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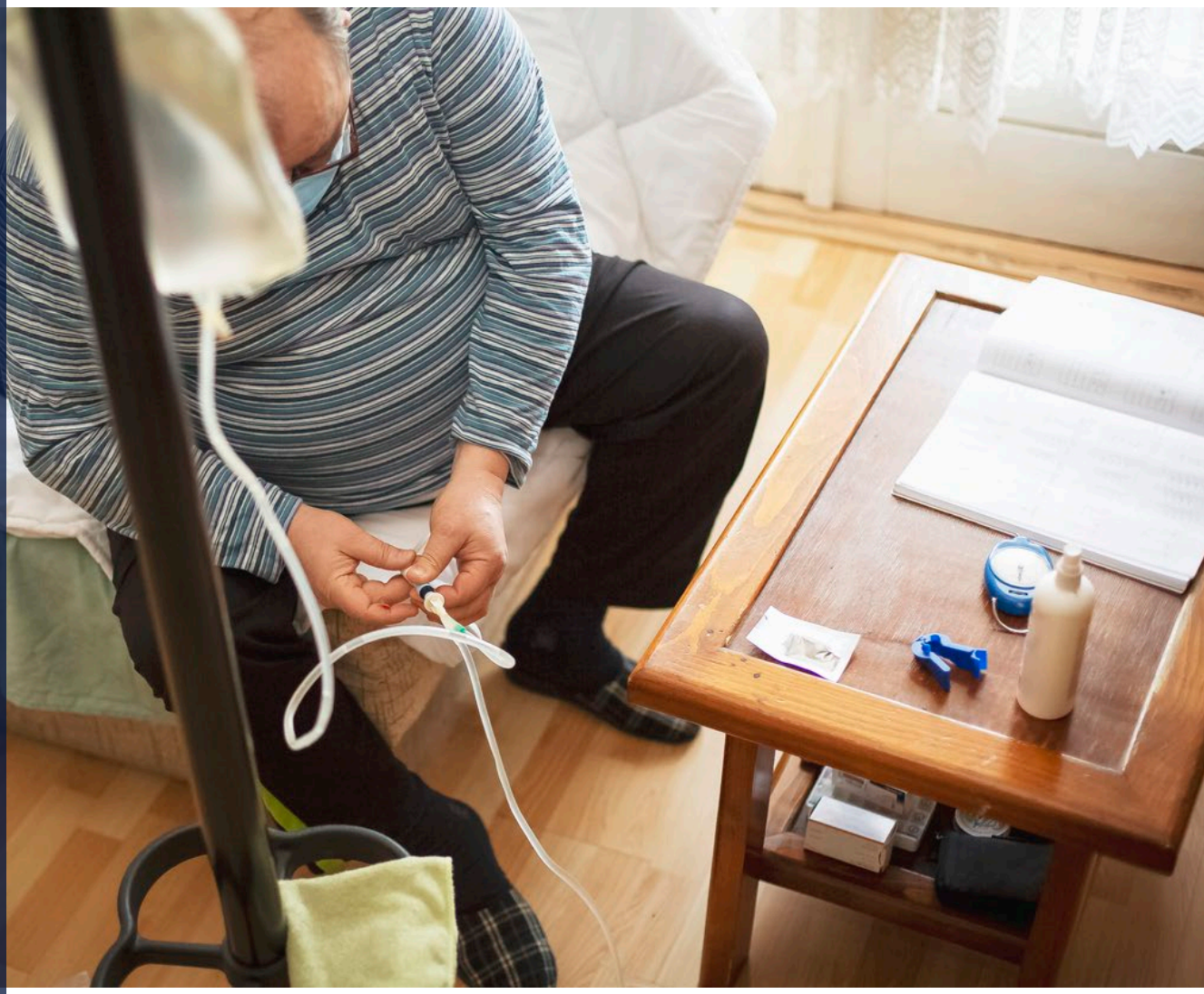
Kidney Care Choices (KCC) Model

First Annual Evaluation Report, Performance Year 2022—Appendices



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

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ACKNOWLEDGMENTS

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DISCLAIMER

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Appendix A: Primary Data Collection Methodology

A.1. Patient Advisory Group

A.1.1. Selection Criteria

We recruited Patient Advisory Group (PAG) participants from August 22, 2022, to September 22, 2022. We used a multipronged approach to recruit PAG participants to achieve a mix of participants who were at different stages in their kidney disease and with different treatment modalities, including:

- Patients with chronic kidney disease (CKD) Stage 4 or 5
- Patients with end-stage renal disease (ESRD) with in-center and home dialysis experience
- Patients with a prior or current kidney transplant

The team sent targeted emails to the national patient advocacy organizations asking them to propose a patient advocacy representative from their organization, along with a stakeholder list. We did not provide incentives for participation.

The recruitment emails included a request for a statement of interest from potential PAG members, asking them to briefly describe their interest in participating and any relevant background they wished to share that may help achieve a balance of patients representing different demographic groups. We aimed to have representation from different demographic groups to the extent that patients voluntarily self-identified these demographic characteristics in their statement of interest. Our goal was to have representation from patients who are dually enrolled in Medicare and Medicaid, those who have prior or current employment during dialysis, different age groups, different races and ethnicities, CKD and ESRD disease stages, and those who have experience with in-center dialysis, home dialysis, and current or prior kidney transplant.

Participants were recruited using a snowball sampling approach that relied on reaching out to:

- **National patient advocacy organization representatives with kidney disease**, including the American Association of Kidney Patients, the National Kidney Foundation, and Dialysis Patients Citizens. Patient representatives are an actively engaged population that is likely abreast of policy related to Centers for Medicare & Medicaid Services (CMS) ESRD programs, including the recently launched ESRD Treatment Choices (ETC) and Kidney Care Choices (KCC) Models.[1] They offer a combined perspective of people living with kidney disease and experience with ESRD treatment, as well as familiarity with CMS ESRD programs.
- **The Lewin team's extensive stakeholder network** to forward to people with kidney disease in their community. Our network list is a culmination of years of work engaging

[1] Conway, P. T., & Knight, R. (2021). Legitimization and incorporation of patient preferences: The arrow that hit the Achilles heel of status quo kidney care. *CJASN, 16*(4), 645–647. https://doi.org/10.2215/CJN.11780720

patients and provider groups to participate in technical expert panels, focus groups, and interviews.

A.1.2. Data Collection Procedures

We convened the PAG for two virtual meetings on October 20 and 26, 2022. Each meeting was 2 hours. All 15 participants attended the first meeting, and 11 participants attended the second meeting. The guided discussions elicited patient perspectives and feedback on the models.

The meetings were not public or open to anyone outside the Lewin team. The sessions were recorded for transcription purposes; study team members also kept notes of major topic discussions.

A.1.3. Protocol Development

Two of the 15 PAG members were selected to serve as co-chairs to achieve a peer-based discussion. The co-chairs were responsible for leading the discussion and collaborating with the Lewin team facilitators to make sure PAG objectives were met. The agenda for each session included introductions, an overview of the models, and discussion topics.

The discussion topics were designed to elicit patient perspectives on current kidney care delivery and how they think the models may impact kidney care, including experience with care from providers (for instance, nephrologists, nurses, others on their care teams, and dialysis facilities, if applicable). The PAG discussions elicited feedback to inform interview and survey topics with patients in the ETC or KCC Models as well as topics for interviews and surveys with kidney doctors, kidney nurses, social workers, transplant providers, and dialysis facility representatives. The specific topic areas were:

- Patient experiences in starting dialysis, including home dialysis patient education
- Patient decision-making
- Access to kidney transplant, including waitlisting and living donor transplant
- Goals of the ETC and KCC Models, including clinical and patient-reported outcomes as well as unintended consequences
- Care partner experiences and perceived care partner burden
- Potential questions for living donor interviews
- Feedback on new questions for the CKD patient experience survey and post-transplant patient experience survey

A.1.4. Analysis

We used qualitative analysis methods based on a grounded theory approach to analyze PAG discussions.[2,3,4] We used inductive methods to produce themes based on analysis of codes derived from the recordings and transcripts; we also used session notes organized by the discussion questions.

Atlas.ti software (version 22.0.11.0) provided the foundation to evaluate the content of the two PAG sessions. This qualitative data software allowed for independent review and analysis of the discussion. Evaluation team members who participated in the PAG created an initial set of classification codes in the Atlas.ti projects for analyzing participant comments and responses. The interview structure and questions provided the basis for initial code creation, identification of themes, and supporting quotes for main themes.

Three reviewers, not present at the PAG sessions, independently studied and analyzed the transcripts. Reviewers came together to discuss findings based on initial classification codes. The independent reviews were then merged in Atlas.ti. In turn, two reviewers eliminated coding overlaps and redundancies, such as multiple mention of same code within one comment or prompt. Within Atlas.ti, both the fully merged project and the one with duplicate codes were retained. All review and extraction of themes were developed, discussed, and reviewed by the University of Michigan PAG facilitators (C. Dahlerus, R. Hirth, J. Segal) to establish agreement.[5,6,7,8]

A.2. Participant Implementation Survey

A.2.1. Selection Criteria

We conducted recruitment at the individual Kidney Care First (KCF) Practice level and individual Kidney Contracting Entity (KCE) level, respectively. Survey administration was restricted to one survey invitation per KCF Practice and one per KCE to be efficient with participant time and to limit burden to KCF and Comprehensive Kidney Care Contracting (CKCC) Participants. To achieve a minimum response rate of about 40% overall (for both KCF Practices and KCEs), we sent the respective KCF Practice and KCE online surveys to all KCF Practices and KCEs. Sampling the entire population of Cohort 1 and 2 participants helped

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2 Charmaz, K. (2006). *Constructing grounded theory: A practical guide through qualitative analysis*. Sage Publications.

3 Chun Tie, Y., Birks, M., & Francis, K. (2019). Grounded theory research: A design framework for novice researchers. *SAGE Open Medicine, 7*, 2050312118822927. https://doi.org/10.1177/2050312118822927

4 Charmaz, K., & Thornberg, R. (2020). The pursuit of quality in grounded theory. *Qualitative Research in Psychology*, *18*(3), 305–327. https://doi.org/10.1080/14780887.2020.1780357

5 Ibid.

6 Charmaz, K. (2006). *Constructing grounded theory: A practical guide through qualitative analysis*. Sage Publications.

7 Conway, P. T., & Knight, R. (2021). Legitimization and incorporation of patient preferences: The arrow that hit the Achilles heel of status quo kidney care. *CJASN, 16*(4), 645–647. https://doi.org/10.2215/CJN.11780720

8 Chun Tie, Y., Birks, M., & Francis, K. (2019). Grounded theory research: A design framework for novice researchers. *SAGE Open Medicine,* 7, 2050312118822927. https://doi.org/10.1177/2050312118822927

provide some variability in terms of practice patient mix, geographic location, and proximity to transplant center.

We obtained KCC point of contact (POC) information (telephone, email) from CMS for both KCF Practices and KCEs. We contacted POCs initially via email, then by follow-up email, and later by telephone as needed to request their participation in the survey. Participation was voluntary.

A.2.2. Data Collection Procedures

For KCF Practices, we sent the survey recruitment email to the KCC Model POC, instructing them to forward the survey link to the nephrologist or other designated model lead who would be able to answer specific questions about model implementation and model goals.

We used a slightly different strategy for KCEs given the structural make-up of the required partnerships for KCEs. The recruitment email was sent to the KCE POC and asked them to direct the survey to a representative on the KCE leadership governing body to complete it. We recruited all KCEs with the understanding that responses could be similar across each entity under the same dialysis organization or integrated kidney care organization. This decision was based on our preliminary review of KCE application data for Cohort 1, where we observed identical or nearly identical application responses among KCEs partnered under the same organization.

We fielded both surveys using Qualtrics from June 19, 2023, through August 7, 2023.

A.2.3. Protocol Development

The KCC Participant Implementation Survey aimed to answer the following main implementation research questions:

- Who participates in the KCC Model?
- How do participants implement the KCC Model? What barriers and facilitators do they face implementing the model? How do these barriers and facilitators vary by option?

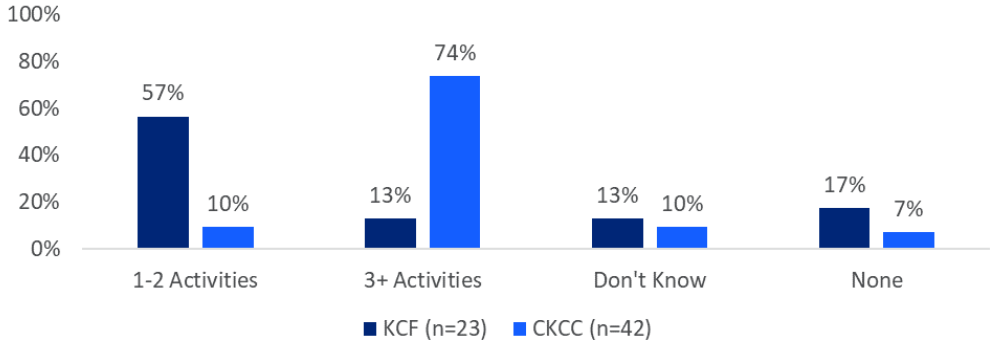
The survey included overall questions about KCC participation and implementation and option-specific questions. A subset of questions addressed the topics of health equity, KCC Learning System activities, Benefit Enhancements and Beneficiary Engagement Incentives, transplant waitlisting, use of the Patient Activation Measure (PAM), the role of financial incentives for KCF Practices and KCE participants, and experience with selecting a transplant provider as a model partner for KCE participants.

A.2.4. Analysis

We received responses from 30 KCF Practices and 51 KCEs. Note, some respondents did not answer every question, so Ns will vary. We exported the data into SAS to generate univariate descriptives, namely frequencies and distributions of response categories. We used Atlas.ti to code open-ended questions.

Exhibit A-1 shows that a little less than half of KCF Practices participated in one to two Learning System activities and a large percentage of KCEs participated in three or more activities.

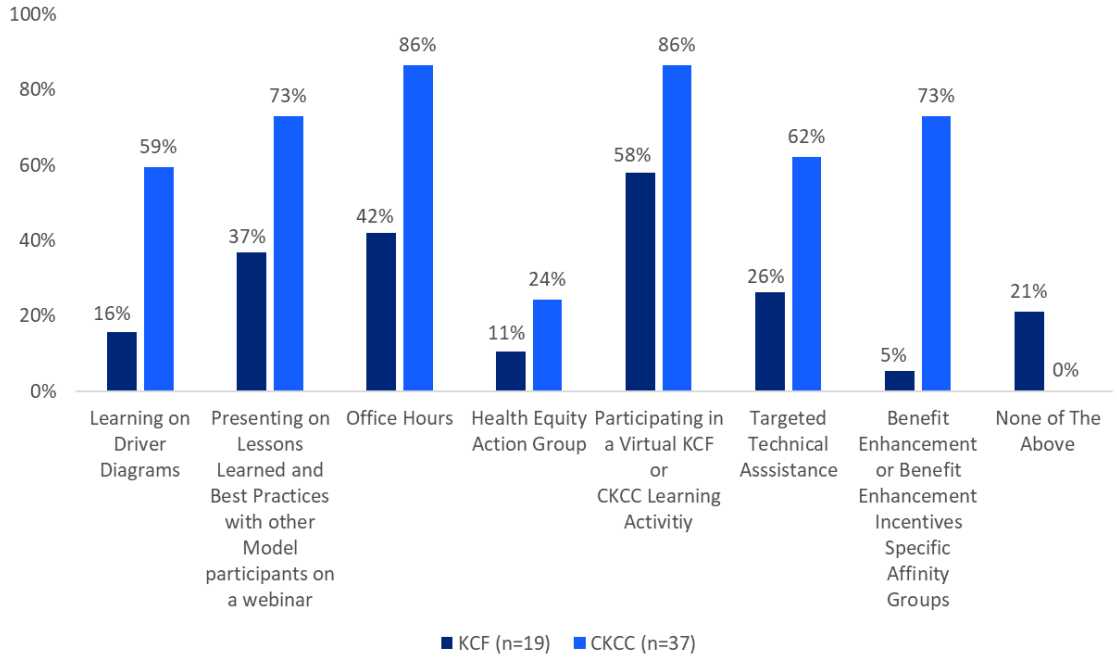
Exhibit A-1. About how many Learning System activities (i.e., office hours, Benefit Enhancements/Beneficiary Engagement Incentives [specific affinity groups, health equity action group, targeted technical assistance]) has your KCF Practice or KCE participated in?



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

About half of KCF Practices participated in office hours and in a virtual KCF learning activity; 21% reported no participation in the listed activities (see **Exhibit A-2**). Overall, more than half of KCEs reported participation in different types of learning activities, including presenting on lessons learned and best practices with other model participants.

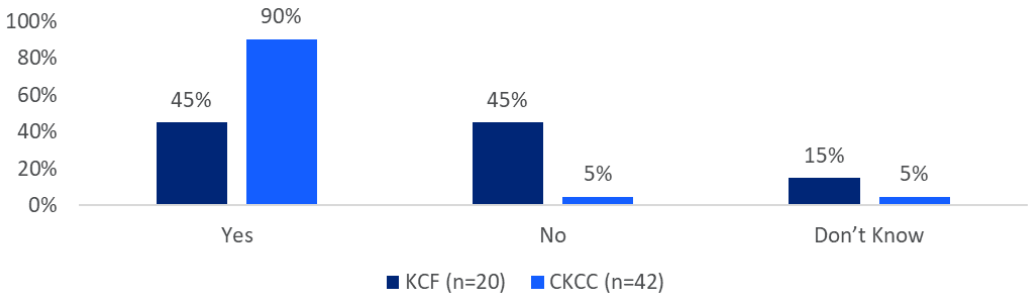
Exhibit A-2. Which KCC Learning System Activities has your KCF Practice or KCE participated in? Select all that apply.



