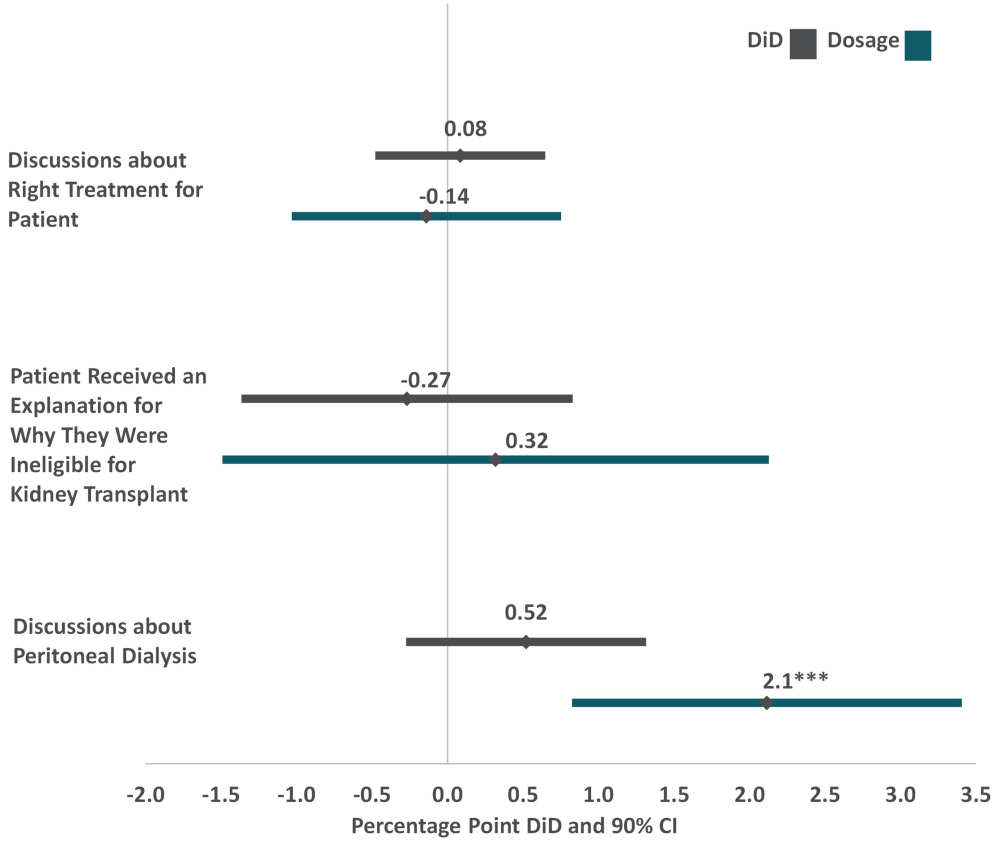
Notes: Pre-KCC and PY 2022 means were adjusted for patient, facility, and market characteristics. Analyses of ICH CAHPS measures were performed using facility-level data. Impact estimates are reported along with lower and upper 90% CIs. Significance of the impact estimates is indicated for each outcome, where * implies significance at the 10% level, ** at the 5% level, and *** at the 1% level assuming a two-tailed test. † indicates that statistical trends tests detected differential trends between the KCC and comparison groups during the pre-KCC period. See **Appendix D**, **Exhibit D-1** for a complete description of the ICH CAHPS items included in these global ratings. CI = confidence interval; DiD = difference-in-differences; ICH CAHPS = In-Center Hemodialysis Consumer Assessment of Healthcare Providers and Systems; PY = performance year.

Exhibit 34. Impact Estimates for In-Center Hemodialysis Patient Experience of Care, Composite Scores



Notes: Pre-KCC and PY 2022 means were adjusted for patient, facility, and market characteristics. Analyses of ICH CAHPS measures were performed using facility-level data. Impact estimates are reported along with lower and upper 90% CIs. Significance of the impact estimates is indicated for each outcome, where * implies significance at the 10% level, ** at the 5% level, and *** at the 1% level assuming a two-tailed test. † indicates that statistical trends tests detected differential trends between the KCC and comparison groups during the pre-KCC period. See **Appendix D**, **Exhibit D-2** for a complete description of the ICH CAHPS items included in these composite measures. CI = confidence interval; DiD = difference-in-differences; ICH CAHPS = In-Center Hemodialysis Consumer Assessment of Healthcare Providers and Systems; PY = performance year.

Exhibit 35. Impact Estimates for In-Center Hemodialysis Patient Experience of Care, Individual Survey Items



Notes: Pre-KCC and PY 2022 means were adjusted for patient, facility, and market characteristics. Analyses of ICH CAHPS measures were performed using facility-level data. Impact estimates are reported along with lower and upper 90% CIs. Significance of the impact estimates is indicated for each outcome, where * implies significance at the 10% level, ** at the 5% level, and *** at the 1% level assuming a two-tailed test. † indicates that statistical trends tests detected differential trends between the KCC and comparison groups during the pre-KCC period. See **Appendix D**, **Exhibit D-3** for a complete description of these individual ICH CAHPS survey questions. CI = confidence interval; DiD = difference-in-differences; ICH CAHPS = In-Center Hemodialysis Consumer Assessment of Healthcare Providers and Systems; PY = performance year.

4.3.2. Patient Activation

In our descriptive analyses of patient activation, we found that PAM survey scores increased overall and across all patient subgroups from the first to the last PAM survey in PY 2022. There was also a high level of agreement in PAM survey responses (see **Appendix E, Exhibit E-2**). The increase in the proportion of "agree" or "strongly agree" responses from the first to the last PAM survey was largest for the following questions:

- "I am confident I can figure out solutions when new problems arise with my health."
- "I know what treatments are available for my health problems."
- "I have been able to maintain lifestyle changes, like eating right or exercising."
- "I am confident that I can maintain lifestyle changes, like eating right and exercising, even during times of stress."

The overall unadjusted mean increase in PAM levels, calculated as the average difference in levels (1–4) from the first to the last survey, was 0.57. All subgroups we examined increased in level from the first to the last survey (see **Appendix E**, **Exhibit E-3).**

In our main analysis, patient activation scores also increased overall and across patient subgroups (**Exhibit 36**). The average score for KCC survey participants from the first to the last PAM survey increased by 8.8 points (90% CI: 8.0, 9.5). The largest mean increase in PAM survey scores occurred in patients with transplants, with a mean risk-adjusted score difference of 12.8 points (90% CI: 10.1, 15.5). The smallest increase overall was in the 75 years and older age group (8.3 points, 90% CI: 7.6, 9.0). Results remained significantly positive in our sensitivity analyses, including our analysis that retained patients with a Level 4 activation score on the first PAM survey and our analysis that excluded patients with outlier scores (see **Appendix E**).

Exhibit 36. Average Change in PAM Survey Score by Patient Subgroup

Group	Characteristic	N	First Survey Mean Score	Last Survey Mean Score	Risk-Adjusted Mean Difference	90% Lower CI	90% Upper CI
Overall		78,778	54.8	63.5	8.8***	8.0	9.5
Sex	Male	41,608	54.7	63.2	8.6***	7.8	9.3
	Female	37,170	54.9	63.9	9.0***	8.2	9.8
Dual Status	Non-Dual Status	57,179	55.2	63.9	8.7***	7.9	9.5
	Partial Dual Status	4,496	54.4	63.1	8.7***	7.7	9.7
	Full Dual Status	17,103	53.4	62.5	9.1***	8.2	9.9
Years of Age	Less Than 65 Years	16,784	56.2	65.6	9.5***	8.6	10.3
	65 to 74 Years	22,968	55.2	64.3	9.1***	8.2	9.9
	75 Years or More	39,026	53.9	62.2	8.3***	7.6	9.0
Patient Type	CKD	41,707	54.7	63.4	8.7***	7.9	9.5
	ESRD	36,662	54.8	63.6	8.8***	7.9	9.6
	Transplant	409	53.7	66.5	12.8***	10.1	15.5

Group	Characteristic	N	First Survey Mean Score	Last Survey Mean Score	Risk-Adjusted Mean Difference	90% Lower CI	90% Upper CI
Model Option	CKCC Option	72,738	54.7	63.3	8.6***	7.8	9.4
	KCF Option	6,040	55.3	66.0	10.7***	8.9	12.5

Notes: Patients who took their first and last surveys closer than 4 months apart and patients who took two PAM surveys on the same day at the same time and received different scores were dropped from the analysis. Significance of the estimate is indicated next to each mean difference, where * implies significance at the 10% level, ** at the 5% level, and *** at the 1% level assuming a two-tailed test. CI = confidence interval; CKCC = Comprehensive Kidney Care Contracting; KCF = Kidney Care First; PAM = Patient Activation Measure.