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

When asked about screening their patients for health-related social needs (HRSNs), 45% of KCF Practices and 90% of KCEs reported yes, they screened for HRSNs (see **Exhibit A-3**). Some KCF Practices (15%) and a few KCEs (5%) reported they did not know.

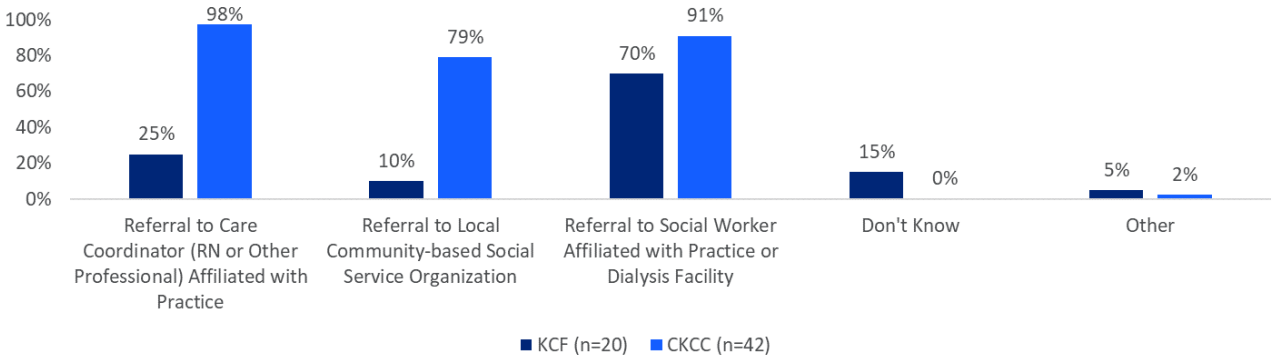
Exhibit A-3. Does or do your KCF Practice or KCE screen patients for health-related social needs (e.g., housing instability, food insecurity, transportation needs, utility needs and/or interpersonal safety)?



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

In a follow-up question about screening for HRSNs, those who did screen were asked to identify what types of assistance they provided to their patients with HRSNs (see **Exhibit A-4**). More than two-thirds of KCF Practices (70%) reported referring patients to the social worker affiliated with their practice of the dialysis facility. KCEs reported referring to multiple forms of assistance that included referral to the care coordinator (98%), referral to local community-based organizations (79%), and referral to the social worker affiliated with the nephrology practice or dialysis facility (91%).

Exhibit A-4. Does or do your KCF or KCE Practice(s) provide the following types of assistance to patients who have health-related social needs? Select all that apply.



Notes: Total n=26 for KCF; total n=51 for KCE. The "Other" category includes "No. For dialysis patients, the dialysis unit social worker is available to assist." (n=1) for KCF, and the nephrology practice (n=1) for KCE. CKCC = Comprehensive Kidney Care Contracting; KCE = Kidney Contracting Entity; KCF = Kidney Care First.

We provide the KCF Practice and KCE Implementation Survey instruments in the following section.

A.2.5. Survey Instrument

A.2.5.1. KCF Practice Implementation Survey

Survey Introduction

Thank you for agreeing to take this survey. The Centers for Medicare & Medicaid Services (CMS) has contracted The Lewin Group and the University of Michigan to evaluate the Kidney Care Choices (KCC) Model. The goal of this survey is to better understand your CMS Kidney Care First (KCF) Practice's experience with the implementation of the KCC Model over the first 12-16 months. We are interested in strategies, successes, and challenges related to this program. We are not auditing your KCF Practice.

If there is any question you do not want to answer, you may skip it. You may also stop your participation at any time. We will combine your responses with those of other KCC Participants in order to understand implementation successes and barriers in the first 12-16 months of the KCC Model. We will report our findings to CMS and a formal write-up will be included in an Annual KCC Model Evaluation Report. When we report the findings, we will not use your name or the name of your practice or organization. This evaluation is IRB exempt (#HUM00219837).

Survey Questions

This survey asks about your experiences since the start of the Kidney Care Choices (KCC) Model. Questions focus on the experiences of your participating CMS Kidney Care First (KCF) Practice, therefore any reference to practice in the survey is asking about your participating nephrology practice. We are interested in both what has gone well, as well as any barriers your KCF Practice has faced. Please answer the questions as best as you. Your individual answers will not be shared with CMS or anyone else outside the Lewin Evaluation Team. Note that some questions may not apply, and you will be directed to the next applicable question. You will see a status bar tracking progress as you complete the survey. The survey will take about 15 minutes to complete.

General Background

1. Please indicate your role in your KCF Practice (select one only):

- Nephrologist
- Practice Administrator
- Advanced Practice Provider
- Other [specify]

2. Briefly describe why you decided to participate as a KCF Practice. [free text response]

Model Financial Incentives

3. Please indicate the extent to which you agree/disagree with the following statement: Our practice has a very good understanding of KCF Practice payments and bonuses.

- Strongly agree
- Agree
- Neither agree/disagree
- Disagree
- Strongly disagree

4. Please indicate the extent to which you agree/disagree with the following statement: Our practice is applying the KCF Practice interventions to all our patients, not just those aligned to the KCC Model.

- Strongly agree
- Agree
- Neither agree/disagree
- Disagree
- Strongly disagree

5. In the past 12-16 months, about what percentage of your practice's CKD and ESRD patients were not aligned to the KCC Model because they were enrolled in a Medicare Advantage (MA) plan?

- <25%
- 25-50%
- 51-75%
- >75%
- Don't know

Learning System Activities

6. About how many Learning System activities (i.e., office hours, Benefit Enhancements (BE) / Beneficiary Engagement Incentives (BEI specific affinity groups, health equity action group, targeted technical assistance) has your KCF Practice participated in?

- 1-2
- 3+
- Don't know
- None → **go to Q12**

7. Which KCC Learning System Activities has your KCF Practice participated in? Select all that apply. If your organization *has* participated in KCC Learning System Activities, which one(s) (select all that apply):

- Learning on Driver Diagrams
- Presenting on lessons learned and best practices with other Model participants on a webinar
- Participating in a virtual KCF or CKCC learning activity
- Office hours
- BE/BEI specific affinity groups

- Health equity action group
- Targeted technical assistance
- Other [describe]

8. KCF Practices can elect to take advantage of several Benefit Enhancements (BE). Select all of the following that your practice uses.

- Kidney Disease Education (KDE)
- Telehealth Expansion
- Post-discharge Home Visits
- None of the above → **If none of the above, go to Q10**

9. Please indicate the extent to which you agree/disagree with the following statement: Overall, the potential for improving care and outcomes outweighs any barriers to using the Benefit Enhancements.

- Strongly agree
- Agree
- Neither agree/disagree
- Disagree
- Strongly disagree

10. The following Beneficiary Engagement Incentives (BEI) are available to KCF Practices. Select all that your practice are using.:

- PY2022 KCC Chronic Disease Management Reward ("gift card")
- PY2022 KCF Cost-sharing Support for Face-to-Face Visits
- None of the above → **If none of the above, go to Q12**

11. How effective are the Beneficiary Engagement Incentive(s) (BEI) you use in increasing patient engagement?

- Extremely effective
- Very effective
- Moderately effective
- Slightly effective
- Not effective at all

Transplant

12. Please rate each strategy below based on its importance to increasing waitlisting. (response options: Extremely important, Very important, Moderately important, Slightly important, Not important at all)

- Educating patients about deceased donor transplant
- Educating CKD patients about pre-emptive transplant
- Increasing referral of ESRD patients to transplant evaluation
- Increasing referral of CKD Stage 4/5 patients to transplant evaluation
- Assisting patients with completion of waitlisting evaluation
- Using patient navigators or care coordinators to assist with evaluation
- Other [describe]

13. Please indicate the extent to which you agree/disagree with the following statement: A major barrier to increasing our patient waitlisting rate is due to poor communication with the transplant center(s) about transplant evaluation status.

- Strongly agree
- Agree
- Neither agree/disagree
- Disagree
- Strongly disagree

14. Rank the following barriers from largest (1) to smallest (4) barrier to increasing waitlisting at your KCF Practice.

- Patient not interested in transplant option
- Poor communication with transplant center about transplant evaluation status
- Insufficient resources/knowledge to provide comprehensive education about transplant option
- Insufficient time/resources to assist patients with completing transplant evaluation

Patient Activation Measure (PAM)

15. Was your KCF Practice using the Patient Activation Measure (PAM) with your CKD and ESRD patients *prior* to participating in the KCC Model?

- Yes
- No
- Don't know

16. Who is administering the Patient Activation Measure (PAM) in your KCF Practice? (select all that apply)

- Self-administered by patients
- Nursing staff / Medical Assistant
- Social worker
- Practice administrator
- Physician
- Other: _____

17. Does your KCF Practice have specific interventions for CKD and ESRD patients with low Patient Activation Measure (PAM) scores? (select one only)

- Yes, interventions are being used in practice
- No, but interventions are being developed and will be implemented in the near future
- No, but interventions will be developed
- No interventions are planned at this time

18. Rate the following barriers to using the Patient Activation Measure (PAM) in practice. (response options: Extreme barrier, Large barrier, Moderate barrier, Slight barrier, Not a barrier at all))

- Lack of familiarity with the PAM
- Having patients complete the survey

- Concerns about validity in the CKD patient population
- Incorporating interventions into clinic workflow
- Adequate staffing to provide interventions for low scoring patients
- Other: _____

19. Please indicate the extent to which you agree/disagree with the following statement: Our Practice can significantly help patients improve their level of activation.

- Strongly Agree
- Agree
- Neither Agree/Disagree
- Disagree
- Strongly Disagree

Health Equity

20. Does your practice collect information on self-reported race and ethnicity from your CKD and ESRD patients?

- Yes
- No → **If No, go to Q23**
- Don't know

21. About what percentage of CKD and ESRD patients in your practice are (total must equal 100%):

- American Indian/Alaska Native
- Asian or Pacific Islander
- Black
- White
- Other/multi-racial

TOTAL 100%

22. About what percentage of CKD and ESRD patients in your practice are (total must equal 100%):

- Non-Hispanic
- Hispanic

TOTAL 100%

23. About what percentage of CKD and ESRD patients in your practice have limited English proficiency, including non-English speaking patients?

- <25%
- 25-50%
- 51-75%
- >75%
- Don't know

24. Which of the following language services does your practice offer for patients with limited English proficiency? (select all that apply)

- Bilingual staff
- On-site interpreter service
- Telephonic interpreter service
- Other _____
- Language services not offered

25. Does your practice screen patients for health-related social needs (e.g., housing instability, food insecurity, transportation needs, utility needs and/or interpersonal safety)?

- Yes
- No → **If No, go to Q27**
- Don't know → **If DK, go to Q27**

26. About what percentage of CKD and ESRD patients in your practice screen positive for health-related social needs?

- <25%
- 25-50%
- 51-75%
- >75%
- Don't know

27. Does your practice provide the following types of assistance to patients who have health-related social needs? Check all that apply.

- Referral to social worker affiliated with practice or dialysis facility
- Referral to care coordinator (RN or other professional) affiliated with practice
- Referral to local community-based social service organization
- Other (please specify: _____)
- Don't know

28. About what percentage of all Medicare patients in your practice are dually eligible for Medicare and Medicaid?

- <25%
- 25-50%
- 51-75%
- >75%
- Don't know

Future Participation

29. Would you be willing to participate in an interview later this year about your KCF Practice Model experiences?

- Yes
- No

30. Please provide your contact information so we may contact you about your KCF Practice Model experiences in the future.

- First and last name: _____
- Email address: _____

END

Thank you for completing this survey!

A.2.5.2. KCE Implementation Survey

Survey Introduction

Thank you for agreeing to take this survey. The Centers for Medicare & Medicaid Services (CMS) has contracted The Lewin Group and the University of Michigan to evaluate the Kidney Care Choices (KCC) Model. The goal of this survey is to better understand your Kidney Care Entity's (KCE) experience with the implementation of the KCC Model over the first 12-16 months. We are interested in strategies, successes, and challenges related to this program. We are not auditing your KCE.

If there is any question you do not want to answer, you may skip it. You may also stop your participation at any time. We will combine your responses with those of other KCC participants in order to understand implementation successes and barriers in the first 12-16 months of the KCC Model. We will report our findings to CMS and a formal write-up will be included in an Annual KCC Model Evaluation Report. When we report the findings, we will not use your name or the name of your practice or organization. This evaluation is IRB exempt (#HUM00219837).

Survey Questions

This survey asks about your experiences since the start of the Kidney Care Choices (KCC) Model. Questions focus on the experiences of your participating Kidney Care Entity (KCE) nephrology practice(s) and nephrologists, therefore any reference to practice in the survey is asking about your participating nephrology practice(s). We are interested in both what has gone well, as well as any barriers your KCE has faced. Please answer the questions as best as you can *as a participant in a KCE*. Your individual answers will not be shared with CMS or anyone else outside the Lewin Evaluation Team. Note that some questions may not apply, and you will be directed to the next applicable question. You will see a status bar tracking progress as you complete the survey. The survey will take about 15 minutes to complete.

General Background

1. Please indicate your role in your KCE (select one only):

- Nephrologist
- Practice Administrator
- Advanced Practice Provider
- Other [**specify**]

2. How many individual nephrology practices/physician groups are participating partners in your KCE?

- 1
- 2
- 3
- 4+

3. Briefly describe why you decided to participate as a KCE. [free text response]

4. KCEs may elect to include preferred providers that contribute to KCE goals. Preferred providers are not responsible for reporting quality through the KCE. Does your KCE include any preferred providers?

- Yes
- No → **If No, go to Q6**
- Don't know

5. Select the different preferred providers that work with your KCE. (select all that apply)

- Home Health
- Hospice
- Dialysis facilities
- Hospitals
- Care coordination entities
- Other [please specify]

Model Financial Incentives

6. Please indicate which CKCC Option your KCE selected and the reasons why. Options are Graduated, Professional, or Global. [select option; free text response for why]

For Questions 7-9: Please indicate the extent to which you agree/disagree with each of the following statements.

7. Our KCE practice(s) has/have a very good understanding of the KCE payments and bonuses.

- Strongly agree
- Agree
- Neither agree/disagree
- Disagree
- Strongly disagree

8. Our KCE expects to have shared savings in PY2022 or PY2023.

- Strongly agree
- Agree
- Neither agree/disagree
- Disagree
- Strongly disagree

9. Some of our KCE partners think the amount of risk is too high.

- Strongly agree
- Agree
- Neither agree/disagree
- Disagree
- Strongly disagree

10. In the past 12-16 months, about what percentage of your practice's CKD and ESRD patients were not aligned to the KCE because they were enrolled in a Medicare Advantage (MA) plan?

- <25%
- 25-50%
- 51-75%
- >75%
- Don't know

Learning System Activities

11. About how many Learning System activities (i.e., office hours, Benefit Enhancements (BE)/Beneficiary Engagement Incentives (BEI) specific affinity groups, health equity action group, targeted technical assistance) has your KCE participated in?

- 1-2 activities
- 3+ activities
- Don't know
- None → **Go to Q17**

12. Which KCC Learning System Activities has your KCE participated in? (select all that apply)

- Learning on Driver Diagrams
- Presenting on lessons learned and best practices with other Model participants on a webinar
- Participating in a virtual KCF or CKCC learning activity
- Office hours
- BE/BEI specific affinity groups
- Health equity action group
- Targeted technical assistance
- Other [please specify]
- None of the above

13. KCEs can elect to take advantage of several Benefit Enhancements. Select all of the following which your KCE practice(s) use(s).

- Kidney Disease Education (KDE)
- Telehealth Expansion
- Post-discharge Home Visits
- 3-Day Skilled Nursing Facility Rule
- Home Health Homebound Waiver

- Concurrent Care for Beneficiaries that Elect the Medicare Hospice Benefit
- None of the above → **If none of the above, go to Q17**

14. Please indicate the extent to which you agree/disagree with the following statement: Overall, the potential for improving care and outcomes outweigh any barriers to using the Benefit Enhancements.

- Strongly agree
- Agree
- Neither agree/disagree
- Disagree
- Strongly disagree

15. The following Beneficiary Engagement Incentives (BEI) are available to KCEs. Select all of the following which your KCE practice(s) is/are using:

- PY2022 KCC Chronic Disease Management Reward ("gift card")
- PY2022 CKCC Part B Cost-sharing Support
- None of the above → **If none of the above, go to Q17**

16. How effective are the Beneficiary Engagement Incentive(s) (BEI) used by your KCE Practice(s) in increasing patient engagement?

- Extremely effective
- Very effective
- Moderately effective
- Slightly effective
- Not effective at all

Transplant

17. Which type of transplant provider is your KCE partnered with? (select all that apply)

- Transplant nephrologist(s)
- Transplant center
- Transplant surgeon(s)
- Other [please specify]

18. Please indicate the extent to which you agree/disagree with the following statement: It was difficult to identify and establish a partnership with a transplant provider for our KCE.