4.4. Discussion

Patient experience of care and patient activation are among the patient-centered outcomes examined in the KCC Model evaluation. By monitoring impacts of the model on these outcomes, we can determine whether the model may be having the intended effects of improving quality, care coordination, and patient engagement. We can also assess whether the model may be having unintended negative effects on patients' care experiences. For PY 2022, we analyzed responses from two surveys to identify changes in experience of care with in-center HD (ICH CAHPS) and patient activation (PAM) for patients under the model.

In our analysis of ICH CAHPS Survey responses, we found that a higher "dose"[46] of the KCC Model at dialysis facilities was associated with a statistically significant increase from the pre-KCC period to PY 2022 in the percentage of patients who responded that they have discussed PD, the predominant form of home dialysis, with their kidney doctor. This result signals that the model may be making progress toward its goal of increasing the use of home dialysis where appropriate. In addition, increased discussions about PD could suggest improved patient education about treatment modalities, which is also an aim of the model and a stated priority discussed by the PAG. Although ICH CAHPS does not assess experience with home dialysis, the survey can still provide insights into whether the model is improving patient awareness of their treatment options.

For other ICH CAHPS measures, we observed limited changes in patients' experience of care from the pre-KCC to the KCC intervention period relative to the comparison group or dialysis facilities with a KCC dose. These findings suggest that there was little effect of the KCC Model on patient experience of care for in-center HD patients in PY 2022. Existing incentives may help explain why we have not found much early evidence of improvement in patient experience under the model. For example, providers are already incentivized to meet performance thresholds for patient experience of care through the national ESRD QIP, which applies to all Medicare-certified dialysis facilities. In addition, CMS publicly reports an overall patient experience of care star rating on Dialysis Facility Care Compare.

We will continue to examine patient experience of care as the KCC Model matures, not only for patients dialyzing in center but also among patients who are more directly affected by the KCC Model incentives—that is, those receiving dialysis at home as well as patients with CKD Stage 4 or 5. Future analyses will use surveys administered to these groups specifically for the KCC Model

[46] "Dose" refers to the proportion of patient-months aligned to the KCC Model at a given dialysis facility.

evaluation and will be supplemented by existing ICH CAHPS Survey responses to provide a more comprehensive understanding of all patient populations under the model.

The KCC Model is the first CMS kidney quality program to implement the PAM. In our analysis of PAM responses, we observed a clinically meaningful increase in risk-adjusted scores of 8.8 points during the first year. The increase in PAM scores is notably larger than that reported in one multi-center study of patients with CKD not on dialysis and patients with ESRD on dialysis, where the median positive score change was three points for patients in PAM Level 1 and two points for patients in PAM Level 2.[47] Additionally, a study found that median score change for patients in Levels 3 or 4 (highest levels of activation) was 0 and –5.5, respectively.[48] The results of the study suggest that, in general, the magnitude of score changes is expected to decline or reverse over time for those in higher levels of activation. Another study examining the reliability and validity of the PAM survey in non-dialysis-dependent patients with CKD reported ceiling effects in PAM scores and cautioned about the ability to measure score changes over time.[49] Given these notable increases early on, PAM scores might stabilize near a ceiling. Observing additional increases of this magnitude may be difficult as scores are reaching the upper bounds of what is normally seen for this patient population. Moving forward, it will be important to monitor scores for any meaningful decreases.

The increase in PAM scores must also be considered in the context of important limitations. We could not use a DiD approach to evaluate patient activation for two reasons: (1) We lacked PAM survey data for a comparison group. (2) Both the first and second surveys included in our analyses were administered during the intervention period (PY 2022), so we did not have pre-KCC data to use as a baseline. Therefore, we cannot determine whether the increase in scores occurred independent of broader trends that would also affect a comparison group, and any change in PAM survey scores should not be interpreted as causal to the KCC Model. Further, PAM has been validated in the CKD non-dialysis population but not in the population of patients with ESRD. Thus, whether the survey can validly measure activation for patients with ESRD in KCC is unknown.

[47] Gair, R., Stannard, C., Wong, E., Hawkins, J., Van der Veer, S., Farrington, K., Hope, J., & Fluck, R. (2019.) *Transforming participation in chronic kidney disease: A programme review*. The Renal Association. https://www.thinkkidneys.nhs.uk/ckd/wp-content/uploads/sites/4/2019/01/Transforming-Participation-in-Chronic-Kidney-Disease-1.pdf

[48] Ibid.

[49] Lightfoot, C., Wilkinson, T., Memory, K., Palmer, J., & Smith, A. Reliability and validity of the Patient Activation Measure in kidney disease results of Rasch analysis. *Clinical Journal of the American Society of Nephrology, 16*(6), 880–888. https://doi.org/10.2215/CJN.19611220

5. How Did Participants Implement the KCC Model?

In this section, we provide an early snapshot of model implementation based on our analysis of responses to the KCC Participant Implementation Survey. We describe the survey instrument and summarize notable results, including factors affecting the implementation of the model options and the efforts taken by participants to begin their implementation processes. To the extent that the participants in both KCF and CKCC could engage in similar implementation approaches, we draw comparisons between results for the two model options.

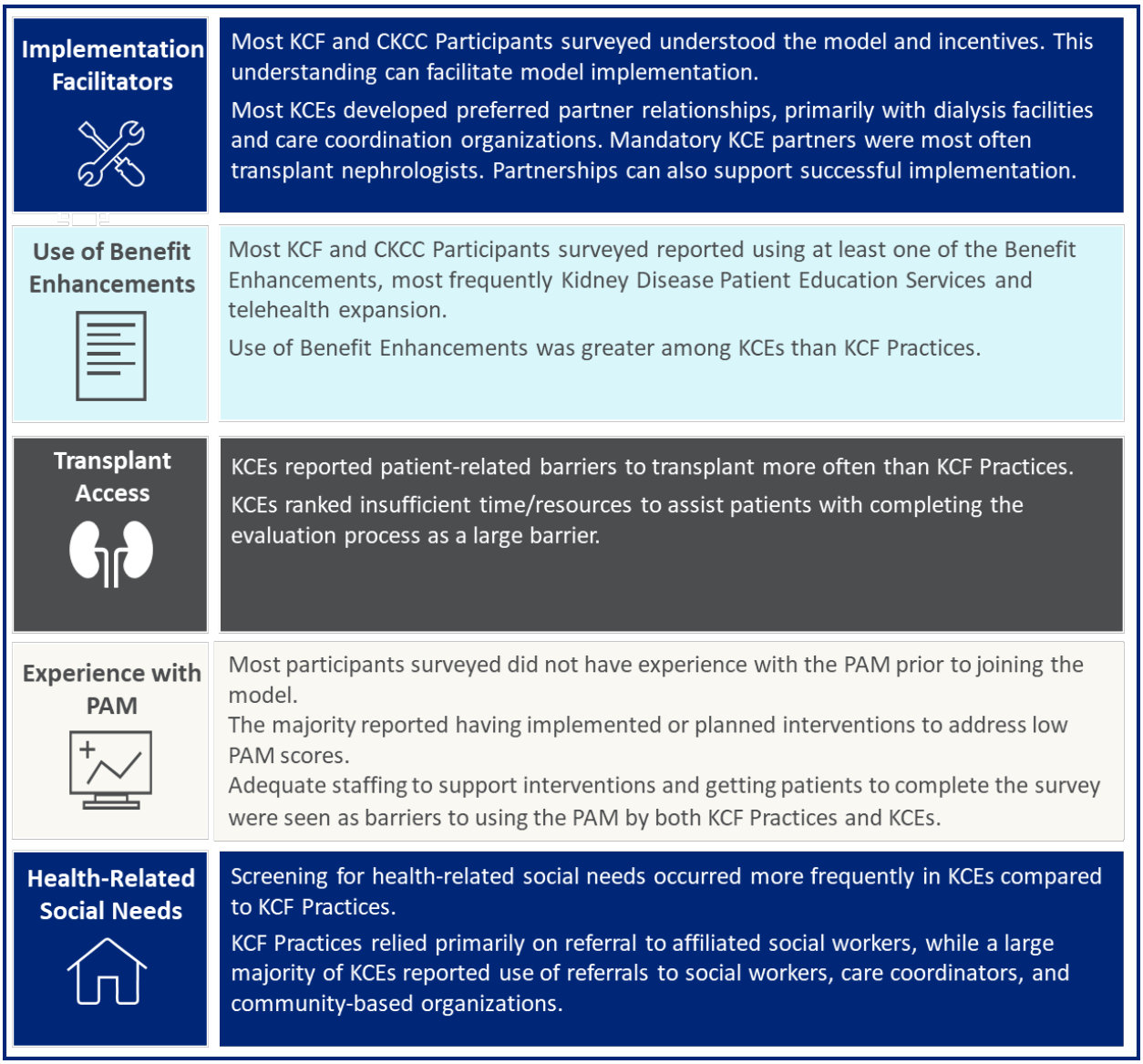
The survey items addressed multiple model design features, key model outcomes, and potential challenges common to KCF Practices and KCEs, allowing for direct comparisons between the model options. Survey topics included the following:

- Reasons for joining the KCC Model
- Choice of the CKCC option (KCEs only)
- Preferred providers and partnerships (KCEs only)
- Barriers and strategies for increasing access to transplants
- Use of available model resources and features, including KCC Learning System activities, Benefit Enhancements, and Beneficiary Engagement Incentives
- Experience with and use of the PAM, a validated survey to assess patients' knowledge, skills, and confidence in their self-management and decision-making capabilities for their health and health care
- Patients' health-related social needs (HRSNs)

5.1. Key Findings

We summarize key findings from the Participant Implementation Survey in **Exhibit 37**. Participants reported that they understood the model and its incentives. One potential facilitator to implementation is preferred partnerships, and most KCEs had formed such relationships, mainly with dialysis facilities and care coordination organizations. Both KCF Practices and KCEs took advantage of Benefit Enhancements, including Kidney Disease Patient Education Services. With regard to transplant access, KCEs cited insufficient resources to help patients with the evaluation as a large barrier to increasing transplant waitlisting. In addition, most participants noted that they are using interventions to address low patient activation, and many KCF Practices and KCEs reported screening for HRSNs, although HSRN screening is more common among KCEs.

Exhibit 37. Key Findings from the Participant Implementation Survey



Note: CKCC = Comprehensive Kidney Care Contracting; KCE = Kidney Contracting Entity; KCF = Kidney Care First; PAM = Patient Activation Measure.

5.2. Methods

We began the evaluation of the model implementation process with the review of application materials submitted for each cohort of participants and program data on model participants. These data informed the design of our primary data collection instruments, including the KCC Participant Implementation Survey.

The KCC Participant Implementation Survey was an online survey of all active KCF Practices and KCEs, including both Cohorts 1 and 2. We collected survey data from June 19, 2023, through August 7, 2023. The survey had both closed and open-ended questions. The survey topics specific to barriers and strategies for increasing access to transplants and use of several Benefit Enhancements (for example, kidney disease education) were informed in part by the PAG

meetings held in October 2022. To address model option-specific features, some items were distinct for KCF Practices and KCEs. For example, the use of formal partnerships or preferred providers was only asked of KCEs because KCF did not include such relationships. Similarly, some Benefit Enhancements were only available to KCEs (see the KCF Practice and KCE survey instruments in **Appendix A**).

We sent the survey via email to all KCF Practices (30) and KCEs (100).[50] Surveys were specific to whether the participant was a KCF Practice or a KCE, and we targeted the universe of KCC Participants rather than a sample. We obtained contact information from the KCC Model website dated March 2, 2023.[51] We supplemented this information with a participant report obtained from the Innovation Center to best identify applicable points of contact.

We analyzed survey responses by examining:

- Categorical proportions for categorical items
- Distributions for items with a five-point Likert scale ("strongly agree" to "strongly disagree") responses
- Ordered frequencies for rank-based survey items, which asked respondents to rank each listed process or activity as a large to small barrier or from most important to least important

In addition, we coded qualitative data from open-ended questions using Atlas.ti to identify common and divergent themes. We did not make statistical comparisons (for instance, of KCF Practice to KCE responses) due to the relatively small sample sizes.

5.3. Results

The survey had a response rate of 77% (n=23) for KCF Practices and 43% (n=43) for KCEs across Cohorts 1 and 2.[52] Responses are specific to each model option and include factors such as potential barriers or facilitators of implementation and the use of Benefit Enhancements or Beneficiary Engagement Incentives. The responses begin to address several of the primary research questions on model implementation. For example, the survey included questions about resource availability and the use of learning and diffusion activities, and we considered how each of these factors varied by model option. We plan to conduct subsequent site visits to collect more information on these questions and address other research questions about specific interventions

[50] The five Cohort 1 KCEs that terminated participation in the model were not included in the Implementation Survey.

[51] The Center for Medicare & Medicaid Innovation. (2023). *Notice of CMS Kidney Care First Practices and Kidney Care Entities Participating in Performance Year 2023 of the of the Kidney Care Choices (KCC) Model.* https://www.cms.gov/priorities/innovation/media/document/kcc-py23-participants

[52] We observed a response pattern for KCEs that were affiliated with one of the large dialysis organizations (LDOs). The responses were nearly identical for each individual KCE associated with the LDO. This pattern resulted in less variation in responses and higher uniformity in response categories. However, we included these surveys as we expect KCEs affiliated with LDOs share similar approaches and experiences with the KCC Model. The results should be interpreted with the understanding that these KCEs reported uniform initial implementation experiences.

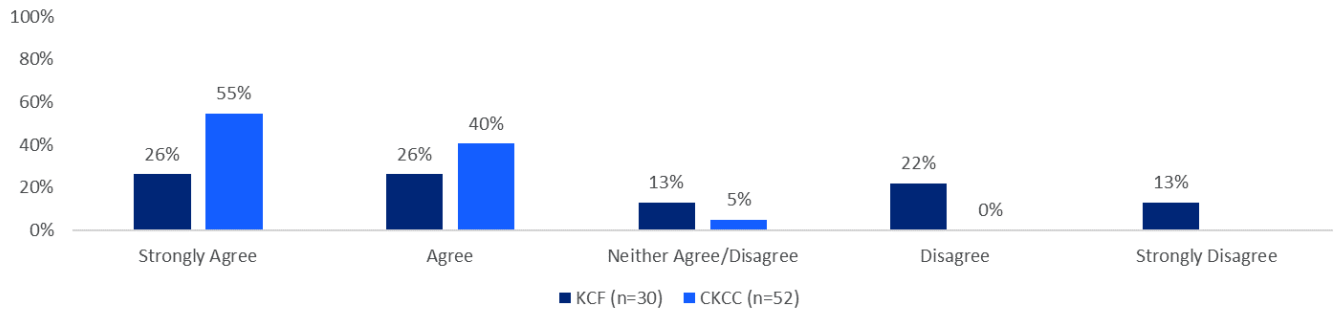
used, how practices changed, and how concurrent participation in other models affected implementation.

5.3.1. Barriers and Facilitators under KCC

Several factors addressed by the survey relate to potential barriers or facilitators of implementation. These include knowledge of the model and its incentives, use of available learning resources, and the types of partnerships in place. These factors can be thought of as prerequisites to implementation.

Successful implementation relies on a solid understanding of the model, whereas a lack of understanding could impede implementation. Almost all (95%) of CKCC Participants either strongly agreed or agreed that their participating providers understood the incentives associated with the model. However, only a slight majority (52%) of KCF Practices strongly agreed or agreed with that statement (**Exhibit 38**). This difference may reflect that the KCF Practices were generally smaller organizations (physician practices) than the KCEs, which were often partnered with dialysis organizations, including large dialysis organizations (LDOs) or integrated kidney care organizations.

Exhibit 38. Please Indicate the Extent to Which You Agree or Disagree with the Following Statement: Our Practice Has a Very Good Understanding of KCF Practice or KCE Payments and Bonuses



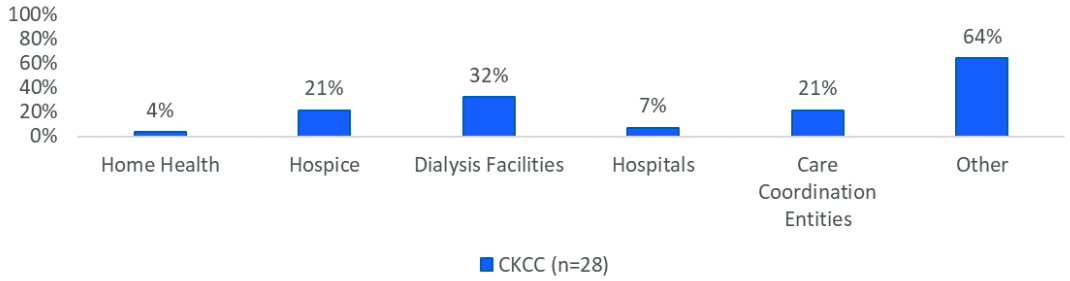
Note: KCE = Kidney Contracting Entity; KCF = Kidney Care First.