- Strongly agree
- Agree
- Neither agree/disagree
- Disagree
- Strongly disagree

19. What barriers did your KCE encounter when trying to identify a transplant provider partner? (select all that apply)

- Willingness of transplant provider to participate in the model
- Low availability of transplant providers in your region
- Overlap with other CMS Models and programs
- Other [describe]
- We did not encounter any barriers

20. Please rate each strategy below based on its importance to increasing waitlisting. (response options: Extremely important, Very important, Moderately important, Slightly important, Not important at all)

- Educating patients about deceased donor transplant
- Educating CKD patients about pre-emptive transplant
- Increasing referral of ESRD patients to transplant evaluation
- Increasing referral of CKD Stage 4/5 patients to transplant evaluation
- Assisting patients with completion of waitlisting evaluation
- Using patient navigators or care coordinators to assist with evaluation
- Other [please specify]

21. Rank the following barriers from largest (1) to smallest (4) barrier to increasing waitlisting at your KCE practice(s).

- Patient not interested in transplant option
- Poor communication with transplant center about transplant evaluation status
- Insufficient resources/knowledge to provide comprehensive education about transplant option
- Insufficient time/resources to assist patients with completing transplant evaluation

Patient Activation Measure (PAM)

22. Was/were your KCE practice(s) using the Patient Activation Measure (PAM) with your CKD and ESRD patients *prior* to participating in the KCC Model?

- Yes
- No
- Don't know

23. Who is administering the Patient Activation Measure (PAM) in your KCE practice(s)? (select all that apply)

- Self-administered by patients
- Nursing staff / Medical Assistant
- Social worker
- Practice administrator
- Physician
- Other: _____

24. Does/do your KCE practice(s) have specific interventions for CKD and ESRD patients with low Patient Activation Measure (PAM) scores? (select one only)

- Yes, interventions are being used in practice
- No, but interventions are being developed and will be implemented in the near future
- No, but interventions will be developed
- No interventions are planned at this time

25. Rate the following barriers to using the Patient Activation Measure (PAM) in practice. (answer options: Extreme barrier, Large barrier, Moderate barrier, Slight barrier, Not a barrier at all)

- Lack of familiarity with the PAM
- Having patients complete the survey
- Concerns about validity in the CKD patient population
- Incorporating interventions into clinic workflow
- Adequate staffing to provide interventions for low scoring patients
- Other: _____

26. Please indicate the extent to which you agree/disagree with the following statement: Our KCE practice(s) can significantly help patients improve their level of activation.

- Strongly Agree
- Agree
- Neither Agree/Disagree
- Disagree
- Strongly Disagree

Health Equity

27. Does/do your KCE practice(s) collect information on self-reported race and ethnicity from your CKD and ESRD patients?

- Yes
- No → **If No, go to Q30**
- Don't know

28. About what percentage of CKD and ESRD patients in your KCE practice(s) are (total must equal 100%):

- American Indian/Alaska Native
- Asian or Pacific Islander
- Black
- White
- Other/multi-racial

TOTAL 100%

29. About what percentage of CKD and ESRD patients in your KCE practice(s) (total must equal 100%):

- Non-Hispanic
- Hispanic

TOTAL 100%

30. About what percentage of CKD and ESRD patients in your KCE practice(s) have limited English proficiency, including non-English speaking patients?

- <25%
- 25-50%
- 51-75%
- >75%
- Don't know

31. Which of the following language services does/do your KCE practice(s) offer for patients with limited English proficiency? (select all that apply)

- Bilingual staff
- On-site interpreter service
- Telephonic interpreter service
- Other _____
- Language services not offered

32. Does/do your KCE practice(s) screen patients for health-related social needs (e.g., housing instability, food insecurity, transportation needs, utility needs and/or interpersonal safety)?

- Yes
- No → **If No, go to Q34**
- Don't know → **If DK, go to Q34**

33. About what percentage of CKD and ESRD patients in your KCE practice(s) screen positive for health-related social needs?

- <25%
- 25-50%
- 51-75%
- >75%
- Don't know

34. Does/do your KCE practice(s) provide the following types of assistance to patients who have health-related social needs? (select all that apply)

- Referral to social worker affiliated with practice or dialysis facility
- Referral to care coordinator (RN or other professional) affiliated with practice
- Referral to local community-based social service organization
- Other (please specify: _____)
- Don't know

35. About what percentage of all Medicare patients in your KCE practice(s) are dually eligible for Medicare and Medicaid?

- <25%
- 25-50%
- 51-75%
- >75%
- Don't know

Future Participation

36. Would you be willing to participate in an interview later this year about your KCE Model experiences?

- Yes
- No

37. Please provide your contact information so we may contact you about your KCE Model experiences in the future.

- First and last name: _____
- Email address: _____

END

Thank you for completing this survey!

Appendix B: Difference-in-Differences (DiD) Approach

B.1. Data Sources and Outcome Measures

The data used to construct our analytic files underlying the difference-in-differences (DiD) analyses are shown in **Exhibit B-1**.

Exhibit B-1. Data Sources Used for the KCC Model Evaluation

Data Source	Data Contents
KCC Model Data	▪ KCC participating dialysis facilities and nephrologists
Master Data Management Tool	▪ Beneficiary alignment to other shared savings programs
CCW Virtual Research Data Center Data from the CCW include Medicare claims for services provided between 10/1/2015 and 12/31/2022 that were processed by 3/31/2023 (3-month runout)	▪ Claims for Medicare covered services
Snowflake (CCW cloud-based database management system)	▪ Beneficiary location, hospice enrollment status, and Medicare primary/secondary payer indicator
Master Beneficiary Summary File	▪ Beneficiary characteristics, demographics, enrollment status, and chronic condition indicators
Geographic-Based Indices of Health	▪ Beneficiary Area Deprivation Index values
Medicare Data on Provider Practice and Specialty	▪ Entity provider counts
Minimum Data Set	▪ Beneficiary nursing facility status
Medicare Bayesian Improved Surname Geocoding	▪ Beneficiary race and ethnicity characteristics
U.S. Department of Agriculture Rural-Urban Continuum Codes	▪ Entity rurality codes
Patient Activation Measure (PAM®)	▪ Beneficiary's ability to manage their health care
USDAFacts	▪ Coronavirus disease 2019 (COVID-19) case rates
End-Stage Renal Disease Quality Reporting System	▪ Complete patient histories at incidence of dialysis including: – Cause of ESRD – Information on dialysis care – Date of first dialysis – Pre-ESRD care
Dialysis Facility Compare 2017–2022	▪ Facility organization characteristics and quality metrics
Area Health Resources Files (aggregated to CBSA, defined by CMS Office of Management and Budget)	▪ Market characteristics: – Population size – Economic and health care supply indicators
In-Center Hemodialysis Consumer Assessment of Healthcare Providers and Systems (ICH CAHPS®)	▪ Patient experience with in-center hemodialysis care
Missouri Census Data Center Geographic Correspondence Engine (Geocorr)	▪ ZIP Code to OMB CBSA crosswalk

Note: CBSA = core-based statistical area; CCW = Chronic Conditions Data Warehouse; ESRD = end-stage renal disease; OMB = Office of Management and Budget.

We define the dialysis modality, transplant, waitlisting, quality of care, utilization, and Medicare payment measures evaluated in this report using a DiD methodology in **Exhibit B-2**.

Exhibit B-2. Outcome Measures Used to Evaluate the KCC Model

Outcome	Definition of the Outcomes
Total Medicare Parts A & B Payments (excluding CKD services)	Monthly standardized payments included under Medicare Part A and Part B excluding CKD payments. Payments are counted in the month of the claim from date for all Part A claims (acute, home health, hospice, SNFs, inpatient rehabilitation facilities, long-term care hospitals, and other inpatient facilities) and Part B Institutional claims (hospital outpatient, imaging, therapy, and total dialysis). Payments are counted in the month of the first expense date for all Part B non-institutional claims (E/M services, Part B covered drugs, durable medical equipment, etc.). CKD payments are identified by the following HCPCS codes: 99201, 99202, 99203, 99204, 99205, 99211, 99212, 99213, 99214, 99215, 99354, 99355, 99490, 99495, 99496, 99497, 99498, 99348, 99349, 99358, 99487, G0402, G0438, G0439, G0506, 99421, 99422,99423, 99441, 99442, and 99443; payments from these services were only excluded from months when a beneficiary had CKD alignment status.
Total Part A Payments	Monthly standardized payments included under Medicare Part A. Payments are counted in the month of the claim from date and includes all Part A claims (acute, home health, hospice, SNFs, inpatient rehabilitation facilities, long-term care hospitals, and other inpatient facilities).
Hospitalization Payments	Monthly standardized payments for acute inpatient includes claim types 60/61 where 3rd digit of the CCN=0 (IPPS) or 3rd/4th digit of CCN=13 (critical access hospital).
Readmission Payments	Monthly standardized payments included under Medicare Part A for ACHs when an unplanned readmission occurs within 30 days of an index admission. Readmission payments are counted in the month of the claim from date of the unplanned readmission index admission stay.
Institutional PAC Payments	Monthly standardized payments for services incurred during that month at inpatient rehabilitation facilities, SNFs, and long-term care hospitals. These correspond to claim types 60/61 where last 4 digits of the CCN are between 3025–3099 or 3rd digit of CCN is R or T, 20/30, 60/61 where 3rd/4th digits of CCN are 20, 21, 22.
Home Health Payments	Monthly standardized payments for home health services (claim type 10).
Total Part B Payments	Monthly standardized payments included under Medicare Part B. Payments are counted in the month of the claim from date for all Part B Institutional claims (hospital outpatient, imaging, therapy, and total dialysis). Payments are counted in the month of the first expense date for all Part B non-institutional claims (E/M services, Part B covered drugs, durable medical equipment, etc.).
Total Dialysis Payments	Monthly standardized payments for dialysis services included under Medicare Part B. Includes claim type 40 and bill type 72X (Part B Institutional dialysis) and claim types 71 or 72 with the first two digits of Berenson-Eggers Type of Services (BETOS)=P9 (Part B non-institutional dialysis).
Home Dialysis Payments	Monthly standardized payments for home dialysis service. Home dialysis is based on Part B Institutional claim with condition code 74 or 76 and revenue center code of 0821, 0831, 0841, 0851, or 0881.
Home HD Payments	Monthly standardized payments for home HD service. Home HD is based on Part B institutional claim with condition code 74 or 76 and revenue center code of 0821 or 0881.

Outcome	Definition of the Outcomes
PD Payments	Monthly standardized payments for home peritoneal service. Home peritoneal is based on Part B institutional claim with condition code 74 or 76 and revenue center code of 0831, 0841, or 0851.
Hospital Outpatient Payments	Monthly standardized payments for institutional hospital outpatient facility services. Hospital outpatient payments include claim type 40 with a bill type of 13 or 85.
Evaluation and Management Payments	Monthly standardized payments for E/M office/outpatient services. E/M payments include claim type 71 and 72 with the first digit of Berenson-Eggers Type of Services Berenson-Eggers Type of Services (BETOS) of "M" and a HCPCS code of 99201, 99202, 99203, 99204, 99205, 99211, 99212, 99213, 99214, or 99215.
Total Medicare Parts A & B Payments (including CKD services)	Monthly standardized payments included under Medicare Part A and Part B including CKD MCPs. Payments are counted in the month of the claim from date for all Part A claims (acute, home health, hospice, SNFs, inpatient rehabilitation facilities, long-term care hospitals, and other inpatient facilities) and Part B institutional claims (hospital outpatient, imaging, therapy, and total dialysis). Payments are counted in the month of the first expense date for all Part B non-institutional claims (E/M services, Part B covered drugs, durable medical equipment, etc.). Standardized payments do not zero-out MCP amounts; therefore, standardized payments include the CKD MCP amounts by default.
CKD Services Payments	Monthly standardized payments for services included in the CKD QCP. CKD QCP are identified by the following HCPCS codes: 99201, 99202, 99203, 99204, 99205, 99211, 99212, 99213, 99214, 99215, 99354, 99355, 99490, 99495, 99496, 99497, 99498, 99348, 99349, 99358, 99487, G0402, G0438, G0439, G0506, 99421, 99422,99423, 99441, 99442, and 99443; payments from these services were only included from months when a beneficiary had CKD alignment status.
Number of Outpatient Dialysis Sessions	Monthly count of the number of outpatient dialysis sessions for a beneficiary.
In-Center HD	Monthly beneficiary flag indicating a beneficiary had at least one in-center HD service. In-center HD is based on Part B institutional claim with condition code 71 and revenue center codes of 0821 or 0881.
Home Dialysis	Monthly beneficiary flag indicating a beneficiary had at least one home dialysis service. Home dialysis is based on Part B institutional claim with condition code 74 or 76 and revenue center code of 0821, 0831, 0841, 0851, or 0881.
Home HD	Monthly beneficiary flag indicating a beneficiary had at least one home HD service. Home HD is based on Part B institutional claim with condition code 74 or 76 and revenue center code of 0821or 0881.
PD	Monthly beneficiary flag indicating a beneficiary had at least one home peritoneal service. Home peritoneal is based on Part B institutional claim with condition code 74 or 76 and revenue center code of 0831, 0841, or 0851.
Nursing Facility Dialysis	Monthly beneficiary flag indicating a beneficiary had at least one outpatient dialysis service performed in a nursing facility. Nursing facility dialysis is based on claim type 40 with bill type 72x, with a revenue center code of 0821, 0831, 0841, 0851, or 0881 and a condition code of 80.
Home Dialysis Training	Monthly beneficiary flag indicating a beneficiary received self-care training. Self-care training was based on claim type code 40 with bill type 72x, with a condition code of 73, and revenue center lines of 0821, 0831, 0841, 0851, or 0881.
Hospitalizations	Monthly beneficiary flag indicating a beneficiary had an ACH. ACH claims were based on claim type 60 where the 3rd digit of the CCN=0 (Inpatient Prospective Payment System) or 3rd/4th digit of CCN=13 (critical access hospital).

Outcome	Definition of the Outcomes
Readmissions	Monthly beneficiary flag indicating a beneficiary had an unplanned readmission in the month. An unplanned readmission is a hospitalization stay within 30 days of an index hospitalization stay.
ED Visits	Monthly beneficiary flag indicating if a beneficiary had any emergency department claim/visit (inpatient and outpatient). The outpatient ED visit is based on Part B institutional claims that have a claim line with a revenue center code starting with 045. The inpatient ED visits are based on Part A claims that have a claim line with a revenue center code starting with 045. All ED visits are counted in the month of the claim from date on the claim.
CKD QCP List Services	A monthly count of the CKD QCP services. CKD QCP services are identified as physician carrier claim (claim type 71/72) with a HCPCS code of 99201, 99202, 99203, 99204, 99205, 99211, 99212, 99213, 99214, 99215, 99354, 99355, 99490, 99495, 99496,99497, 99498, 99348, 99349, 99358, 99487, G0402, G0438, G0439, G0506, 99421, 99422, 99423, 99441, 99442, or 99443.
Fistula Use	Monthly beneficiary flag indicating a beneficiary used an AV fistula for vascular access.
Graft Use	Monthly beneficiary flag indicating a beneficiary used an AV graft for vascular access.
No Prior Nephrology Care	Monthly beneficiary flag that indicates a beneficiary had no prior nephrology care prior to the beneficiary's first month of dialysis. The month of first dialysis was based on data from the Renal Management Information System (REMIS). Prior dialysis care was based on CMS Form 2728 (Medical Evidence Report) data for Question 17 (prior erythropoietin in 6+ months, prior nephrologist care in 6+ months, prior kidney dietician care in 6+ months, first access type was a graft or fistula, first access type was not a fistula and had maturing fistula or maturing graft).
Hospitalization for ESRD Complications	Monthly beneficiary flag of inpatient claims (claim type 60) with a principal diagnosis for an ESRD complication.
Hospitalization for Vascular Access Complication	Monthly beneficiary flag of inpatient claims (claim type 60) with a principal diagnosis for a vascular access complication.
Phosphate Binder Adherence	Monthly beneficiary indicator identifying a beneficiary who received at least two phosphate binder prescriptions in a given year and had a proportion of days covered greater than or equal to 80%, adjusting for early refills (same generic name, strength, dosage, form). The proportion of days covered is defined as the number of days per month that a beneficiary is covered by Medicare Part D prescription drug claims for the same medication or another phosphate binder, divided by the number of days in a given month. This measure does not include over-the-counter vitamins and supplements, which may also be used as phosphate binders.
Part D Drug Costs	Sum of drug costs (i.e., ingredient costs, dispensing fee, sales tax, and vaccination fee if applicable) for all prescription drug events with date of service in the month. These costs are counted only for Medicare beneficiaries who are enrolled in Part D during the month.
ED Visits without Hospitalization	Monthly flag of beneficiary outpatient ED claims/visits (that is, did not result in inpatient hospitalization on the same claim). ED claims were based on Part B institutional claims that had a claim line with a revenue center code starting with 045. Visits were counted in the month of the CLM_FROM_DT.

Outcome	Definition of the Outcomes
Testing/Labs	Percentage of beneficiaries with CKD Stage 4 or 5 who have had laboratory testing that will allow for GFR calculation during the quarter. Each beneficiary may contribute up to 4 quarters during the measurement period. Incomplete quarters (those with fewer than 3 eligible months) are removed from the analyses.
ED Encounter or Hospital Admission for Hyperkalemia	Monthly indicator of a hospitalization or ED visit with primary diagnosis of hyperkalemia in CKD Stage 4 or 5 and ESRD beneficiaries (ICD-10 code: E875)
ED Encounter or Hospital Admission for Fluid Overload	Monthly indicator of a hospitalization or ED visit with primary diagnosis of fluid overload or congestive heart failure in CKD Stage 4 or 5 and ESRD beneficiaries (ICD-10 codes: E877, E8770, E8771, E8779, J810, R601, R609, I110, I130, I132, I2601, I2602, I2609, I270, I271, I272, I2720, I2721, I2722, I2723, I2724, I2729, I2781, I2789, I279, I280, I281, I288, I289, I420, I423, I424, I425, I426, I427, I428, I429, I43, I5A, I501, I5020, I5021, I5022, I5023, I5030, I5031, I5032, I5033, I5040, I5041, I5042, I5043, I50810, I50811, I50812, I50813, I50814, I5082, I5083, I5084, I5089, I509, I514, I515)
Optimal ESRD Starts CBE #2594	Percentage of new patients with ESRD aged 18 years and over who initiate renal replacement therapy in a 12-month measurement period with an optimal ESRD therapy, which includes preemptive kidney transplant, home dialysis (PD or home hemodialysis), or outpatient in-center hemodialysis via AV fistula or AV graft. Patients who start dialysis and then recover kidney function within 90 days, and/or have incomplete data are excluded.
Statin Use	Proportion of days CKD Stage 4 or 5 beneficiaries are covered by the pharmacy-supplied medication of a statin after adjustment for inpatient stays. Patients who have any diagnosis of hyperkalemia in the prior 12 months are excluded.
Hypertension Medication Use	Proportion of days CKD Stage 4 or 5 beneficiaries are covered by the pharmacy-supplied medication of angiotensin-converting enzyme (ACE) inhibitor or angiotensin receptor blocker (ARB) during the month after adjustment for inpatient stays. Beneficiaries who are less than 50 years of age are excluded.
Diabetes Medication Use: Metformin	Monthly indicator of pharmacy-supplied medication of metformin for CKD Stage 4 or 5 beneficiaries and ESRD beneficiaries who also have a diagnosis of diabetes mellitus.
Diabetes Medication Use: SGLT2 Inhibitors	Proportion of days CKD Stage 4 or 5 beneficiaries are covered by the pharmacy-supplied medication of an SGLT2 inhibitor after adjustment for inpatient stays.
Transplant-Specific Measures: Rates of Waitlisting*	Monthly percentage of patient-months on the kidney or kidney-pancreas waitlist for patients with CKD Stage 5 and ESRD on the first day of the month. Beneficiaries who are CKD Stage 4 or have a transplant (except for the month of transplant), are aged 75 years or older during the month, have dementia, have cancer, or are in hospice are excluded.
Transplant-Specific Measures: Rates of Waitlisting Active Status	Monthly percentage of patient-months on the kidney or kidney-pancreas waitlist in an active status for patients with CKD Stage 5 and ESRD on the first day of the month. Beneficiaries who are CKD Stage 4 or have a transplant (except for the month of transplant), are aged 75 years or older during the month, have dementia, have cancer, or are in hospice are excluded.
Transplant-Specific Measures: Rates of Waitlisting Inactive Status	Monthly percentage of patient-months on the kidney or kidney-pancreas waitlist in an inactive status for patients with CKD Stage 5 and ESRD on the first day of the month. Beneficiaries who are CKD Stage 4 or have a transplant (except for the month of transplant), are aged 75 years or older during the month, have dementia, have cancer, or are in hospice are excluded.
Transplant-Specific Measures: Transplants	Monthly rate of transplants (per 1,000 months) among patients with CKD Stage 5 and ESRD. Beneficiaries who are CKD Stage 4 or have a transplant (except for the month of transplant), are aged 75 years or older during the month, have dementia, have cancer, or are in hospice are excluded.

Outcome	Definition of the Outcomes
Transplant-Specific Measures: Live Donor Transplants	Monthly rate of live donor transplants (per 1,000 months) among patients with CKD Stage 5 and ESRD. Beneficiaries who are CKD Stage 4 or have a transplant (except for the month of transplant), are aged 75 years or older during the month, have dementia, have cancer, or are in hospice are excluded.
Transplant-Specific Measures: Deceased Donor Transplants	Monthly rate of deceased donor transplants (per 1,000 months) among patients with CKD Stage 5 and ESRD. Beneficiaries who are CKD Stage 4 or have a transplant (except for the month of transplant), are aged 75 years or older during the month, have dementia, have cancer, or are in hospice are excluded.
Transplant-Specific Measures: Preemptive Transplant	Monthly rate of preemptive transplants (per 1,000 months) among CKD Stage 5 patients. Beneficiaries who are CKD Stage 4, ESRD, or have a transplant (except for the month of transplant), are aged 75 years or older during the month, have dementia, have cancer, or are in hospice are excluded.

Notes: Payments are capped at the 99th percentile of all positive expenditure values associated with the outcome. * Transplant measures are based on waitlisting and transplant data from 2017–2022 Scientific Registry of Transplant Recipients (SRTR) files. The data reported here have been supplied by the Hennepin Healthcare Research Institute (HHRI) as the contractor for 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, waitlisted candidates, and transplant recipients in the United States, 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. ACH = acute care hospital; AV = arteriovenous; CBE = Consensus-Based Entity; CCN = CMS Certification Number; CKD = chronic kidney disease; ED = emergency department; E/M = evaluation and management; ESRD = end-stage renal disease; GFR = glomerular filtration rate; HCPCS = Healthcare Common Procedure Coding System; HD = hemodialysis; ICD-10 = International Classification of Diseases, Tenth Revision; MCP = Monthly Capitated Payment; PAC = post-acute care; PD = peritoneal dialysis; QCP = Quarterly Capitated Payment; SGLT2 = sodium-glucose cotransporter-2; SNF = skilled nursing facility.

B.2. Patient Alignment and Eligibility

We simulated alignment based on the KCC Model rules. We simulated alignment for two fundamental reasons: (1) to apply consistent alignment methods to a comparison group and (2) to apply consistent alignment methods to a historical period for our baseline.

Our simulation applied quarterly alignment runs. Our baseline period started in Quarter 1 (Q1) 2017. Our intervention period started in Q1 2022. A quarterly alignment iteration started by assessing the criteria for whether a beneficiary was eligible for prospective alignment for a given quarterly performance period. Different eligibility criteria were based on different time criteria (for instance, lookback period, run date, performance period). The lookback period encompassed 4 historical quarters and skipped the quarter immediately preceding the performance period quarter. For example, the lookback period for performance period Q1 2017 encompassed Q4 2015 through Q3 2016 (skipped Q4 2016), the lookback period for performance period Q2 2017 encompassed Q1 2016 through Q4 2016 (skipped Q1 2017), and so forth. As a proxy for run date, our simulation used monthly characteristics in the month following the lookback period; when a criterion required a specific run date, we used the first day of the run date month.

Step 1: Prospective Alignment Eligibility Criteria

- **Claims requirements** (inclusion criterion): A beneficiary met this inclusion criterion as a patient with CKD if they (1) had at least one claim of any type with a diagnosis code for CKD Stage 4 (N18.4) and/or Stage 5 (N18.6), (2) had no Monthly Capitated Payment (MCP) ESRD claim, and (3) had no outpatient dialysis claim (non-acute kidney injury [AKI] bill type 72 [BT72]) in the lookback period. A beneficiary met this inclusion criterion as a patient with ESRD if they (1) had two or more MCP ESRD claims, and (2) at least one outpatient dialysis claim (non-AKI BT72) in the lookback period and (3), had less than two AKI outpatient dialysis treatments in the most recent 15 outpatient dialysis treatments through the run date month. Please see **Exhibit B-3** for additional claims details.
- **Medicare Part A and Part B** (inclusion criterion): A beneficiary met this inclusion criterion if they were enrolled in both Medicare Parts A & B in the month of the run date.
- **Medicare Advantage (MA), cost plan, or other non-MA** (exclusion criterion): A beneficiary met this exclusion criterion if they were not enrolled in Medicare fee-for-service in the month of the run date.
- **Resided in the United States** (inclusion criterion): A beneficiary met this inclusion criterion if they resided in the United States, including territories, on the first day of the run date month.
- **Medicare as secondary payer** (exclusion criterion): A beneficiary met this exclusion criterion if they had Medicare as a secondary payer at any time in the month of the run date. Medicare as a secondary payer was defined as the beneficiary having any of the following listed as a primary payer: (1) employer group health plan insurance for an aged beneficiary, (2) employer group health plan for an ESRD beneficiary, and/or (3) working disabled beneficiary under 65 years of age with a local government health plan.

- **At least 18 years of age** (inclusion criterion): A beneficiary met this inclusion criterion if they were at least 18 years of age prior to the first day of the month of the run date.
- **Alive** (inclusion criterion): A beneficiary met this inclusion criterion if they had no death date or had a validated death date in or after the month of the run date.
- **Medicare Shared Savings Initiative Overlap** (exclusion criterion): A beneficiary met this exclusion criterion if they were aligned to select initiatives based on the Master Data Management database at any time in the upcoming performance period quarter. Select initiatives included the following: Next Generation Accountable Care Organization (ACO) Model, Medicare Shared Savings Program (MSSP) tracks 1+, 3, AP (BASIC one-sided risk, level A, prospective), BP (BASIC one-sided risk, level B, prospective), CP (BASIC two-sided risk, level C, prospective), DP (BASIC two-sided risk, level D, prospective), EP (BASIC two-sided risk, level E, prospective), and NP (ENHANCED track, prospective) or voluntarily aligned to MSSP (any tracks) [*MSSP criterion applies to CKCC entities only, not KCF entities*], Financial Alignment Initiative, Vermont All-Payer Model, Global and Professional Direct Contracting Model, Primary Care First Model (voluntarily aligned beneficiaries only), Comprehensive Primary Care First Model (voluntarily aligned beneficiaries only), and/or Independence at Home Demonstration. As noted above, the MSSP overlap criterion only applied to CKCC entities and not KCF entities.
- **Transplant** (exclusion criterion): A beneficiary met this exclusion criterion if they had a kidney transplant in the run month or the 12 months after the run month.
- **Hospice** (exclusion criterion): A beneficiary met this exclusion criterion if they had a hospice claim and/or were enrolled in hospice in the last 3 months of the lookback period and/or the month of the run date.

Step 2: Additional Criteria

Beneficiaries who satisfied the above eligibility criteria (that is, not excluded) were next evaluated for additional criteria prior to prospective alignment. A beneficiary had to first meet the *majority of care* criterion for an entity. The majority of care criterion assessed whether the majority (greater than 50%) of a beneficiary's select services (CKD claims for patients with CKD or MCP claims for patients with ESRD) in the lookback period were performed within the service area of an entity. A beneficiary who met the majority of care criterion for an entity was then assessed for the *two-touch* criterion. A patient with CKD satisfied the two-touch criterion with two CKD claims within 365 days of each other in the lookback period (at an entity that satisfied the majority of care criterion). A patient with ESRD satisfied the two-touch criterion with two MCP claims within 90 days of each other in the lookback period (at an entity that satisfied the majority of care criterion). Please see **Exhibit B-3** for additional claims details (that is, CKD claims and MCP claims definitions).

Step 3: Tie Break

Among beneficiaries who satisfied the above eligibility and additional criteria for multiple entities, we used a tie-break process to select one entity. The entity whose nephrology professionals delivered the most services (that is, plurality rule) to the beneficiary during the lookback period was selected. In the event that multiple entities tied for the most services, the

entity that delivered the most recent service (that is, recency rule) in the lookback period was selected. In the event neither the plurality rule nor the recency rule broke the tie, we selected the entity with the largest claim ID.

Quarterly Iterations:

- **New alignments**: During each quarterly alignment iteration, we conducted the above steps (eligibility criteria, additional criteria, and tie break) among beneficiaries who were not aligned in a previous quarterly iteration.
- **Previously aligned beneficiaries**: Among beneficiaries who were already aligned (that is, not newly aligned as CKD or ESRD in the quarterly iteration), we evaluated rules to revise the disease status.
  - *CKD to ESRD*: We changed the disease status of a beneficiary aligned as a CKD patient to ESRD if the beneficiary had an outpatient dialysis claim (non-AKI BT72) and/or an MCP claim in the lookback period. The disease status change to ESRD was effective from the later of (1) the month of the first ESRD-related claim (that is, MCP or outpatient dialysis) or (2) the month the beneficiary's alignment started.
  - *ESRD to CKD*: We changed the disease status of a beneficiary aligned as an ESRD patient to CKD if the beneficiary no longer had ESRD-related claims and the beneficiary had a CKD diagnosis on any claim during the lookback period. The disease status change to CKD was effective from the later of (1) the first month of the performance year (PY) or (2) the month the beneficiary's alignment started.
  - *Transplant*: We changed the disease status of a beneficiary aligned as a CKD and/or ESRD patient to transplant if the beneficiary had a kidney transplant during the lookback period. The disease status change to transplant was effective from the later of (1) the month of the transplant, (2) the month the beneficiary's alignment started, or (3) the start of the active PY.

Annual Reconciliation:

After 3 months following the end of a PY, criteria were assessed to evaluate whether a patient should be dealigned.

- **Dealignment from PY:** Beneficiaries who only had CKD and/or ESRD status in the performance year (that is, no transplant status) were dealigned from the performance year if (1) the beneficiary had the *majority of services* (CKD services, ESRD services, or both CKD and ESRD services for beneficiaries with both statuses in the performance year) outside the entity's service area during the performance year, and/or (2) the beneficiary did not have a *single touch* service with the entity during the performance year (CKD service, MCP claim for ESRD, or either for beneficiaries with both statuses in the performance year).
- **Dealignment from the next performance year (PY+1):** Beneficiaries who *died* during the performance year were dealigned from the next performance year. Transplant status beneficiaries whose *transplant failed* during the performance year were dealigned from

the next performance year. Transplant failure was based on the following: (1) a transplant failure diagnosis code T86.12 following the transplant, and/or (2) two or more MCP claims after 180 days following the transplant, and/or (3) 24 or more outpatient dialysis sessions (non-AKI BT72) after 180 days following the transplant. Beneficiaries with ESRD status in the performance year, and no transplant status, who had *no outpatient dialysis* (non-AKI BT72) in the performance year were dealigned from the next performance year.

- **Transplant:** Transplant patients remain aligned to the entity for 36 months from the first transplant status month. As described in the preceding section, this is overruled if the transplant failed (that is, dealigned from the next performance year). In addition, the 36 months can be extended by a subsequent transplant when there was no evidence of transplant failure. The 36 months restarts from the subsequent transplant.
- **Monthly eligibility:** The above section described eligibility criteria required for prospective alignment (that is, eligibility prior to alignment). Eligibility criteria are evaluated again for each month within the performance year. For beneficiaries with only *CKD and/or ESRD* status (that is, no transplant status in the performance year), the following eligibility criteria were evaluated and are effectively identical to the prospective alignment criteria, except evaluated for each month in the performance year: (1) Medicare Part A and Part B (inclusion criterion); (2) MA, cost plan, or other non-MA (exclusion criterion); (3) resided in the United States (inclusion criterion); (4) Medicare as secondary payer (exclusion criterion); (5) age at least 18 years (inclusion criterion); (6) alive (inclusion criterion); and (7) Medicare Shared Savings Initiative overlap (exclusion criterion). To be clear, the hospice criterion evaluated above for prospective alignment eligibility is not evaluated as a monthly eligibility criterion.
- For beneficiaries with *transplant* status in the performance year, a beneficiary is ineligible following a transplant failure. The beneficiary is ineligible from the earliest of any of the following: (1) a transplant failure diagnosis code T86.12 following transplant (ineligible from the month of the claim with a failure diagnosis), (2) two or more MCP claims after 180 days following the transplant (ineligible from month of the earlier/first MCP claim), and (3) 24 or more outpatient dialysis sessions (non-AKI BT72) after 180 days following the transplant (ineligible from month of the earlier/first outpatient dialysis claim). To be clear, transplant patients are not evaluated for the eligibility criteria in the preceding paragraph; once aligned as transplant, beneficiaries effectively remain eligible unless the transplant fails.
- Among beneficiaries who transitioned from CKD and/or ESRD to transplant status in the performance year, annual reconciliation also evaluated select rules to update eligibility solely for the CKD and/or ESRD months (that is, not transplant months). Beneficiaries were not eligible in CKD and/or ESRD months during the performance year if (1) the beneficiary had the *majority of services* (CKD services, ESRD services, or both CKD and ESRD services for beneficiaries with both statuses in the performance year) outside the entity's service area, and/or (2) the beneficiary did not have a *single touch* service with the entity, and/or (3) a beneficiary with ESRD status had *no outpatient dialysis* (non-AKI BT72). To be clear, when a patient fails any of these rules, only the CKD and ESRD months in the performance year are not eligible; later transplant months remain eligible.