Participants can gain or share model knowledge through the KCC Learning System, which provides learning opportunities on model related to topics such as patient-focused care, Benefit Enhancements, and care delivery. The Learning System offers events specific to CKCC, KCF, and both KCC payments options, as well as cross-model events. Most participants in both options engaged in some KCC Learning System activities, with office hours and virtual sessions being popular (see **Appendix A, Exhibits A-1** and **A-2**). However, use was more common (participating in at least one activity) and more intensive (number of activities) among KCEs than among the KCF Practices. Almost 75% of KCEs reported participating in three or more activities, compared with just under 15% of KCF Practices.

Key partnerships and preferred provider arrangements could also be a prerequisite to successful implementation. KCEs may elect to include preferred providers (such as dialysis facilities, hospitals, care coordination entities) that contribute to KCE goals. Preferred providers are optional Medicare-enrolled providers or suppliers and are not responsible for reporting quality through the KCE. Use of partnerships and preferred providers was only asked of KCEs, as it was not relevant

in the narrower structure of practices participating in the KCF option. Of the 42 KCEs who responded, 62% reported preferred provider relationships, 33% reported none, and 5% did not know when asked whether their KCE includes any preferred providers. Among those that reported having at least one preferred provider, provider types included dialysis facilities (32%), care coordination entities (21%), hospice organizations (21%), hospitals (7%), and home health agencies (4%) (see **Exhibit 39**).[53] In addition, 64% reported a preferred provider other than one of the pre-specified types, with dieticians and ambulatory surgery centers cited most frequently. For partnerships, transplant nephrologists (68%) were most frequently reported, followed by transplant surgeons (18%), and transplant centers (14%); one partnership was with an organ procurement organization (2%).

Exhibit 39. Percentage of KCE Preferred Provider Types



Notes: About 64% reported "other" (n=18) preferred provider types, including dietician, ambulatory surgery center (n=15), mental health provider (1), primary care (1), skilled nursing facility, general surgery practice for access placement (1).
KCE = Kidney Contracting Entity.

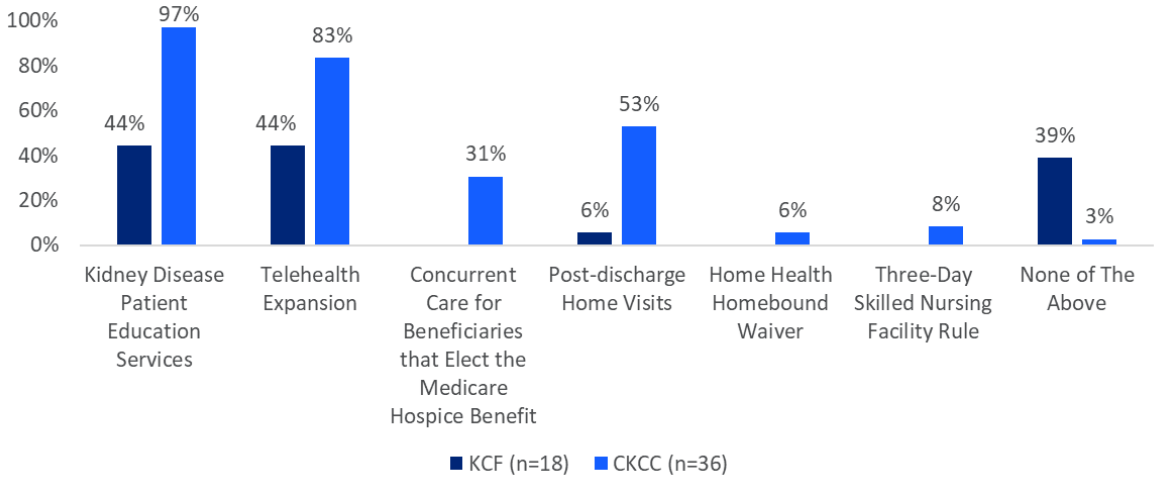
5.3.2. Benefit Enhancements and Beneficiary Engagement Incentives

KCF Practices and KCEs can take advantage of several Benefit Enhancements. These optional model elements are intended to provide participants with flexibility in model implementation, addressing needs such as patient education or mode of patient visit (for example, telehealth, post-discharge home visits).

Most KCF (61%) and CKCC (97%) Participants surveyed reported using at least one of the available Benefit Enhancements, with Kidney Disease Patient Education Services and telehealth expansion reported most frequently (see **Exhibit 40**). Use of the enhancements that are available in both options was greater in KCEs. Less than 10% of KCEs also reported use of model-specific enhancements (Home Health Homebound Waiver and 3-day Skilled Nursing Facility Rule).

[53] Respondents did not answer every question.

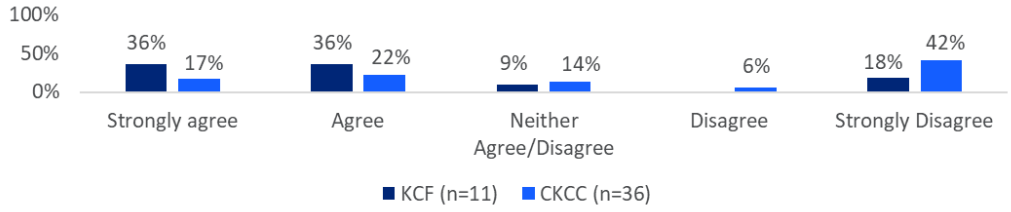
Exhibit 40. KCF Practices or KCEs Can Elect to Take Advantage of Several Benefit Enhancements. Select All of the Following Which Your Practice/KCE Uses.



Note: KCE = Kidney Contracting Entity; KCF = Kidney Care First.

We observed slight differences between participants in KCF and CKCC in whether they felt use of the Benefit Enhancements (for instance, Kidney Disease Patient Education Services benefit) outweighed any barriers. A larger percentage of KCF Practices responded that they strongly agree or agree, whereas a larger percentage of KCEs reported that they disagree or strongly disagree (see **Exhibit 41**). This result may suggest a gap in expectations between providers and patients when viewed through the lens of the PAG, which emphasized the need for providers to educate and engage patients earlier and more often than they are now. However, education and patient engagement can occur outside the scope of the Benefit Enhancements.

Exhibit 41. Please Indicate the Extent to Which You Agree or Disagree with the Following Statement: Overall, the Potential for Improving Care and Outcomes Outweighs Any Barriers to Using the Benefit Enhancements



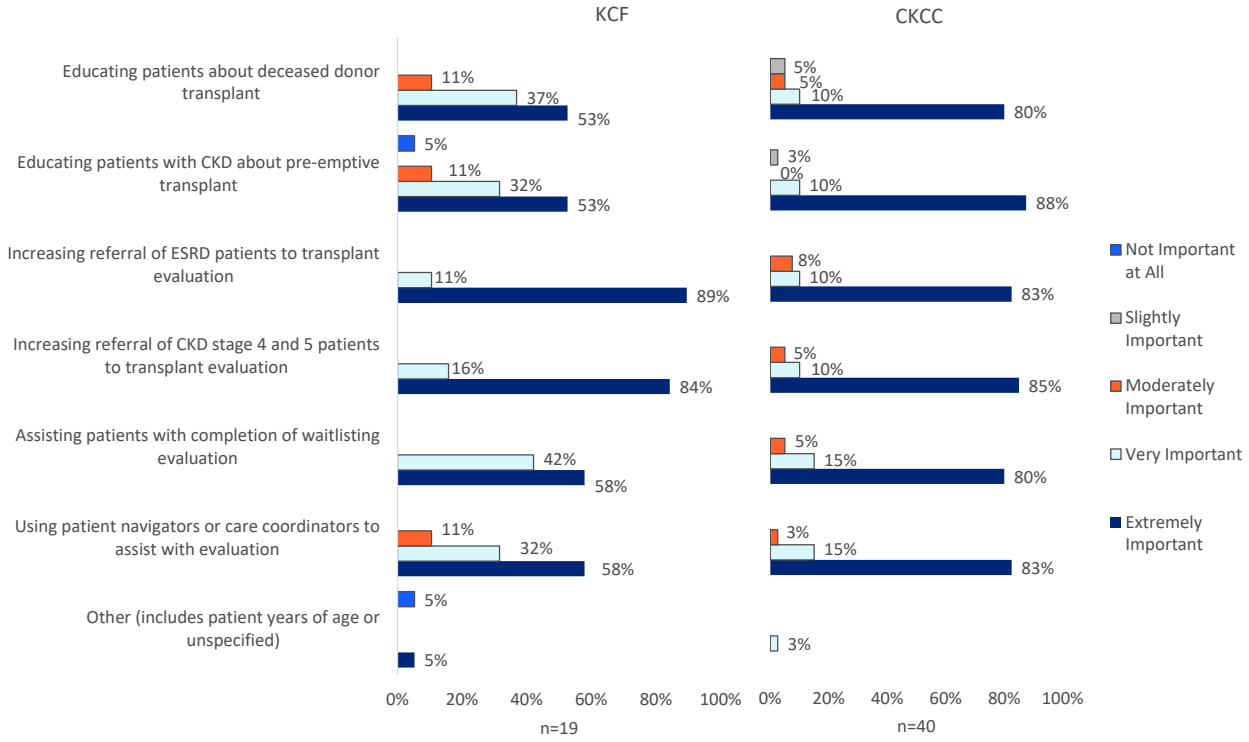
Note: KCE = Kidney Contracting Entity; KCF = Kidney Care First.