Additional alignment simulation details:

- **Baseline versus intervention:** To ensure comparability with the implementation contractor's performance period alignment, we separated and ran our intervention period (that is, performance period) simulation independent of our baseline period simulation. The intent of separating the baseline and intervention simulations was to prevent a carryover effect from the baseline into the intervention period (for instance, prevent transplant status beneficiaries whose alignment started in the baseline period from carrying over into the intervention period, thereby overinflating transplant status beneficiaries at the start of the intervention period).
- **Comparison group adaptations:** We ran separate, independent alignment simulations for the potential comparison group (that is, universe from which the matched comparison group was selected). Therefore, in combination with the separate baseline and intervention runs, we ran four independent alignments (baseline and intervention for both KCC and comparison group). To the extent possible, we applied identical alignment methods to the comparison group. We used Taxpayer Identification Numbers (TINs) that were not KCC Participants as a proxy for an entity for the comparison group. We simulated service areas—to evaluate the majority of services criteria—for comparison group TINs. We derived the comparison group service areas with an iterative process that combined contiguous core-based statistical areas (CBSAs) and/or counties until the service area encompassed the majority of beneficiaries treated by the TIN.

  In addition, we adapted the MSSP overlap criterion for the comparison group. For KCC, the MSSP overlap criterion did not apply to KCF entities and only applied to CKCC entities. There is no similar designation (that is, KCF vs. CKCC) during alignment for potential comparison group TINs. Accordingly, we did not apply the MSSP overlap criterion to the comparison group within the alignment simulation. An exclusion criterion for MSSP was applied post-alignment (for instance, a comparison group entity matched to a CKCC entity excluded any month(s) where a beneficiary was aligned to MSSP).
- **Contamination**: Given the independent simulations for the KCC entities and potential comparison group, it was possible a beneficiary might be aligned to both KCC and the comparison group in the same month in these independent simulations. We applied a process conceptually similar to the above alignment tie break to ensure alignment to only one. Accordingly, we evaluated rules to assess whether a beneficiary was "contaminated" by KCC (for instance, an enduring influence after KCC alignment ended). Months were defined as contaminated when (1) the beneficiary was ever aligned to a KCC entity (that is, even if later dealigned) in the month or (2) the month was within 12 months after the patient was ever aligned to a KCC entity. We excluded a beneficiary's months from the comparison group alignment when months were contaminated by KCC. To be clear, contamination rules had no influence on KCC entity alignments.

Exhibit B-3. Claims Criteria Details

Type of Claim	Claim Criteria
MCP Claim*	90957: Dialysis services, four or more physician visits per month (12–19 years of age)
	90958: Dialysis services, two to three physician visits per month (12–19 years of age)
	90959: Dialysis services, one physician visit per month (12–19 years of age)
	90960: Dialysis services, four or more physician visits per month (20+ years of age)
	90961: Dialysis services, two to three physician visits per month (20+ years of age)
	90962: Dialysis services, one physician visit per month (20+ years of age)
	90965: Home dialysis services per month (12–19 years of age)
	90966: Home dialysis services per month (20+ years of age)
CKD Claim*	99201: New patient office or other outpatient visits, typically 10 minutes
	99202: New patient office or other outpatient visit, total time 15–29 minutes
	99203: New patient office or other outpatient visit, 30–44 minutes
	99204: New patient office or other outpatient visit, 45–59 minutes
	99205: New patient office or other outpatient visit, 60–74 minutes
	99211: Office or other outpatient visit for the evaluation and management of established patient that may not require presence of health care professional
	99212: Established patient office or other outpatient visit, 10–29 minutes
	99213: Established patient office or other outpatient visit, 20–29 minutes
	99214: Established patient office or other outpatient visit, 30–39 minutes
	99215: Established patient office or other outpatient visit, 40–54 minutes
	99348: Residence visit or established patient with low level of medical decision making, per day, if using time, at least 30 minutes
	99349: Residence visit for established patient with moderate level of medical decision making, per day, if using time, at least 40 minutes.
	99354: Extended office or other outpatient service, first hour
	99355: Extended office or other outpatient service, each additional 30 minutes
	99358: Extended patient service without direct patient contact, first hour
	99421: Online digital evaluation and management service for an established patient for up to seven days, total time five 5 to 10 minutes
	99422: Online digital evaluation and management service for an established patient for up to seven days, total time 11 to 20 minutes
	99423: Online digital evaluation and management service for an established patient for up to seven days, total time 21+ minutes
	99441: Telephone medical discussion with physician five to 10 minutes
	99442: Telephone medical discussion with physician 11 to 20 minutes
	99443: Telephone medical discussion with physician 21 to 30 minutes
	99487: Complex chronic care management services for two or more chronic conditions, first 60 minutes of clinical staff time directed by health care professional, per calendar month
	99490: Chronic care management services, first 20 minutes of clinical staff time directed by health care professional, per calendar month
	99495: Transitional care management services for problem of at least moderate complexity
	99496: Transitional care management services for problem of high complexity

Type of Claim	Claim Criteria
CKD Claim* (cont.)	99497: Advance care planning, first 30 minutes
	99498: Advance care planning, each additional 30 minutes
	G0402: Initial preventive physical examination; face-to-face visit, services limited to new beneficiary during the first 12 months of Medicare enrollment
	G0438: Annual wellness visit; includes personalized prevention plan of service, initial visit
	G0439: Annual wellness visit; includes a personalized prevention plan of service, subsequent visit
	G0463: Hospital outpatient clinic visit for assessment and management of a patient
	G0506: Comprehensive assessment of and care planning for patients requiring chronic care management services (list separately in addition to primary monthly care management service)
Dialysis	Outpatient dialysis facility claim (National Claims History claim type 40 with Bill Type 72) and at least one dialysis revenue center code: 0821 (HD), 0831 (PD), 0841 (Continuous Ambulatory Peritoneal Dialysis), 0851 (Continuous Cycling PD), 0881 (Miscellaneous Dialysis); excludes claims for AKI based on condition code 84

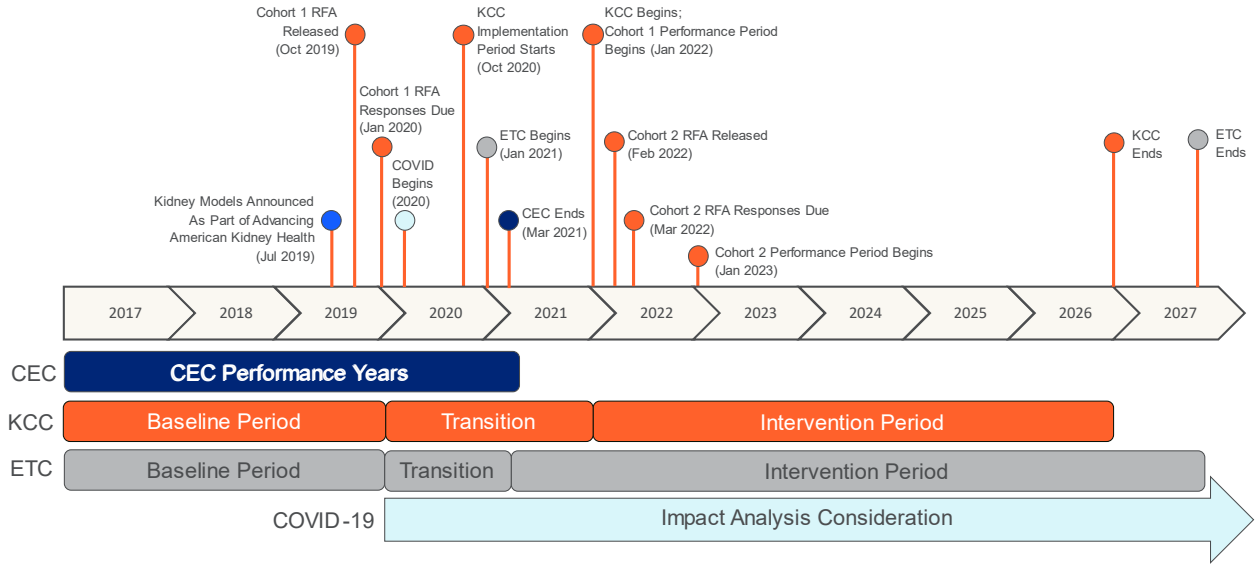
Notes: * HCPCS codes on Medicare Part B carrier claims (National Claims History claim type codes 71 and 72). AKI = acute kidney injury; CKD = chronic kidney disease; HCPCS = Healthcare Common Procedure Coding System; HD = hemodialysis; MCP = Monthly Capitated Payment; PD = peritoneal dialysis.

B.3. Baseline Period Determination

The DiD model rests on one's ability to collect data from a pre-intervention period and to establish trends in outcomes. Although a long baseline period can help establish consistent trends, shorter baseline periods can be beneficial when there are outlier periods or events—such as systematic changes in technologies or a public health emergency (PHE)—that fundamentally break trends and shift outcomes in the baseline period. The use of a baseline period allows us to estimate and control for any exogenous differences, on average, that exist between the treatment and comparison group.

We used a 3-year baseline period, from January 1, 2017, to December 31, 2019, which is prior to the KCC implementation and intervention periods, to define the pre-KCC period. Prior to PY 2022, we define a "transition period" including the KCC Model implementation period (January 1, 2020, to December 31, 2021). We omit the implementation period from our baseline trends to eliminate bias that could be introduced if providers anticipate the model and make changes in advance of the first performance year. For future cohorts, we will implement a similar transition period to limit bias from anticipatory behavior. The KCC timeline is illustrated in **Exhibit B-4**.

Exhibit B-4. KCC Timeline and Model Overlap

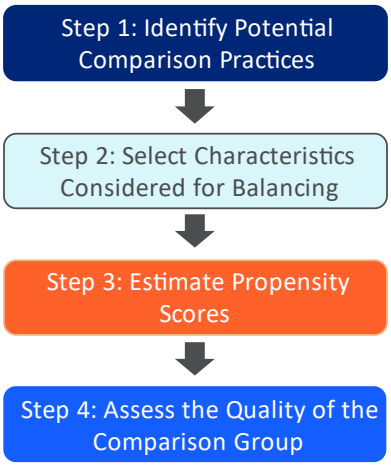


Note: CEC = Comprehensive End-Stage Renal Disease Care Model; ETC = End-Stage Renal Disease Treatment Choices; RFA = request for applications.

B.4. Comparison Group Construction

We followed a four-step process to construct comparison groups of nephrology practices. The selection of an appropriate comparison group is essential for this voluntary model evaluation as it determines the standard against which outcomes for aligned patients of KCC participating practices are measured. The comparison group was developed to be sufficiently large and balanced to support comprehensive analyses, including subgroup analyses to evaluate health equity, disparity, underserved communities, and model overlap (for example, ETC and prior Comprehensive ESRD Care [CEC] Model participants). Additionally, we developed the comparison group construction to support analytic methods for multiple cohorts of participants. Future annual reports will explore modifications and alternative comparison groups if necessary.

Overview of Comparison Group Selection Approach



We developed one comparison group for the KCF option that applies to nephrology practices and a second comparison group for CKCC risk-sharing options that applies to KCEs composed of nephrologists and transplant providers and optional dialysis facilities to support calculation of impact estimates at the risk-sharing option level. While ultimately we constructed two separate comparison groups, much of the comparison group process is identical across the two model options.

For both the KCF and CKCC comparison groups, the selection process focused on nephrology practices, defined using TINs, as they are the common link between all risk-sharing options. Our decision to construct the comparison group around nephrology practices, as opposed to another level such as dialysis facilities, has three additional advantages. First, it aligns with the KCC

Model's design to encourage nephrologists to actively lead the care coordination for the patient. Second, it accounts for patients with CKD who would rarely be associated with a transplant center, and never with a dialysis facility. Third, the model allows for patients who dialyze at nursing facilities to be aligned, and a practice-based design includes these patients.

B.4.1. Step 1: Identify Comparison Group Practices

In selecting comparison group practices, we sought to identify non-participating nephrology practices with characteristics resembling those of KCC Participants in the pre-KCC period to act as the counterfactual for the impact analysis. Nephrology practices that are not participating in the KCC Model that had patients pseudo-aligned to them through our internal alignment process (see **Section B.2**) were considered in the initial pool of potential matches to participant practices. Participating nephrology practices are defined as those that were flagged as participants in the model as of January 1, 2022. **Exhibit B-5** details our comparison group eligibility approach.

Exhibit B-5. Participant and Comparison Pool Construction

Sample Criteria		Number of Practices (TINs)		
Title	**Description**	**CKCC**	**KCF**	**Pool**
Active Participants as of 2022	**Participants:** This is a list of practices that are participating in the model, as of January 1, 2022.	235	30	N/A
	Pool: Not applicable (N/A). By definition, non-participants are not active participants.			
Practices That Had Patient-months in the Baseline	**Participants:** This limits participants to practices that had at least one aligned patient-month between 2017 and 2019.	227	30	2,496
	Pool: This is the first step where practices not participating in the model (that is, the pool) enter the sample.			
Removed Practices That Are Cohort 2 Participants	**Participants:** N/A. By definition, Cohort 2 participants cannot be Cohort 1 participants.	227	30	2,244
	Pool: Removed all TINs that are listed as participants in the model as of January 1, 2023.			
Removed Practices That Had Any NPIs That Were Aligning Providers in Either Cohort 1 or Cohort 2	**Participants:** N/A. By definition, Cohort 2 participants cannot be Cohort 1 participants.	227	30	1,883
	Pool: Removed all TINs that provided kidney services through any NPI that is listed as a participant as of January 1, 2022, or January 1, 2023.			
Removed Practices That Did Not Have at Least One Aligned Patient in 2017, 2018, and 2019	To ensure participants and potential matches are present in our DiD analyses, we required practices to have at least one aligned patient in each year of the pre-KCC period.	216	26	1,629
Removed Practices That Did Not Have at Least 10 Aligned Patients in 2017, 2018, and 2019	To ensure participants and potential matches are present in sufficient numbers to be useful in our DiD analyses, we required practices to have at least 10 aligned patients in each year of the pre-KCC period.	212	25	1,332
Used in Matching Models	The final sample, both participants and non-participants, used in the matching model.	212	25	1,332

Note: CKCC = Comprehensive Kidney Care Contracting; DiD = difference-in-differences; KCF = Kidney Care First; N/A = not applicable; NPI = National Provider Identifier; TIN = Taxpayer Identification Number.

B.4.2. Step 2: Select Characteristics for Balancing

To select our core set of matching variables, we used our knowledge of the characteristics and organizational structure of nephrology practices, dialysis facilities, and kidney care initiatives as well as empirical analyses. We selected characteristics as matching variables if conceptually they were thought to be important aspects of the KCC selection process or if empirically they were strong predictors of participation. When considering conceptual importance, we gained insight from examining the applications of KCC Participants, prior Center for Medicare and Medicaid Innovation evaluation reports (such as the CEC Model evaluation), and knowledge of kidney conditions. When considering empirical importance, we ran statistical tests such as the least absolute shrinkage and selection operator (LASSO), variance inflation factor regressions, and models to assess possible over-fitting. While all matching variables are at the TIN level (practice), as practice is our level of matching, our selected matching variables broadly fall into groupings: (1) average characteristics of patients aligned to the practice, (2) practice structure characteristics, and (3) characteristics of the market in which the practice performed services under the model. Each variable was constructed using 2019 data, the year the model was announced.[9] We present matching variables in **Exhibit B-6**.

Market characteristics were defined using a decision rule that links practices to CBSA.[10]

[9] We also considered basing variables off data from 2017, 2018, 2019, or an average of 2017 through 2019 but decided to solely use 2019 as the base year for matching variables, as 2019 values best represent the reality that practices were facing when deciding whether to join KCC.

[10] If a practice provided services under the model in a single CBSA, the market characteristics for that practice corresponded to the characteristics of its CBSA. If a practice provided services under the model in multiple CBSAs, the market characteristics for that practice correspond to a weighted average of the characteristics of each CBSA in which the practice provides services. The weights are based on the share of the aligned patient-months for the practice that occurred in that CBSA.

Exhibit B-6. Matching Characteristics

Domain	Category	Description	Source
Average Patient Characteristic	Dual Eligibility Status	The percentage of the aligned patient-months that correspond to patients who are fully or partially dually eligible for Medicaid	MBSF
	Sex	The percentage of the aligned patient-months that correspond to patients who are female	MBSF
	Race and Ethnicity	The percentage of the aligned patient-months that correspond to patients who are Black or African American	RTI race and ethnicity code
		The percentage of the aligned patient-months that correspond to patients that are Hispanic	
	ETC Overlap	The percentage of the aligned patient-months that correspond to a patient who was ever aligned in ETC	MDM dataset
	Disease Status	The percentage of the aligned patient-months that are aligned due to transplant	Internal alignment algorithm
		The percentage of the aligned patient-months that are aligned due to CKD	
	Years of Age	The average patient age that corresponds to the aligned patient-months	MBSF
Nephrology Practice Structure Characteristic	Size*	The number of patients who were aligned to the practice	Internal alignment algorithm
	Geographic Reach	The number of CBSAs in which the practice provided services under the model	Internal alignment algorithm
	Provider Specialty	The percentage of the Medicare providers in the TIN with a specialty of nephrology	Medicare data on Provider Practice and Specialty dataset
		The percentage of the Medicare providers in the TIN with a specialty of internal medicine	
Market Characteristics	MA Penetration	The share of Medicare beneficiaries in the market that are in MA	MBSF
	Rurality	The average RUCC in the market, where each county in the market is weighted by its share of aligned patient-months	U.S. Department of Agriculture Economic Research Service
	Number of Practices	Number of practices within the market that have aligned patient-months	Internal alignment algorithm
	Number of ESRD FFS Patients	Number of FFS Medicare patients with ESRD	MBSF

Notes: * Given the disparity in practice size for a few outlier participants (large number of patients served), we measured size differently across the KCF and CKCC matching algorithms. For KCF, we included a measure that corresponds to the natural log of the number of aligned beneficiaries, with the values for the two largest KCF Practices truncated to the value of the third largest KCF Practice. For CKCC, we bin the size measure into quintiles and include an indicator variable for each quintile. CBSA = core-based statistical area; CKD = chronic kidney disease; ESRD = end-stage renal disease; ETC = End-Stage Renal Disease Treatment Choices; FFS = fee-for-service; MA = Medicare Advantage; MBSF = Master Beneficiary Summary File; MDM = Master Data Management; RUCC = Rural-Urban Continuum Code; RTI = Research Triangle Institute; TIN = Taxpayer Identification Number.

In **Exhibit B-7**, we present the various data sources used to create the matching variables.

Exhibit B-7. Data Sources Used for Matching Characteristics

Dataset Name	Date Range	Dataset Contents	Use
AHRF	2017–2019	County-level data on population, environment, geography, health care facilities, and health care professionals	Used for descriptive analysis of KCC and non-KCC market characteristics and the creation of matching variables
KCC Participation List	January 1, 2022, and January 1, 2023	KCC names, IDs, NPIs, TINs	Used to identify participants
CCW	2017–2019	Medicare Part A and Part B claims and patient and enrollment information (MBSF, Enrollment Data Base, Medicare Data on Provider Practice and Specialty, etc.), including patient unique identifier, address, date of birth/death, sex, race, age, and Medicare enrollment status	Used for descriptive analysis of KCC and non-KCC characteristics and the creation of matching variables
RUCC	2017–2019	RUCC is a measurement of rurality	Used for descriptive analysis of KCC and non-KCC market characteristics and the creation of matching variables
MDM	2012–2019	Provider- and patient-level information on participation in Innovation Center payment demonstration programs	Used for descriptive analysis of KCC and non-KCC characteristics and the creation of matching variables
Missouri Census Data Center: Geocorr 2022*	2017–2019	A crosswalk that allows for counties to aggregate up into CBSAs	Aggregate county-level characteristics into CBSA-level characteristics to align with our definition of market.

Notes: *Geocorr 2022 uses 2020 FIPS to identify counties and 2020 CBSA definitions. While there is a 1:1 mapping of FIPs to CBSA in the data, some counties (that is, FIPS) are mapped to a catch-all CBSA (with the code "99999"). In these instances, we attributed a county to its nearest CBSA, as measured by geographic distance. AHRF = Area Health Resources Files; CBSA = core-based statistical area; CCW = Chronic Conditions Data Warehouse; FIPS = Federal Information Processing Standards; MBSF = Master Beneficiary Summary File; MDM = Master Data Management; NPI = National Provider Identifier; RUCC = Rural-Urban Continuum Code; TIN = Taxpayer Identification Number.

B.4.3. Step 3: Estimate Propensity Scores

We estimated propensity scores, defined as the probability of receiving treatment conditional on a set of characteristics, separately for KCF and CKCC using a logit model. When estimating the KCF matching model, practices that selected into the CKCC option were excluded from the analysis; likewise, when estimating the CKCC matching model, practices that selected into the KCF option were excluded. The same comparison pool, as described above, is used in the analyses. As the KCF and CKCC matching models were estimated completely separately, while using the same comparison pool, we allowed for the possibility a non-participant practice be matched to both a KCF Practice and a CKCC practice.

B.4.3.1. KCF Algorithm

We used a propensity score matching algorithm to match non-participating practices to KCF Practices. Using the matching variables described above, we first predicted participation into the

KCF option. Second, we used 1:1 nearest neighbor matching without replacement to match each participant practice to a single non-participant practice.[11]

B.4.3.2. CKCC Algorithm

We used a propensity score matching algorithm to match non-participating practices to a pooled treatment group of CKCC practices.[12] We elected to not use KCEs as the matching unit because KCEs, as a construct, do not exist outside of the CKCC model, meaning there are no untreated KCEs to act as a comparator. Using the matching variables described above, we first predicted participation into the CKCC option. Second, we used 1:2 nearest neighbor matching with replacement to match each participant practice to two non-participant practices. Two CKCC Participant practices had predicted probabilities of participation that were greater than the largest probability of participation among non-participants (that is, they violated common support). As is common in the literature, we dropped these two participant practices from the analysis and subsequent DiD analyses. For participants within common support, we elected to use 1:2 matching, as opposed to 1:1 matching, to reduce the possibility we would need to rematch participants in the event of attrition, potentially through practice disbandment.

We also elected to match with replacement, as opposed to without replacement, for the matched comparison group to resemble participants more closely along key dimensions. Primarily, a disproportionate share of the largest practices in the country were in CKCC, so we wanted to allow large practices not in the model to act as a match for more than one CKCC Participant. We did not have concerns about matching without replacement in the KCF matching algorithm because the comparison pool was large enough to sufficiently pair with each of the 25 KCF Participants. However, given the 212 CKCC Participants, many of which were substantially larger than the majority of non-participants, matching with replacement was preferred. After matching, two matches had no observations in the intervention period. As discussed above, anticipating this scenario was one of our rationales for using 1:2 matching.[13] We used weights in the DiD analyses to account for practices that are matched more than once (see **Section B.6**).

B.4.4. Step 4: Assess the Quality of the Comparison Groups

This section describes the various methods we used to assess the quality of the comparison groups for the KCF and CKCC analyses.

[11] After KCF matching, one preliminary selected comparison practice had no observations in the intervention period. To ensure the DiD analyses were unbiased and each participant had a corresponding match, we rematched the single relevant participant to a new non-participant, using the same model and estimates, with the next nearest propensity score (second nearest neighbor).

[12] Alternatively, we tested multinomial logit models that matched non-participants to participants of a given CKCC option (Graduated Level 1, Graduated Level 2, Professional, and Global). We will continue to explore option specific matching as power improves with the introduction of Cohort 2 participants.

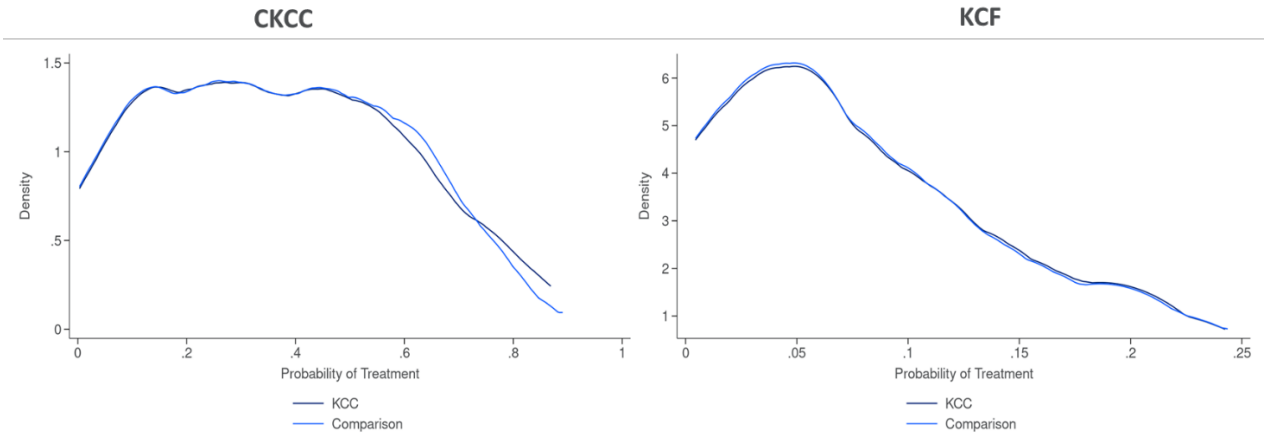
[13] To account for the "missing" observations, we removed the practices missing intervention data from our sample and "moved" the weights for those practices to the other practices matched to the same participants. For example, if previously practice A and B were matched to participant C, they would have a weight of 0.5 in the analyses. If practice A has no intervention data, practice A is removed from analyses and practice B would now receive a weight of 1.0 in the analyses.

B.4.4.1. Density Plots

First, we plotted the density plots of the predicted probabilities of participation by participant and non-participant match.

In **Exhibit B-8**, we present the propensity score density distributions for participants and their matches separately for CKCC and KCF. The distributions for participants closely resembled those of their matches, which informed us that each participant was matched to a non-participant with a similar propensity score, which is a signal of a well-balanced comparison group.

Exhibit B-8. Predicted Probability of Participation: CKCC and KCF



Notes: The density plots show the predicted probability of participation for KCC practices and their matches, separately for KCF and CKCC. The predicted probabilities were obtained using the models described in **Section B.4.3.1** and **Section B.4.3.2**. CKCC = Comprehensive Kidney Care Contracting; KCF = Kidney Care First.

B.4.4.2. Balance Diagnostics

We assessed the balance across the treatment and comparison groups in two primary ways. First, we examined standardized mean differences (SMDs) across samples, and second, as described in **Section B.4.4.3**, we estimated various tests of parallel trends.

We assessed balance at the practice level (that is, unit of matching) by calculating SMDs on patient, practice, and market characteristics between the participants and matched non-participants:

$$\text{SMD} = (\mu_1 - \mu_2)/\sqrt{(\sigma_1^2 + \sigma_2^2)/2}$$

We compared SMDs against a standard threshold value of 0.2 to understand the extent of any differences between the participants and matched non-participants.[14] Descriptive statistics and SMDs for the matched analytic KCF sample are described in **Exhibit B-9**.

As shown in **Exhibits B-9** and **B-10**, the matching process led to smaller, on average, SMDs between the participants and their matches, compared with the SMDs between participants and the entire comparison pool. In particular, SMDs shrunk notably for practice structure

[14] An SMD threshold of 0.2 is commonly used in literature to assess covariate balance across treatment and comparison group observations.

characteristics for both KCF and CKCC. As a specific example, the SMD for providers in a practice who are nephrologists between the comparison pool and treated practices went from 0.32 and 0.43 for KCF and CKCC, respectively, to 0.03 and –0.03, signaling a marked improvement in balance. However, we were unable to achieve balance along all dimensions, with both KCF and CKCC Participants being relatively more likely to have had prior CEC experience and CKCC Participants having more aligning providers than their matched comparison group. Note that, as described in **Exhibit B-14**, we control for CEC experience in our DiD regressions.

Exhibit B-9. Descriptive Statistics and SMDs: KCF

Characteristics				KCF		Comparison Pool		Matched Comparison Group		Pool	Match
Domain		Label	Matching Variable?	N = 25		N = 1,332		N = 25			
				Mean	SD	Mean	SD	Mean	SD	SMD	SMD
Patient Characteristic	Medical	ESRD	Yes	51.8%	15.9%	50.0%	22.8%	48.7%	13.9%	0.09	**0.21**
		Transplant	Yes	5.3%	2.2%	4.4%	4.0%	4.7%	2.5%	**0.28**	**0.26**
		CKD		47.2%	16.8%	49.7%	25.0%	51.3%	15.4%	-0.12	**-0.25**
		CKD Stage 4		44.7%	15.9%	46.5%	23.7%	48.0%	14.7%	-0.09	**-0.22**
		CKD Stage 5		7.5%	4.1%	8.6%	6.4%	8.5%	3.3%	-0.19	**-0.26**
		ESRD with AV Fistula		60.7%	10.3%	58.6%	16.7%	58.9%	10.5%	0.15	0.17
		ESRD with AV Graft		17.6%	8.9%	16.0%	10.7%	17.3%	7.8%	0.16	0.03
	Demographic	Age	Yes	69.1	3.5	70.5	5.0	69.4	4.7	**-0.32**	-0.05
		Aligned to ETC	Yes	9.6%	16.8%	8.8%	17.1%	9.3%	16.5%	0.05	0.01
		Black or African American	Yes	25.4%	22.0%	25.4%	25.3%	21.9%	21.9%	0.00	0.16
		Female	Yes	44.8%	4.9%	47.0%	8.5%	45.6%	5.0%	**-0.32**	-0.17
		Hispanic	Yes	14.4%	15.9%	13.4%	19.8%	14.8%	21.8%	0.05	-0.02
		Non-Hispanic White		53.2%	19.7%	52.0%	30.5%	56.3%	27.9%	0.05	-0.13
	SDOH	Fully or Partially Dually Eligible	Yes	39.6%	14.5%	39.4%	21.3%	39.7%	19.5%	0.01	0.00
		Patient ADI		47.7	17.9	49.3	23.6	53.2	20.1	-0.08	**-0.29**
Market Characteristics		MA Penetration	Yes	40.4%	18.9%	38.1%	12.1%	40.5%	11.5%	0.15	0.00
		Number of Medicare Patients with ESRD in CBSA (log)	Yes	7.5	1.4	7.5	1.9	7.3	1.5	0.01	0.11
		Number of Practices with Aligned Patients in CBSA (log)	Yes	2.5	1.9	2.9	1.9	2.4	1.7	-0.17	0.05
		USDA RUCC	Yes	1.7	0.89	2.0	1.4	1.8	0.92	**-0.25**	-0.11
		Census Region Indicator: Midwest		0.04	0.20	0.16	0.37	0.16	0.37	**-0.42**	**-0.40**
		Census Region Indicator: Northeast		0.20	0.41	0.24	0.43	0.16	0.37	-0.10	0.10
		Census Region Indicator: South		0.44	0.51	0.39	0.49	0.44	0.51	0.09	0.00
		Census Region Indicator: West		0.32	0.48	0.20	0.40	0.24	0.44	**0.27**	0.18

Characteristics			KCF		Comparison Pool		Matched Comparison Group		Pool	Match
Domain	Label	Matching Variable?	N = 25		N = 1,332		N = 25			
			Mean	SD	Mean	SD	Mean	SD	SMD	SMD
Market Characteristics (cont.)	Median Income (in thousands)		$65.7	$13.0	$68.9	$16.9	$68.1	$17.4	**-0.21**	-0.15
	Medicare FFS Patient-months with Full Medicaid Dual Enrollment		13.8%	6.6%	13.5%	7.1%	12.9%	6.2%	0.04	0.14
	Medicare FFS Patient-months with Partial Medicaid Dual Enrollment		3.8%	2.7%	3.5%	2.7%	3.6%	2.4%	0.12	0.08
	Number of Nephrologists in CBSA		117.9	157.8	180.3	242.9	115.8	195.7	**-0.30**	0.01
	Persons in Poverty (in Thousands)		454.2	544.7	605.5	764.9	400.8	598.4	**-0.23**	0.09
Practice Structure	Number of Patients (Log)	Yes	5.5	0.9	4.5	1.0	5.6	0.8	**1.0**	-0.09
	Number of CBSAs Aligning Providers Operate in (log)	Yes	0.33	0.47	0.27	0.44	0.45	0.52	0.14	**-0.23**
	Providers in Practice Who Are Internists	Yes	6.8%	9.6%	18.1%	32.9%	5.2%	9.3%	**-0.46**	0.18
	Providers in Practice Who Are Nephrologists	Yes	66.4%	35.9%	53.4%	44.9%	65.5%	39.9%	**0.32**	0.03
	Any Prior CEC Participation		0.20	0.41	0.04	0.19	0.08	0.28	**0.51**	**0.34**
	Number of Aligning Providers with Aligned Patients (log)		1.6	1.1	0.61	0.8	1.4	0.92	**0.98**	0.13

Notes: Cell shading of the SMD columns signify the magnitude of the standardized mean difference. If the magnitude of the SMD is larger than 0.2, it is shaded red. ADI = Area Deprivation Index; AV = arteriovenous; CBSA = core-based statistical area; CEC = Comprehensive End-Stage Renal Disease Care; CKD = chronic kidney disease; ESRD = end-stage renal disease; ETC = End-Stage Renal Disease Treatment Choices; FFS = fee-for-service; KCF = Kidney Care First; MA = Medicare Advantage; RUCC = Rural-Urban Continuum Code; SD = standard deviation; SDOH = social determinants of health; SMD = standardized mean difference; USDA = U.S. Department of Agriculture.

We provide descriptive statistics and SMDs for the matched analytic CKCC sample in **Exhibit B-10**.