In addition to Benefit Enhancements, participants can offer certain Beneficiary Engagement Incentives. Participants in both model options could opt to use Beneficiary Engagement Incentives for chronic disease management rewards and cost-sharing support (details of the cost-sharing support differed by model option; see **Appendix A**). We observed greater differences in Beneficiary Engagement Incentive use between KCF and CKCC Participants than in Benefit Enhancement use. Only one of the 25 responding KCF Practices (4%) reported use of cost-sharing support, and none reported use of disease management rewards. Conversely, 76% of responding KCEs reported use of cost-sharing support, and 61% reported use of disease management rewards. Only 21% of KCEs did not use either of the available Beneficiary Engagement Incentives.

5.3.3. Transplant Access

Respondents assessed the importance of strategies to increase waitlisting and ranked the importance of perceived barriers to this goal. KCF Practices generally selected five of the six strategies as "extremely important" or "very important" to increased waitlisting (see **Exhibit 42**). One marked difference is that 84% and 89% selected increasing referrals for patients with CKD Stage 4 or 5 and patients with ESRD, respectively, as "extremely important," whereas the relative percentages of "extremely" and "very important" were closer or the same in magnitude for the other strategies. Responses from KCEs were more uniform than those received from KCF Practices. Between 80% and 88% of KCEs surveyed rated each of the six strategies as "extremely important."

Exhibit 42. Please Rate Each Strategy Below Based on Its Importance to Increasing Waitlisting



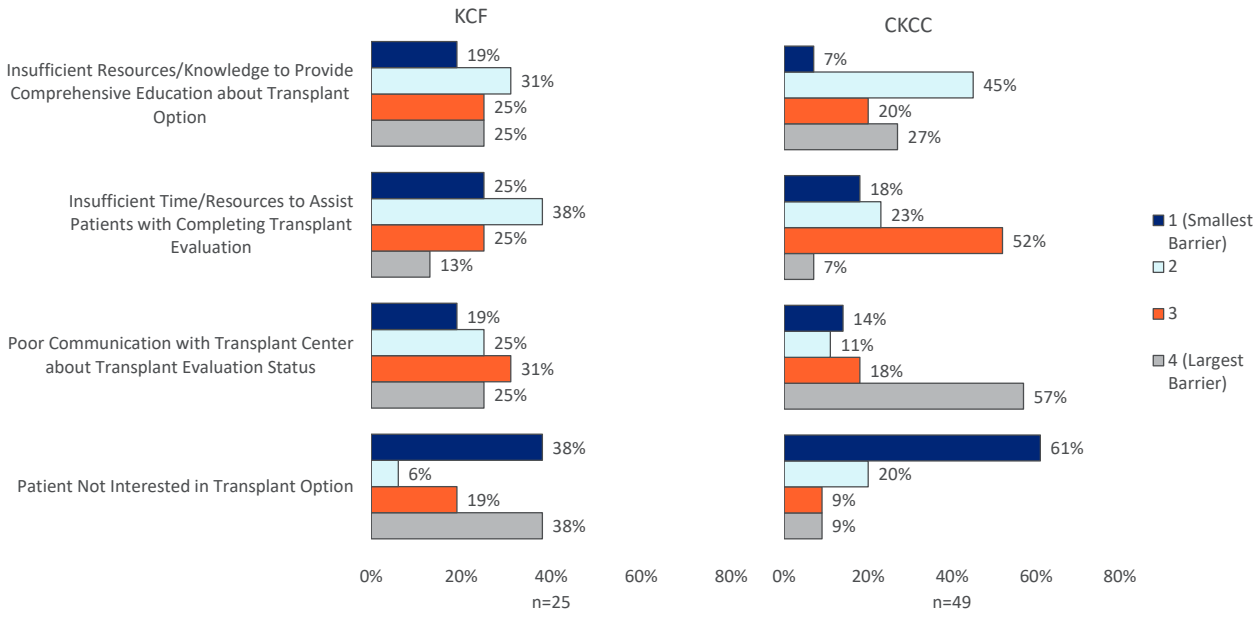
Note: CKCC = Comprehensive Kidney Care Contracting; CKD = chronic kidney disease; ESRD = end-stage renal disease; KCF = Kidney Care First.

More than half of KCF Practices reported poor communication with the transplant center (56%) and patient not interested (57%) as a large or the largest barrier to increased waitlisting, whereas insufficient time or resources to assist the patient with completing the evaluation process was reported as a small or the smallest barrier by 63% of KCF Practices (see **Exhibit 43**). Among KCEs, poor communication with the transplant center (75%) and insufficient resources to assist patients with the evaluation (59%) were reported as a large or the largest barrier to increasing transplant waitlisting.

The ranking of relative importance of barriers differed by model option. A larger percentage of KCEs than KCF Practices reported resource limitations for educating patients and poor

communication with transplant centers as a large or the largest barrier. In addition, 81% of KCEs ranked limited patient interest as a small or the smallest barrier, compared with 44% of KCF Practices.

Exhibit 43. Rank the Following Barriers from Smallest (1) to Largest (4) Barrier to Increasing Waitlisting at Your Practice(s)

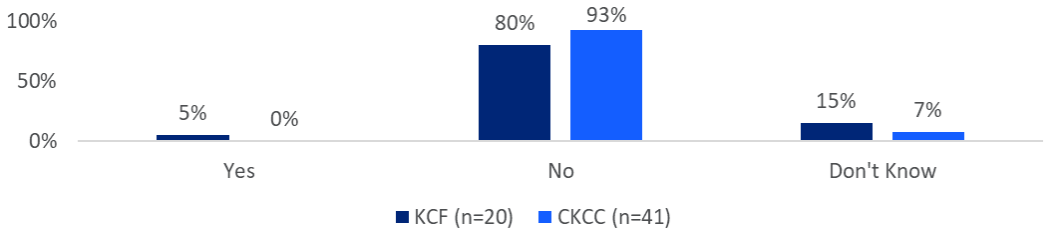


Note: CKCC = Comprehensive Kidney Care Contracting; KCF = Kidney Care First.

5.3.4. Patient Activation

As discussed in **Section 4**, the PAM is a multi-item measure to assess patient knowledge, skill, and confidence for self-management of their care and serves as one of the KCC Model's quality measures.[54] Most participant respondents in either model option indicated they had not used the PAM prior to the model (80% of KCF Practices and 90% of KCEs) (see **Exhibit 44**).

Exhibit 44. Was/Were Your KCF or KCE Practice(s) Using the Patient Activation Measure (PAM) with Your CKD and ESRD Patients Prior to Participating in the KCC Model?



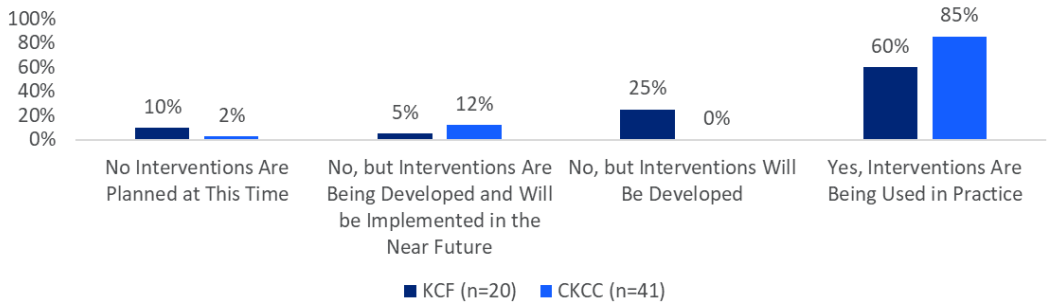
Note: CKD = chronic kidney disease; ESRD = end-stage renal disease; KCE = Kidney Contracting Entity; KCF = Kidney Care First.

When asked about whether they are using interventions to address low PAM scores, a notable percentage (60% of KCF Practices and 85% of KCEs) said they had already incorporated

[54] The impact of the model on PAM is presented in **Section 4**.

interventions into practice (see **Exhibit 45**). Further, 5% of KCF Practices and 12% of KCEs indicated they will develop interventions for implementation in the near future.

Exhibit 45. Does Your KCF or KCE Have Specific Interventions for CKD and ESRD Patients with Low Patient Activation Measure (PAM) Scores?

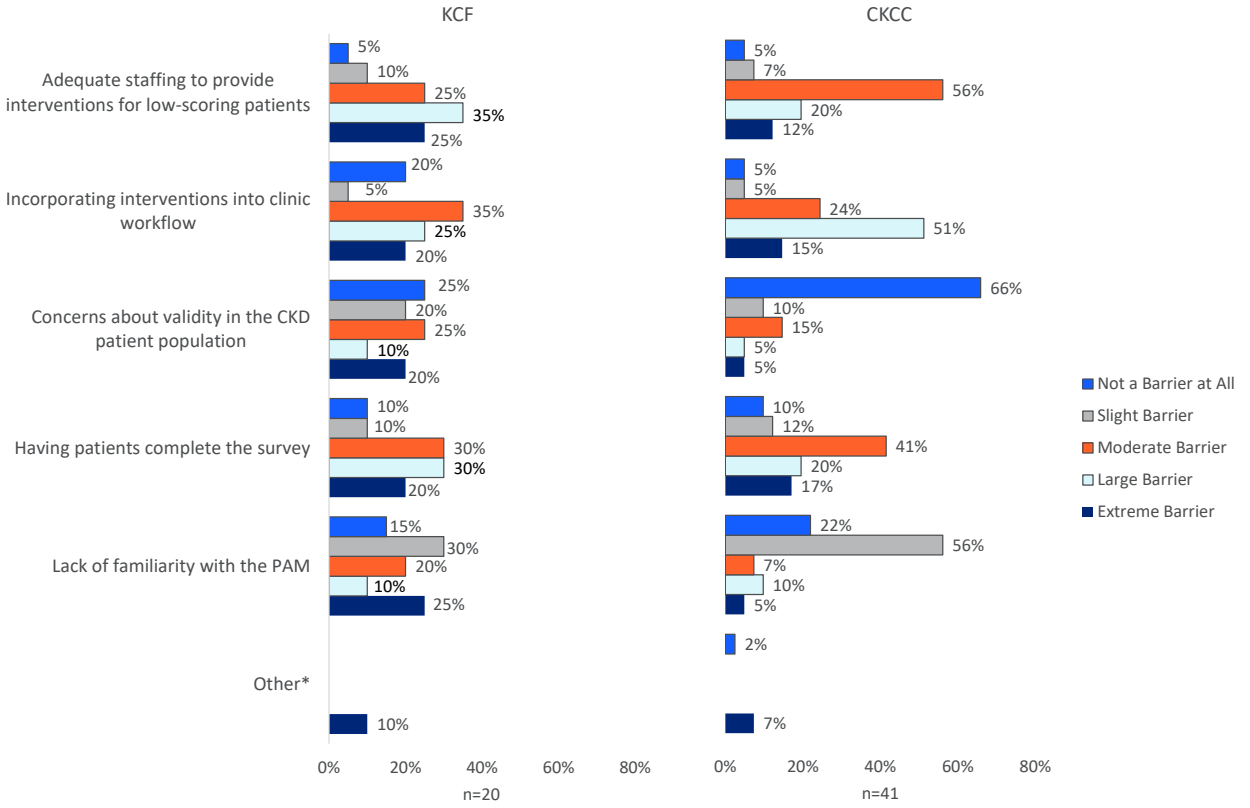


Note: CKD = chronic kidney disease; ESRD = end-stage renal disease; KCE = Kidney Contracting Entity; KCF = Kidney Care First.

Participants also rated barriers to implementing PAM in practice (see **Exhibit 46**). Among KCF Practices responding to the survey, large or extreme barriers included getting patients to complete the survey (50%) and adequate staffing to effectively intervene for low-scoring patients (60%). Concerns about validity (45%) and lack of familiarity with PAM (45%) were considered not a barrier or only a slight barrier.

KCEs viewed incorporating interventions into the clinic workflow as a large or extreme barrier (66%), whereas concern about validity of PAM in the CKD population was not considered a barrier or was only a slight barrier (76%). Similarly, a lack of familiarity with PAM was also seen as a slight barrier or not a barrier (78%). KCF Practices and KCEs diverged somewhat in their rating of specific barriers as large or extreme. Notably, they differed in their rating of incorporation of interventions into clinic workflow as a large or extreme barrier (KCEs: 66% vs. KCF Practices: 45%), and a lack of familiarity with PAM was not considered a barrier or was ranked as only a slight barrier by a higher percentage of KCEs (68%) versus KCF Practices (45%). The overall distribution of ratings for each factor as not a barrier to an extreme barrier varied more among KCEs compared with KCF Practices.

Exhibit 46. Rate the Following Barriers to Using the Patient Activation Measure (PAM) in Practice



Notes: For KCF Practices, *other* included complexity of PAM. For KCEs, *other* included the following: dialysis providers not allowing care management resources into centers to administer PAM, patient abrasion with surveys, difficulty engaging the patients, inability to access patients in non-LDO dialysis centers not part of KCEs, manpower costs to administer and track, patient survey fatigue, provider time to administer the survey, and short window of time to resurvey patients before the end of the PY. CKCC = Comprehensive Kidney Care Contracting; KCF = Kidney Care First; LDO = large dialysis organization; PAM = Patient Activation Measure.

5.3.5. Health-related Social Needs

CMMI has stated its commitment to improving health equity in its payment models. When patients' HRSNs are not met, issues with equity in access to care and health outcomes can be created or exacerbated. For example, patients with transportation barriers may miss medical appointments including dialysis sessions, and those struggling to pay utility bills may not be able to afford essential medications. Therefore, we asked both KCF and CKCC Participants whether they screened for HRSNs, as well as what actions they took for patients who screened positive. These actions could include referring patients with these needs to care coordinators or social workers within the dialysis practice or referring them to local community-based social services organizations with the ability to assist patients in addressing their HRSNs. An example of such assistance that promotes health equity could include a community organization helping an eligible low-income patient with kidney disease, diabetes, and food insecurity to enroll in the federal Supplemental Nutrition Assistance Program. At the same time, the patient's health care providers may offer tailored nutrition counseling, thereby enabling the patient to achieve better outcomes by adhering to a healthier diet for their kidney disease and diabetes.

KCEs screened for HRSNs more frequently (90%) than did KCF Practices (44%) (see **Appendix A, Exhibit A-3.**). Differences in types of assistance provided to patients with HRSNs were even larger between these model option participants. KCF Practices primarily relied on referral to affiliated social workers (70%) and seldom used the other strategies (25% referred to a care coordinator and 10% referred to a community-based organization). Conversely, most KCEs used each of the three types of assistance (98% referred to affiliated social workers, 91% referred to a care coordinator, and 79% referred to a community-based organization) (see **Appendix A, Exhibit A-4.**).

5.4. Discussion

Both KCF Practices and KCEs have taken several implementation steps, ranging from learning about the model options and their incentives to making new investments and changing behaviors. They participated in KCC Learning System activities, used waivers, assessed and assisted with patient activation and social needs, and—in the case of KCEs—built formal partnerships and preferred provider relationships.

On most measures, KCEs reported more extensive engagement and implementation activities than did KCF Practices. These differences make sense given that the CKCC model option requires transplant provider partners and allows other relationships, such as affiliations with dialysis organizations. In addition, CKCC is a total cost of care model (although variable based on risk track), which amplifies participants' incentives to pursue interventions such as care coordination. Multiple strategies to increase transplant waitlisting were deemed important by both KCF Practices and KCEs. However, participants rated barriers to increased waitlisting differently, with KCEs viewing patient-related barriers such as lack of patient interest in transplantation as more important than did KCF Practices.

The use of PAM and reported barriers varied somewhat between KCF Practices and KCEs. Although a large percentage of KCEs reported using interventions to address low PAM scores, a notable percentage of KCEs also reported that incorporating interventions into clinic workflow was a large barrier. In contrast, KCF Practices generally reported incorporation of interventions into clinic workflow as a slight barrier or not a barrier. We will explore this difference further in site visit interviews.

Another area of divergence between the model option participants was in the ranking of barriers to increase waitlisting. One key theme of the PAG discussions was that, in general, education about transplants varies considerably and is often insufficient due to a lack of information provided or support through the referral and evaluation process. Survey responses from the KCEs somewhat aligned with this point: 59% of KCEs ranked insufficient time or resources to assist patients with completing the transplant evaluation process as a large barrier or the largest barrier. In contrast, only 38% of KCF Practices indicated that this factor was a large or the largest barrier.