Exhibit B-10. Descriptive Statistics and SMDs: CKCC

Characteristic				CKCC N = 210		Comparison Pool N = 1,332		Comparison Group Unique N = 235		Pool	Match
Domain		Label	Matching Variable?	Mean	SD	Mean	SD	Mean	SD	SMD	SMD
Patient Characteristic	Medical	ESRD	Yes	54.9%	15.8%	50.0%	22.8%	54.8%	17.3%	**0.25**	0.00
		Transplant	Yes	4.9%	2.3%	4.4%	4.0%	5.0%	2.9%	0.16	-0.05
		CKD		44.5%	17.1%	49.7%	25.0%	44.2%	18.8%	**-0.24**	0.02
		CKD Stage 4		41.6%	16.5%	46.5%	23.7%	41.4%	18.0%	**-0.24**	0.01
		CKD Stage 5		7.6%	3.9%	8.6%	6.4%	7.6%	3.9%	-0.19	-0.01
		Patients with ESRD with AV Fistula		58.4%	12.1%	58.6%	16.7%	61.6%	10.8%	-0.01	**-0.28**
		Patients with ESRD with AV Graft		17.1%	7.8%	16.0%	10.7%	16.0%	8.0%	0.12	0.15
	Demographic	Age	Yes	69.3	4.1	70.5	5.0	69.3	4.3	**-0.26**	0.02
		Aligned to ETC	Yes	12.0%	18.9%	8.8%	17.1%	10.1%	17.6%	0.18	0.10
		Black or African American	Yes	26.1%	21.5%	25.4%	25.3%	25.5%	22.6%	0.03	0.03
		Female	Yes	46.1%	4.9%	47.0%	8.5%	46.3%	5.9%	-0.13	-0.02
		Hispanic	Yes	17.1%	23.0%	13.4%	19.8%	19.6%	24.7%	0.17	-0.10
		Non-Hispanic White		47.6%	24.3%	52.0%	30.5%	46.3%	26.0%	-0.16	0.05
	SDOH	Fully or Partially Dually Eligible	Yes	38.9%	19.2%	39.4%	21.3%	41.6%	20.6%	-0.03	-0.14
		Patient ADI		47.9	22.4	49.3	23.6	48.0	23.7	-0.06	-0.01
Market Characteristics		MA Penetration	Yes	39.1%	12.1%	38.1%	12.1%	40.0%	11.1%	0.08	-0.08
		Number of Medicare Patients with ESRD in CBSA (log)	Yes	8.0	1.4	7.5	1.9	8.1	1.5	**0.31**	-0.04
		Number of Practices with Aligned Patients in CBSA (log)	Yes	3.1	1.7	2.9	1.9	3.2	1.8	0.12	-0.06
		USDA RUCC	Yes	1.6	0.87	2.0	1.4	1.6	0.94	**-0.33**	-0.03
		Census Region Indicator: Midwest		0.20	0.40	0.16	0.37	0.11	0.32	0.09	**0.24**
		Census Region Indicator: Northeast		0.16	0.37	0.24	0.43	0.22	0.42	-0.20	-0.16
		Census Region Indicator: South		0.40	0.49	0.39	0.49	0.45	0.50	0.00	-0.12
		Census Region Indicator: West		0.24	0.43	0.20	0.40	0.21	0.41	0.10	0.08

Characteristic			CKCC N = 210		Comparison Pool N = 1,332		Comparison Group Unique N = 235		Pool	Match
Domain	Label	Matching Variable?	Mean	SD	Mean	SD	Mean	SD	SMD	SMD
Market Characteristics (cont.)	Median Income (in thousands)		$71.6	$16.3	$68.9	$16.9	$70.3	$16.2	0.16	0.08
	Medicare FFS Patient-Months with Full Medicaid Dual Enrollment		14.0%	7.6%	13.5%	7.1%	14.5%	7.8%	0.07	-0.06
	Medicare FFS Patient-Months with Partial Medicaid Dual Enrollment		3.1%	2.7%	3.5%	2.7%	3.4%	2.7%	-0.15	-0.14
	Number of Nephrologists in CBSA		185.1	222.1	180.3	242.9	210.9	248.1	0.02	-0.11
	Persons in Poverty (in Thousands)		625.9	709.0	605.5	764.9	715.5	778.1	0.03	-0.12
Practice Structure	Number of Patients: First Quintile	Yes	3.3%	18.0%	23.6%	42.5%	4.5%	20.8%	**-0.62**	-0.06
	Number of Patients: Second Quintile	Yes	6.7%	25.0%	21.9%	41.4%	5.2%	22.3%	**-0.45**	0.06
	Number of Patients: Third Quintile	Yes	13.3%	34.1%	20.9%	40.7%	11.9%	32.5%	**-0.20**	0.04
	Number of Patients: Fourth Quintile	Yes	24.3%	43.0%	19.5%	39.6%	24.3%	43.0%	0.12	0.00
	Number of patients: Fifth Quintile	Yes	52.4%	50.1%	14.0%	34.8%	54.0%	49.9%	**0.89**	-0.03
	Number of CBSAs Aligning Providers Operate in (log)	Yes	0.51	0.66	0.27	0.44	0.45	0.54	**0.43**	0.09
	Providers in Practice Who are Internists	Yes	0.09	0.22	0.18	0.33	0.08	0.19	**-0.31**	0.06
	Providers in Practice Who are Nephrologists	Yes	0.69	0.28	0.53	0.45	0.70	0.38	**0.43**	-0.03
	Any Prior CEC Participation		0.31	0.47	0.04	0.19	0.05	0.22	**0.78**	**0.73**
	Number of Aligning Providers with Aligned Patients (log)		1.6	1.1	0.61	0.80	1.23	0.88	**1.1**	**0.41**

Notes: Cell shading of the SMD columns signifies the magnitude of the standardized mean difference. If the magnitude of the SMD is larger than 0.2, it is shaded red. ADI = Area Deprivation Index; AV = arteriovenous; CBSA = core-based statistical area; CEC = Comprehensive End-Stage Renal Disease Care; CKCC = Comprehensive Kidney Care Contracting; CKD = chronic kidney disease; ESRD = end-stage renal disease; ETC = End-Stage Renal Disease Treatment Choices; FFS = fee-for-service; MA = Medicare Advantage; RUCC = Rural-Urban Continuum Code; SD = standard deviation; SDOH = social determinants of health; SMD = standardized mean difference; USDA = U.S. Department of Agriculture.

B.4.4.3. Parallel Trend Test of Key Outcomes

The validity of the DiD design as a causal estimator relies on the assumption that outcomes in the treatment group would evolve similarly to outcomes in the comparison group in the absence of the KCC Model. Although this assumption is fundamentally untestable, we follow what is common in the literature by testing whether KCF/CKCC and their respective comparison groups were on parallel trends in the baseline period.

We assessed parallel trends both visually and statistically by examining unadjusted trend graphs between the two groups and by estimating regression models in which we test the significance of a differential linear trend between participant and comparison groups. Statistically testing differential trends allows us to gain inferential insight on the direction and magnitude of the coefficient on the differential linear trend. The estimated regression model mirrors our DiD regression model (see below), with a few key modifications. The models are estimated solely using data in the pre-KCC (2017–2019) period.

Specifically, for KCF and CKCC, we estimated the following regression models:

$$Y_{i,j,t} = \alpha + \beta KCF_i + \delta_1 KCF_i * Trend_t + \delta_2 Trend_t + \theta' X_{i,j,t} + \tau_t + \varepsilon_{i,j,t} \quad (1)$$

$$Y_{i,j,t} = \alpha + \beta CKCC_i + \delta_1 CKCC_i * Trend_t + \delta_2 Trend_t + \theta' X_{i,j,t} + \tau_t + \varepsilon_{i,j,t} \quad (2)$$

where subscripts i, j, and t denote individuals, practices, and months, respectively. *KCF* and *CKCC* are indicator variables that identify the group of KCF or CKCC patients aligned to the model in a given month. $X_{i,j,t}$ is a vector of patient-, practice-, and market-level covariates. τ_t is year-month fixed effects.[15] $Trend_t$ is a monthly linear time trend and captures changes over time common to both groups. The primary coefficient of interest, δ_1, is the coefficient on the interaction term of the KCF/CKCC group indicator and the linear time trend. This coefficient captures the differential linear time trend experienced in the treatment group relative to the comparison group during the pre-KCC period prior to model intervention. If outcome trends between the treatment and comparison groups are the same prior to the start of the KCC Model, then the interaction coefficient should be near zero and not statistically significant.

If the estimated coefficient δ_1 is statistically significant at the 0.1 level, we deem the outcome for that specification as having "failed" our parallel trends tests. However, the magnitude of δ_1, not solely its statistical significance, helps us put our estimated DiD impacts in context. Thus, when we report DiD impact estimates, we also report the p-value and coefficient of the differential linear trend coefficient (δ_1).

B.5. KCC and Comparison Group Populations

Patient characteristics for aligned and eligible beneficiaries from KCC and matched comparison groups (for the first month the patient is aligned) are compared in **Exhibits B-11** and **B-12**.

[15] For transplants, transplant waitlisting, and CKD medication adherence measures, we do not include year-by-month fixed effects due to the limited degrees of freedom. Additionally, we run sensitivity analyses of the main outcome measures including year fixed effects instead of year-by-month fixed effects. Results are consistent with our main specification.

Although there are more patients aligned and eligible in the KCC Model options than each comparison group, KCC and comparison patients are very similar on average.

Exhibit B-11. KCF and Comparison Population Average Characteristics

Characteristic		KCF (N=23,580)	Comparison Group (N=17,997)
Patient Level	Black or African American	23.6%	20.0%
	Non-Hispanic White	55.6%	62.5%
	Hispanic	14.1%	11.4%
	Female	45.9%	47.1%
	Age, Years	69.4	69.3
	CKD	55.7%	58.6%
	ESRD	43.7%	40.8%
	Transplant	0.58%	0.64%
	CKD at Alignment	56.5%	59.0%
	ESRD at Alignment	43.1%	40.4%
	Transplant at Alignment	0.41%	0.53%
	Full Dual Eligibility	27.7%	29.2%
	Partial Dual Eligibility	7.8%	8.5%
	ADI Quintile 1	17.5%	11.2%
	ADI Quintile 2	25.9%	18.0%
	ADI Quintile 3	19.7%	23.4%
	ADI Quintile 4	17.5%	23.3%
	ADI Quintile 5	17.8%	22.6%
	Eligible for Medicare due to Old Age	21.4%	24.1%
	Diabetes	63.6%	63.7%
	Hypertension	94.9%	94.6%
	ESRD-HCC Score at Alignment	1.0	1.0
Market Level	MSSP Patient	5.8%	8.7%
	MA Penetration	41.2%	36.5%
	Medicare FFS Beneficiaries	214,653.5	159,573.3
	CBSA Providers	35.4	42.7
	Median Income	$64,147	$64,620
	Percent ACO	26.6%	29.6%
	Urban	9.1%	17.5%
	Midwest	3.9%	14.9%
	Northeast	18.9%	20.3%
	South	38.6%	41.5%
	West	38.7%	23.3%
	Persons in Poverty per 10,000 Population	1,318.2	1,218.3

Characteristic		KCF (N=23,580)	Comparison Group (N=17,997)
Practice Level	Persons with 4 or More Years College per 10,000 Population	1,768.4	1,945.3
	Percentage Aligned to Practices in ETC HRRs	16.8%	34.9%
	Aligning NPI Participated in CEC	28.2%	6.5%
	Average number of Nephrologists (pre-KCC)	14.6	7.5
	Average number of Nurse Practitioners (pre-KCC)	23.9	38.3
	Average number of Internal Medicine Specialists (pre-KCC)	21.8	26.9

Notes: Characteristics based on beneficiaries first month aligned to KCF or the comparison group. The pre-KCC period is January 2017–December 2019. ACO = Accountable Care Organization; ADI = Area Deprivation Index; CBSA = core-based statistical area; CEC = Comprehensive End-Stage Renal Disease Care; CKD = chronic kidney disease; ESRD = end-stage renal disease; ETC = End-Stage Renal Disease Treatment Choices; FFS = fee-for-service; HCC = Hierarchical Condition Category; HRR = Hospital Referral Region; KCF = Kidney Care First; MA = Medicare Advantage; MSSP = Medicare Shared Savings Program; NPI = National Provider Identifier.

Exhibit B-12. CKCC and Comparison Population Average Characteristics

Characteristic		CKCC (N=269,911)	Comparison Group (N=120,267)
Patient Level	Black or African American	24.9%	23.5%
	Non-Hispanic White	55.2%	51.4%
	Hispanic	12.1%	17.3%
	Female	46.9%	46.5%
	Age	69.9	69.5
	CKD	55.0%	53.1%
	ESRD	44.4%	46.2%
	Transplant	0.55%	0.64%
	CKD at Alignment	55.8%	53.8%
	ESRD at Alignment	43.8%	45.8%
	Transplant at Alignment	0.42%	0.43%
	Full Dual Eligibility	25.7%	29.8%
	Partial Dual Eligibility	6.8%	8.0%
	ADI Quintile 1	15.1%	20.9%
	ADI Quintile 2	20.6%	18.7%
	ADI Quintile 3	21.3%	17.3%
	ADI Quintile 4	20.9%	18.1%
	ADI Quintile 5	20.8%	23.5%
	Eligible for Medicare due to Old Age	21.0%	21.0%
	Diabetes	65.1%	66.3%
	Hypertension	95.6%	94.7%
	ESRD-HCC Score at Alignment	1.0	1.0

Characteristic		CKCC (N=269,911)	Comparison Group (N=120,267)
Market Level	MA Penetration	36.8%	37.1%
	Medicare FFS Beneficiaries	319,617.3	433,822.0
	CBSA Providers	36.3	36.0
	Median Income	$66,257	$65,802
	Percent ACO	28.5%	28.5%
	Urban	10.5%	11.1%
	Midwest	17.8%	12.7%
	Northeast	10.4%	20.8%
	South	49.5%	47.4%
	West	22.2%	19.1%
	Persons in Poverty per 10,000 Population	1,236.8	1,355.0
	Persons with 4 or More Years College per 10,000 Population	1,975.0	1,969.4
	Percentage Aligned to Practices in ETC HRRs	42.5%	26.0%
Practice Level	Aligning NPI Participated in CEC	49.5%	5.9%
	Average Number of Nephrologists (pre-KCC)	20.9	6.3
	Average Number of Nurse Practitioners (pre-KCC)	6.5	30.1
	Average Number of Internal Medicine Specialists (pre-KCC)	1.8	18.4

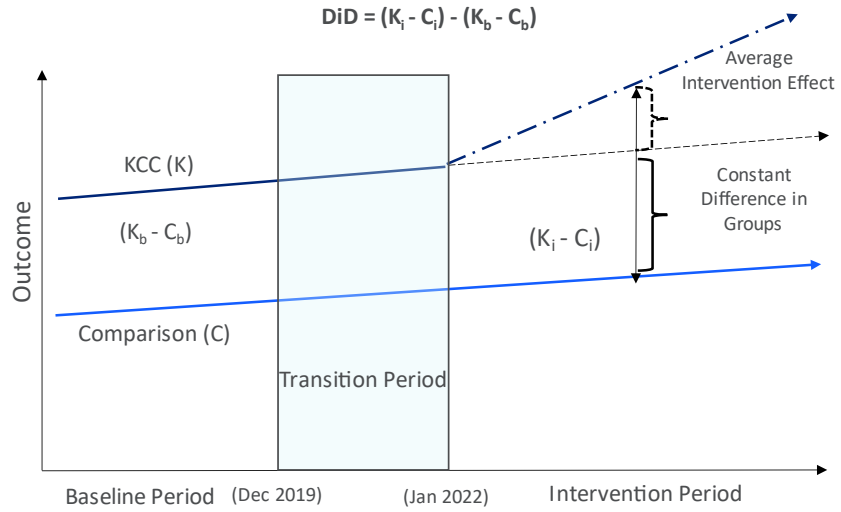
Notes: Characteristics based on beneficiaries first month aligned to CKCC or the comparison practice. The pre-KCC period is January 2017–December 2019. ACO = Accountable Care Organization; ADI = Area Deprivation Index; CBSA = core-based statistical area; CEC = Comprehensive End-Stage Renal Disease Care; CKCC = Comprehensive Kidney Care Contracting; CKD = chronic kidney disease; ESRD = end-stage renal disease; ETC = End-Stage Renal Disease Treatment Choices; FFS = fee-for-service; HCC = Hierarchical Condition Category; HRR = Hospital Referral Region; MA = Medicare Advantage; NPI = National Provider Identifier.

B.6. DiD Regression Model and Estimated KCC Impacts

The DiD approach quantifies the impact of the KCC Model by comparing changes in outcomes for the KCC population before and after KCC with changes in outcomes for the comparison population before and after KCC.

The DiD estimate can be expressed as the difference in outcomes between the KCC and comparison groups in the intervention period minus the difference in outcomes between the KCC and comparison groups in the baseline period, as shown in **Exhibit B-13**. $Y_{K,i}$ and $Y_{C,i}$ are the mean outcomes for the KCC group and comparison group, respectively, during the intervention period. $Y_{K,b}$ and $Y_{C,b}$ are the mean outcomes for the KCC group and comparison groups during the baseline period. The primary assumption to interpret the DiD estimate as a causal impact of the KCC Model is that if the KCC Model did not exist, the two groups would continue to follow the same parallel trends during the intervention period (shown by the black dotted and grey lines). With this assumption, any observed difference in outcomes between the pre-KCC period ($Y_{K,b} - Y_{C,b}$) and intervention period ($Y_{K,i} - Y_{C,i}$) is thus driven by the KCC Model. The resulting DiD estimate of the average treatment effect of the KCC Model is $(Y_{K,i} - Y_{C,i}) - (Y_{K,b} - Y_{C,b})$.

Exhibit B-13. Illustration of DiD Model



K_b = KCC mean outcome at baseline
K_i = KCC mean outcome at intervention
C_b = Comparison mean outcome at baseline
C_i = Comparison mean outcome at intervention

Note: DiD = difference-in-differences.