These results should be interpreted with some caution, as many of the responses from individual KCEs were affiliated with the same dialysis organization, and those survey responses were identical, suggesting that the dialysis organization responded from the perspective of the organization as a whole rather than fully reflecting variations in local context. Although it is reasonable to expect some correlation in practices and perceptions across different KCEs affiliated

with the same dialysis organization, our results may underestimate the extent of within-organization variation. If so, we may have overestimated the differences between KCF and CKCC Participants. For example, the uniform responses about the use of a Benefit Enhancement may accurately reflect the typical approach taken by KCEs in that LDO, but it is possible that some of the KCEs have not yet implemented the enhancement.

This Participant Implementation Survey is one component of an iterative mixed-methods approach to develop our overall understanding of the model. Subsequent site visits and key informant interviews will allow us to further investigate new participant investments and behaviors to implement the model, as well as specific barriers and strategies to increase waitlisting, shift more patients toward home dialysis, and slow disease progression. The site visits may also help explain some of the differences seen between the responses of KCF Practices and KCEs, such as KCEs being more likely to rank insufficient time or resources to assist patients with completing the evaluation process as a significant barrier. We will also explore two patient-reported surveys on patient experience and quality of life in the second annual evaluation report.

6. Did the KCC Model Have Unintended Consequences?

Although the intent of the KCC Model is to improve the quality of care while reducing costs, the incentive structure could have unintended impacts on provider behavior that may affect care delivery, Medicare payments, or patient selection. Thus, an important component of the evaluation of the KCC Model is identifying potential unintended impacts of the incentives created by the model. For this first annual evaluation report, we evaluated one measure of potential unintended consequences. For the CKCC model option, we assessed whether costs were shifted to Part D, which was outside the scope of shared savings or risks (Part A and B payments). In future evaluation reports, we will continue to evaluate potential unintended consequences as the model matures through both quantitative and qualitative analyses.

6.1. Key Findings

We summarize key findings from our analysis of unintended consequences in **Exhibit 47**. We did not identify increases in Part D drug costs associated with participation in the CKCC model option in PY 2022. This result suggests that providers did not shift care from Part A and B services toward Part D to improve their payment outcomes under the model.

Exhibit 47. Unintended Consequences of the KCC Model

Medicare Part D Drug Costs	There is no evidence that changes in care as a result of the CKCC model option increased Part D drug costs PPPM.

Note: CKCC = Comprehensive Kidney Care Contracting; PPPM = per patient per month.

6.2. Methods

We assessed potential unintended consequences using the same DiD approach that we used to estimate the main impacts of the KCF and CKCC model options. The analysis of the impact of the KCC Model on Medicare Part D PPPM costs is restricted to patients with Part D coverage, representing 80% and 79% of the analytic sample for KCF Practices and KCEs, respectively. The DiD model for Part D PPPM drug costs follows the same specifications as the models described in **Section 3** and **Appendix B**.

6.3. Results

As a total cost of care model with shared savings or losses based on Total Medicare Parts A & B payments, the incentives in the CKCC option might lead providers to shift costs toward Part D if outpatient pharmaceuticals can be substituted for injectable medications or non-pharmaceutical

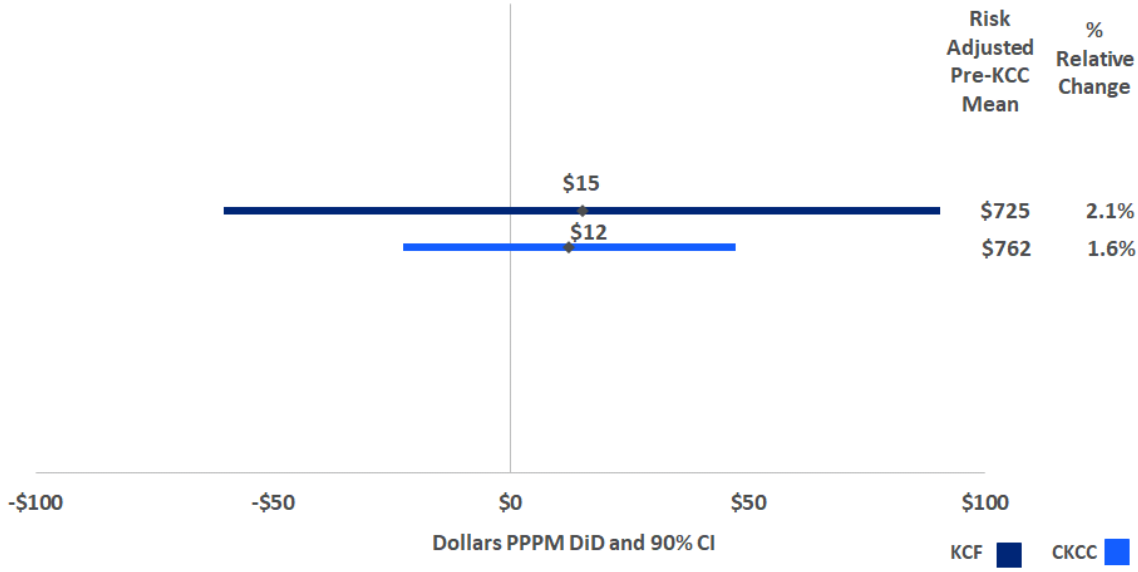
services.[55] We might expect the potential unintended consequence of increased Part D drug costs for patients aligned to the CKCC model option.

Potential Impacts | Because shared savings or losses are based on Part A and B payments, the CKCC option may lead to the unintended consequence of increased Part D drug costs.

Findings | There were no early impacts of the CKCC option or the KCF option on Part D drug costs.

Overall, the KCC Model did not have a statistically significant impact on Part D drug costs. Payments for KCC-aligned patients and the comparison group rose from the pre-KCC period to PY 2022. KCF is not a total cost of care model, so we would not expect to see an increase in Part D costs PPPM. However, we analyzed the impact of the KCF model option on this outcome measure for completeness. The KCF model option also did not have a statistically significant impact on Part D drug costs relative to the comparison group (see **Exhibit 48**).

Exhibit 48. Impact of the KCC Model on Part D Drug Costs



Notes: Denominator includes patients with CKD, ESRD, or transplant. Significance of the DiD impact estimate is indicated next to each estimate, where * implies significance at the 10% level, ** at the 5% level, and *** at the 1% level assuming a two-tailed test. † indicates that statistical trends tests detected differential trends between the KCC and comparison groups during the pre-KCC period. Total Part D costs represent total costs of prescriptions, including ingredients costs, dispensing fees, sales tax, and vaccine administration fees (if applicable). CI = confidence interval; CKCC = Comprehensive Kidney Care Contracting; DiD = difference-in-differences; KCF = Kidney Care First; PPPM = per patient per month.

[55] Total Part D drug costs represents the total costs of prescriptions, including ingredient costs, dispensing fees, sales tax, and vaccine administration fees (if applicable). Medicare's share of these costs depends on many factors, including the Plan Benefit Payment benefit structure, patient cumulative drug utilization at the date of services, drug rebates, and CMS subsidies. This report does not evaluate the impact on Medicare Part D payments.

6.4. Discussion

In a shared savings model that encourages lower payments such as the CKCC option, it is important to monitor potential unintended consequences that may negatively affect patient care or that involve shifting care to domains not included in the total cost of care calculations. One example is a potential shift toward payments on outpatient medicines covered by Part D. Because Part D is voluntary and not a benefit held by all patients, Part D payments are not included in the CKCC total cost of care calculations. Thus, the model could create an incentive to substitute certain Medicare Parts A & B services for Part D drugs where possible. However, we did not find a statistically significant difference in the change in Part D drug costs from the pre-KCC period to PY 2022 between the CKCC and comparison groups. The estimated impact of the CKCC model option on Part D drug costs, while positive, was small and not statistically different from zero.

KCF Practices may not consider the cost or utilization of services for which they are not directly accountable. One such service could be avoidable use of the ED. Thus, as part of our analysis of model impacts, we assessed whether ED visits without a subsequent hospitalization rose for KCF Practices relative to the comparison group (see **Section 3.3.1.2**). As with Part D payments for KCEs, we did not find evidence of an increase in ED visits without hospitalization for KCF Practices.

We will continue to monitor Part D drug costs for unintended consequences in future annual evaluation reports. In addition, we will remain cognizant of other potential unintended consequences that may be suggested by future qualitative or quantitative findings. The PAG raised several concerns about model implementation that could guide future analyses of unintended consequences. First, testing for care stinting under the CKCC total cost of care framework could be expanded to measures beyond shifting costs to Part D. Second, although PAG members agreed with the model's goals, such as increasing home dialysis, they also noted major gaps in education about kidney disease generally and modality choice in particular. PAG members expressed concern that providers may respond to model incentives by steering too many patients to home dialysis. If shifts toward home dialysis are not patient centric, we may expect to see an increase in patients who start home dialysis but quickly switch or return to in-center dialysis. Most home dialysis initiation occurs relatively early in the course of ESRD, and patients would need to be followed for a period to investigate rates of switching between home and in-center dialysis. We did not believe that sufficient events and follow-up would have accrued to analyze this outcome in the first evaluation report. In addition to analyses of early modality switches, the upcoming home dialysis and CKD Stage 4 or 5 patient experience surveys could provide evidence on how patients feel about their provider's role in modality choice.

> *"I had stated to my doctor three different occasions that I wanted to do in center … I kept getting pressure and pressure and pressure to try home [dialysis]. So I thought, well, he's the doctor so we did. We went for two weeks on training, and it was a horrible experience … and finally I went on in-center, and everything was fine. [I had to] raise my voice to my doctor and be like either we're [going to] do it the way that I agree to do it, or I'm [going to] go find somebody that's going to stay with me and help me out. Once that conversation took place, everything was fine."*
>
> *– Patient Advisory Group Participant*

7. Discussion

The KCC Model builds on the completed CEC Model by strengthening financial incentives for desired outcomes, including increasing home dialysis and transplantation rates, reducing total spending on Part A and B services, enhancing or maintaining quality of care, and delaying the progression of kidney disease. The KCC Model offers multiple options for provider participation. Model design reflects voluntary participation in one of two model options. Nephrology practices could elect to participate in the KCF model option, receiving capitated payments for managing the care of aligned patients, payment adjustments based on quality and utilization, and bonus payments for successful transplantation. The CKCC model option is available to nephrology practices that team with a transplant provider and optional partners such as dialysis facilities to form KCEs. Unlike KCF, CKCC is a total cost of care model for all Medicare Parts A & B services and features three options with different levels of participant risk.

The KCC Model began with an initial cohort of participants on January 1, 2022, and will run for 5 years. A second and final cohort of participants joined the model on January 1, 2023. Unlike the concurrent ETC Model, which mandated participation by dialysis facilities and managing clinicians located in randomly selected geographic areas, KCC participation was fully voluntary.

We observed early effects for a number of outcomes. Higher use of home dialysis modalities is a major model objective. In KCF, overall home dialysis and PD rates increased. In CKCC, PD rates increased, and the increase in overall home dialysis was almost significant. Increased access to transplantation is another major model objective. Although transplantation rates did not change differentially for participants relative to non-participants in year one, waitlisting, a precursor of most transplants, did increase substantially in CKCC and was driven by an increase in patients with active status on the waitlist. Given the potential role of the transplant providers, which are mandatory participants in each KCE, site visits to be conducted in the coming evaluation year and reported in AR2 will explore potential mechanisms underlying this result. There were also several suggestive findings where the estimated impact was qualitatively meaningful but the effect narrowly missed statistical significance. These included a reduction in Total Medicare Parts A & B payments of more than 3% in KCF and a 2 percentage point absolute (57% relative) increase in preemptive transplantation in CKCC. We will monitor each of these suggestive findings in future ARs to determine whether the accumulation of more data and experience in the model ultimately confirms the effects as significant. For many other outcomes, the KCC Model showed no statistically significant effects in its first year of operation. Outcomes without significant effects included Total Medicare Parts A & B payments, net savings or losses to Medicare, hospitalization rates, the use of selected medications, and transplantation rates. We will also continue to monitor these outcomes in future ARs.

KCC relies on voluntary participation. As such, an understanding of who participated can inform both the evaluation design (which variables should be matched or included as statistical controls and what is the extent of potential selection bias) and policy decisions (would the model be scalable to types of providers that may not have participated voluntarily). Cohort 1 KCC Participants operated in about two-thirds of states, although the Midwest and portions of the West were underrepresented. For most provider, patient, and market characteristics, differences between KCF Practices, KCEs, and non-participants were modest. However, several differences did emerge. Participants, even in the KCF option, which was designed to be more accessible to

individual practices, were notably larger than non-participants. Model participation was also associated with prior CEC participation. Sociodemographic factors including ADI scores and percentage of patients who are Black or African American varied modestly across most model participant groups and non-participants, but these values were lower in areas where CKCC Global participants operated. This finding indicates that we should monitor whether the outcomes ultimately associated with that option differ from those in other model options and how any differences affect equitable access to benefits of the model.

> *"We're all aware of the stroke signs, and when someone's having a stroke or things like that, so just getting the word out about how important kidneys are… It's just kind of pushed to the side."*
>
> *– Patient Advisory Group Participant*

An important value underlying the KCC Model is the promotion of patient-centric care. To that end, we convened a PAG to inform this evaluation. The PAG consisted of 15 patients who had experienced CKD and various renal replacement therapy modalities. Four major themes emerged from the discussions: insufficient kidney disease education generally, gaps in modality education and selection, need for improved access to transplants, and recognition of care partner burden. These findings will guide interpretation of quantitative results and design of qualitative approaches, such as the upcoming site visits. In addition to the PAG, we captured the patient perspective through two patient surveys on experience of care. In-center dialysis experience was assessed using the ICH CAHPS Survey. In the first year of KCC, for most measures, there were no statistically significant changes in patient experience for either of the model options versus their comparison groups. We also used the PAM survey to assess individuals' fundamental knowledge, skills, and confidence necessary for an individual to manage their health care. We found that overall and across all patient subgroups, there was a statistically significant increase in PAM survey scores from the first to the last PAM survey for KCF- and CKCC-aligned patients. Given the concerns raised by the PAG, these increases are encouraging. However, due to limitations of the PAM analysis (lack of pre-KCC PAM surveys as baseline and lack of comparison group surveys), we cannot interpret the increases as causal to the KCC Model.

We also surveyed KCC Participants about their preparations for model participation; use of model design features, such as Benefit Enhancements, Beneficiary Engagement Incentives, and Learning System activities; strategies to increase transplantation; and use of the PAM and assessments of patients' HRSNs. On most measures, CKCC Participants reported more extensive engagement and implementation activities than did their counterparts in KCF. These differences are consistent with the broader nature of the CKCC model option, with its required and optional partnerships. CKCC Participants also reported higher use of interventions for low PAM scores or social needs. These survey results will help inform the upcoming site visits and allow us to assess implementation steps and barriers in more detail.

We also assessed unintended consequences of the model, such as care shifting, which may be incentivized in a shared savings model such as CKCC. Accordingly, we tested for increases in Part D costs, which could indicate a shift toward care outside the CKCC's shared responsibility, but did not find evidence of such care shifting in the first year. For KCF, we assessed changes in the probability of an ED visit without hospitalization as part of our impact analyses and also did not find any differential trends between participants and the comparison group. We will remain

cognizant of other potential unintended consequences that may be suggested by future qualitative or quantitative findings. The PAG raised several concerns about model implementation that could guide future analyses of unintended consequences, including the potential that some home dialysis use might be provider driven rather than patient centric. If that occurs, we might expect to see an increase in patients who start home dialysis but quickly switch to or return to in-center dialysis.

Overall, the KCC Model showed some promising effects in its first year in one or both model options, including increases in the use of peritoneal dialysis, improvements in the percentages of new patients with ESRD experiencing optimal (planned) starts to ESRD care, and increases to the transplant waitlisting rate. In future annual evaluation reports, we will be able to confirm whether these early trends continued and assess whether other trends become apparent as more data and experience with the model accrue. Some outcomes apply primarily to specific patient groups (for example, those just starting dialysis or those eligible for a transplant), and it may require multiple years to have sufficiently large samples to detect differences. Other outcomes, such as increases in living and deceased transplantation rates or reductions in payments due to better care coordination, may take multiple years of intervention to change, particularly if major changes in staffing, communication and coordination across providers, or technology are required. Similarly, we may gain sufficient statistical power to pursue new subgroup analyses as more data accrue. For example, the current quantitative analyses do not distinguish between the different shared savings or risk options within the CKCC model option.

Another area of interest in future annual evaluation reports will be potential interactions or complementary effects between the voluntary KCC Model and the mandatory ETC Model. Important model goals such as increasing home dialysis and transplantation overlap across the models. Given the PAG's emphasis on the importance of early, repeated, and multipronged modality education efforts, the inclusion of patients with CKD Stage 4 or 5 in the KCC Model may enhance the opportunities of providers jointly participating in ETC to affect those outcomes. We will assess these experiences with the care and education process in subsequent evaluation reports through patient and care partner surveys and interviews. Similarly, the ETC Model's health equity incentives may enhance the effectiveness of KCC Participants, which care for populations with a high prevalence of patients with dual eligibility for Medicare and Medicaid and patients receiving the Part D low-income subsidy. We will examine this possible effect in future annual evaluation reports through subgroup analyses for key outcomes.