We estimated two DiD specifications for the KCC Model, one for the KCF option and one for the CKCC option, using the comparison groups selected for each. Specifically, for KCF and CKCC, we estimated the following DiD regression models

$$Y_{i,j,t} = \alpha + \beta KCF_i + \delta KCF_i * Year_{2022} + \gamma_1 KCF_i * Transition\ Year_{2020} + \gamma_2 KCF_i * Transition\ Year_{2021} + \theta' X_{i,j,t} + \tau_t + \varepsilon_{i,j,t} \quad (3)$$

$$Y_{i,j,t} = \alpha + \beta CKCC_i + \delta CKCC_i * Year_{2022} + \gamma_1 CKCC_i * Transition\ Year_{2020} + \gamma_2 CKCC_i * Transition\ Year_{2021} + \theta' X_{i,j,t} + \tau_t + \varepsilon_{i,j,t} \quad (4)$$

where subscripts *i*, *j*, and *t* denote individuals, practices, and months, respectively. KCF and CKCC are indicator variables that identify the group of KCF or CKCC eligible patients aligned to the model in a given month. $X_{i,j,t}$ is a vector of patient-, practice-, and market-level covariates. τ_t is year-month fixed effects and captures changes over time common to both groups. We included three treatment indicator-year interaction terms to capture the effect of the model in PY 2022 and to monitor any differential effects during the transition period. The primary coefficient of interest, δ, is the coefficient on the interaction term of the KCF/CKCC group indicator and the first performance year (PY 2022). These DiD coefficients capture the differential changes in the model group relative to the comparison group during the intervention period. The coefficients on the transition period year interaction terms, Y_1 and Y_2, capture any differential effects prior to the start of the model and are used to monitor anticipatory effects and to ensure that they are not captured in the DiD estimate. Overall KCC Model (KCF and CKCC combined) impacts for select outcomes were generated post-estimation as a weighted average of the individual KCC option DiD estimates.

Weighted regression. Because the CKCC comparison group was constructed using 1:2 matching, each observation in the CKCC regressions aligned to a matched practice received a

weight of 0.5, as opposed to one for observations aligned to participants.[16] Additionally, because we matched with replacement, weights accumulate for comparison practices matched to multiple participants. Specifically, non-participants receive an additional 0.5 weight for every time they were matched to a participant. For example, if a non-participant practice was matched to three unique CKCC practices, it received a weight of 1.5 in the regressions.

Two-part model. Nine of the 13 Medicare payment (per patient per month [PPPM]) measures were estimated using a two-part model because they had a substantial proportion of patient-months with zero payments. In the two-part model for these measures, we first fit a logit model for the probability of observing a nonzero versus zero payment. In the second part, we fit a generalized linear model with a log link for the positive payments. Impact estimates, including predicted pre-KCC period and PY 2022 levels, were adjusted to account for the nonzero cross-partial resulting from nonlinearity.[17]

Computation of standard errors. We clustered standard errors at the practice level to account for any arbitrary serial or autocorrelation among patient-months aligned to the same practice.

Overall KCC Model impact for select outcomes. We estimated overall KCC Model impacts by taking a weighted average of CKCC- and KCF-specific impacts for six outcomes: dialysis modality in center and home, hospitalizations, readmissions, emergency department (ED) visits, and total Parts A and B payments (excluding CKD Quarterly Capitated Payment [QCP]). First, both options' impacts were estimated using seemingly unrelated regressions (SUR) to generate cross-option covariance estimates with standard errors clustered at the practice-by-option level. Then, we created joint point estimates and standard errors from a weighted average of the separate option impacts from SUR. Weights were calculated based on the combined weight of each individual option in each measure's estimation sample, representing the relative sample populations after taking into account repeated matches. We report combined impact estimates in **Exhibit B-17**.

B.6.1. DiD Models' Covariate Adjustments

The structure of the DiD model itself controls for time-varying changes that are experienced by all patients, as well as time-invariant differences between KCC aligned and comparison patients. We also include covariates in the DiD model to improve the precision of impact estimates and to account for observed differences in characteristics between patients aligned to CKCC or KCF Practices and respective matched comparison practices.

We adopted a theory and data-driven approach to select covariates to include in the DiD models. When evaluating potential covariates, we considered differences between the treatment and comparison groups, the relationship between outcomes and the covariates (including avoiding selecting variables that could themselves be influenced by the KCC Model), and risk-adjusters necessary to accurately evaluate the model's impact on health equity in future annual reports. We considered these various factors when deciding whether to require the covariate to be included or allow the covariate to be chosen in the data-driven step.

[16] Because the KCF comparison group was constructed using 1:1 matching without replacement, all patient-month observations aligned to either a KCF Practice or a matched practice receive equal weight.

[17] Karaca-Mandic, P., Norton, E. C., & Dowd, B. (2012). Interaction terms in nonlinear models. *Health Services Research, 47*(1 Pt 1), 255–274.

Using a sample of aligned and eligible patient-months during the pre-KCC period, we estimated a least absolute shrinkage and selection operator (LASSO) model to select covariates for the DiD regressions. The LASSOs were estimated using key outcome measures: Total Medicare Parts A & B payments, home dialysis utilization, and outpatient ED visits. For each outcome, the LASSO was estimated using cross-validation, Bayesian information criterion, and adaptive selection methods. Then using selected covariates, out-of-sample prediction was performed on the testing subsample. The set of covariates were chosen based off the method that performs the best on mean square error and out-of-sample R-squared. Finally, the covariates included in the DiD regression model were the union of the selected covariates across the three outcome LASSO models. We present the covariates in **Exhibit B-14**. For ESRD-specific outcomes, such as dialysis-related outcomes, additional covariates from the ESRD Quality Reporting System were included as risk-adjusters.

Exhibit B-14. Covariate Adjustments Included in the DiD Models

Patient Level	Practice Level	Market Level
▪ Age ▪ Female ▪ Race and ethnicity ▪ ADI quintile ▪ ESRD-HCC score at alignment ▪ Diabetes indicator ▪ Hypertension indicator ▪ Partial dual eligibility ▪ Full dual eligibility ▪ Cancer indicators (breast, lung, endometrial, colorectal) ▪ Indicators for COVID-19 diagnosis during month and 1, 2, or 3 months prior ▪ Original reason for entitlement due to old age ▪ Indicator if aligning NPI participated in CEC ▪ CKD, ESRD, transplant status at first alignment ▪ Alignment to MSSP* ▪ **Covariates included in ESRD-specific regressions only:** – Body mass index – Cause of ESRD – diabetes – Cause of ESRD – hypertension – Cause of ESRD – glomerulonephritis – Currently retired due to disability – Previously retired due to disability – CEC patient flag – ETC patient flag	▪ Baseline average number of internal medicine specialists ▪ Baseline average number of nephrologists ▪ Baseline average number of nurse practitioners	▪ ACO penetration ▪ Number of providers in CBSA ▪ MA penetration ▪ Median income ▪ Number of Medicare FFS beneficiaries ▪ Census region indicators ▪ Urban indicator ▪ Number of transplant hospitals ▪ Number of transplant surgeons ▪ Percentage of population in poverty ▪ Percentage of population with 4 or more years of college ▪ County-level COVID-19 incidence ▪ ETC HRR indicator ▪ ETC HRR indicator and 2021 and 2022 interaction terms

Notes: *KCF regression models only. Race and ethnicity are RTI race codes. ACO = Accountable Care Organization; ADI = Area Deprivation Index; CBSA = core-based statistical area; CEC = Comprehensive End-Stage Renal Disease Care; CKD = chronic kidney disease; DiD = difference-in-differences; ESRD = end-stage renal disease; ETC = End-Stage Renal Disease Treatment Choices; FFS = fee-for-service; HCC = Hierarchical Condition Category; HRR = Hospital Referral Region; MA = Medicare Advantage; MSSP = Medicare Shared Savings Program; NPI = National Provider Identifier.

B.6.2. Unadjusted Means and Impact Estimates for All Outcomes

This section presents unadjusted means and the DiD impact estimates. First, we present the unadjusted means for each outcome in the pre-KCC period and PY 2022 for the KCF option and the comparison group and the CKCC option and the comparison group in **Exhibits B-15** and **B-16**. Then, we present the aggregate KCC impact estimates for a limited set of outcomes in **Exhibit B-17** for select primary outcomes. We present option-specific impact estimates for all outcomes in **Exhibits B-18** and **B-19**.

Exhibit B-15. Unadjusted Means for the KCF and Comparison Groups

Measure		KCF		Comparison Group	
		Baseline Mean	PY 2022 Mean	Baseline Mean	PY 2022 Mean
Dialysis Care	Number of Outpatient Dialysis Sessions PPPM	11.9	11.7	12.0	11.8
	Home Dialysis (percentage with at least one)	10.0%	15.1%	10.6%	13.5%
	Home HD (percentage with at least one)	1.6%	2.3%	2.2%	3.2%
	PD (percentage with at least one)	8.4%	13.0%	8.5%	10.4%
	In-Center HD (percentage with at least one)	88.6%	80.3%	88.3%	84.7%
	Nursing Facility Dialysis (percentage with at least one)	0.06%	0.16%	0.02%	0.13%
	Dialysis Training (percentage with at least one)	0.44%	0.57%	0.54%	0.52%
Hospitalizations and Emergency Department Visits	Percentage of Patients with at Least One Acute Care Hospitalization in a Given Month	9.1%	8.2%	8.6%	7.8%
	Percentage of Patients with at Least One Readmission within 30 days of an Index Hospitalization Stay in a Given Month	28.2%	27.8%	27.6%	26.9%
	Percentage of Patients with at Least One Emergency Department Visit in a Given Month	14.7%	12.8%	14.7%	13.1%
	Percentage of Patients with at Least One Outpatient Emergency Department Visit in a Given Month	8.8%	7.3%	9.4%	8.0%
Medicare Payments (PPPM)	Total Parts A & B excluding Payments for CKD QCP Services	$4,116	$3,925	$4,005	$3,988
	Total Medicare Part A Payments	$1,525	$1,548	$1,441	$1,478
	Acute Care Hospitalizations Payments	$1,047	$1,044	$991	$1,009
	Readmission Payments	$2,370	$2,445	$2,339	$2,394
	Institutional Post-Acute Care Payments	$227	$254	$220	$249
	Home Health Payments	$141	$153	$114	$130
	Total Medicare Part B Payments	$2,591	$2,386	$2,554	$2,493
	Hospital Outpatient Payments	$342	$363	$422	$483
	Evaluation and Management Payments	$73	$95	$64	$80
	Total Dialysis Payments	$2,819	$2,800	$2,865	$2,915
	Home Dialysis Payments	$263	$419	$281	$384
	PD Payments	$214	$343	$212	$273
	Home HD Payments	$41	$71	$59	$105

Measure		KCF		Comparison Group	
		Baseline Mean	PY 2022 Mean	Baseline Mean	PY 2022 Mean
Quality of Care	Optimal ESRD Starts CBE #2594	47.2%	42.8%	46.4%	42.9%
	Statin Medication Use	34.0%	41.2%	36.3%	43.8%
	Hypertension Medication Use	30.5%	32.1%	29.5%	32.3%
	Diabetes Medication Use (SGLT2)	0.30%	5.2%	0.20%	4.4%
	Diabetes Medication Use (metformin)	0.50%	0.60%	0.40%	0.60%
	Testing/Labs	84.3%	83.3%	84.3%	83.1%
	Number of CKD QCP List Services PPPM	1.2	1.3	1.1	1.1
	Percentage of Patients with ESRD with No Prior Nephrology Care	0.08%	0.12%	0.07%	0.10%
	Percentage of Patients with at Least One Hospitalization for Vascular Access Complications in a Given Month	0.91%	1.0%	0.87%	0.87%
	Percentage of Patients with at Least One Hospitalization for ESRD Complications in a Given Month	0.87%	0.99%	0.80%	0.78%
	Fistula Use (percentage of patients in a given month who had a fistula)	58.7%	51.7%	58.8%	55.3%
	Graft Use (percentage of patients in a given month who had a graft)	20.4%	16.9%	19.2%	15.1%
	Percentage of Patients with Greater Than 80% of Days Covered for Phosphate Binder Prescription in a Given Month	45.8%	53.0%	47.0%	52.7%
	Percentage of Patients with at Least One Emergency Department Encounter for Hospital Admission for Hyperkalemia	0.35%	0.31%	0.32%	0.29%
	Percentage of Patients with at Least One Emergency Department Encounter or Hospital Admission for Fluid Overload	1.5%	1.3%	1.5%	1.3%
Transplants	Percentage of Patients on the Transplant Waitlist in a Given Month	20.1%	20.9%	21.0%	22.6%
	Percentage of Patients on the Transplant Waitlist with Active Status in a Given Month	12.1%	12.8%	10.0%	9.6%
	Percentage of Patients on the Transplant Waitlist with Inactive Status in a Given Month	8.0%	8.2%	10.9%	12.9%
	Transplants (per 1,000 patient-months)	4.2	5.7	4.0	6.2
	Live Donor Transplants	3.5	4.8	3.6	5.5
	Deceased Donor Transplants	0.77	0.88	0.41	0.77
	Preemptive Transplants	3.9	6.0	2.5	3.8
Unintended Consequences	Part D Drug Costs PPPM	$2,243	$3,111	$2,203	$2,986

Notes: The pre-KCC period covers January 2017–December 2019. PY 2022 covers January 2022–December 2022. CBE = Consensus-Based Entity; CKD = chronic kidney disease; ESRD = end-stage renal disease; HD = hemodialysis; KCF = Kidney Care First; PD = peritoneal dialysis; PPPM = per patient per month; PY = performance year; QCP = Quarterly Capitated Payment; SGLT2 = sodium-glucose cotransporter-2.

Exhibit B-16. Unadjusted Means for the CKCC and Comparison Groups

Measure		CKCC		Comparison Group	
		Baseline Mean	PY 2022 Mean	Baseline Mean	PY 2022 Mean
Dialysis Care	Number of Outpatient Dialysis Sessions PPPM	11.9	11.8	11.9	11.9
	Home Dialysis (percentage with at least one)	10.5%	14.9%	9.4%	12.3%
	Home HD (percentage with at least one)	2.2%	3.7%	1.8%	2.9%
	PD (percentage with at least one)	8.4%	11.3%	7.7%	9.5%
	In-Center HD (percentage with at least one)	88.0%	83.2%	89.3%	85.9%
	Nursing Facility Dialysis (percentage with at least one)	0.14%	0.39%	0.06%	0.34%
	Dialysis Training (percentage with at least one)	0.50%	0.65%	0.42%	0.39%
Hospitalizations and Emergency Department Visits	Patients with at Least One Acute Care Hospitalization in a Given Month	9.0%	8.1%	9.1%	8.2%
	Patients with at Least One Readmission within 30 Days of an Index Hospitalization Stay in a Given Month	27.4%	26.3%	27.1%	26.7%
	Patients with at Least One Emergency Department Visit in a Given Month	14.6%	12.9%	14.9%	13.0%
	Patients with at Least One Outpatient Emergency Department Visit in a Given Month	8.8%	7.4%	8.9%	7.5%
Medicare Payments (PPPM)	Total Medicare Parts A & B excluding Payments for CKD QCP Services	$4,229	$4,140	$4,242	$4,289
	Total Medicare Part A	$1,530	$1,551	$1,548	$1,586
	Acute Care Hospitalization Payments	$1,026	$1,026	$1,042	$1,060
	Readmissions Payments	$2,304	$2,338	$2,280	$2,396
	Institutional Post-Acute Care Payments	$248	$273	$249	$282
	Home Health Payments	$135	$149	$134	$146
	Total Medicare Part B Payments	$2,692	$2,592	$2,691	$2,697
	Evaluation and Management Payments	$75	$97	$74	$94
	Hospital Outpatient Payments	$323	$346	$335	$371
	Total Dialysis Payments	$2,830	$2,921	$2,819	$2,901
	Home Dialysis Payments	$282	$428	$254	$348
	PD Payments	$214	$303	$198	$253
	Home HD Payments	$58	$119	$46	$90
Quality of Care	Optimal ESRD Starts CBE #2594	45.3%	53.8%	36.6%	39.9%
	Statin Medication Use	34.5%	41.0%	36.0%	43.0%
	Hypertension Medication Use	29.1%	30.4%	29.7%	31.6%
	Diabetes Medication Use (SGLT2)	0.20%	4.4%	0.20%	4.5%
	Diabetes Medication Use (metformin)	0.50%	0.60%	0.60%	0.70%
	Testing/Labs	85.5%	85.4%	85.2%	84.0%
	Number of CKD QCP List Services PPPM	1.2	1.3	1.2	1.3
	Patients with ESRD with No Prior Nephrology Care	0.08%	0.13%	0.07%	0.10%

Measure		CKCC		Comparison Group	
		Baseline Mean	PY 2022 Mean	Baseline Mean	PY 2022 Mean
Quality of Care (cont.)	**Patients with at Least One Hospitalization for Vascular Access Complications in a Given Month**	0.84%	0.96%	0.88%	1.00%
	Patients with at Least One Hospitalization for ESRD Complications in a Given Month	0.87%	0.88%	0.90%	0.89%
	Fistula Use (percentage of patients in a given month who had a fistula)	60.0%	54.7%	62.1%	58.2%
	Graft Use (percentage of patients in a given month who had a graft)	19.3%	17.6%	17.0%	14.8%
	Patients with Greater Than 80% of Days Covered for Phosphate Binder Prescription in a Given Month	48.2%	52.1%	47.7%	52.7%
	Patients with at Least One Emergency Department Encounter for Hospital Admission for Hyperkalemia	0.33%	0.31%	0.36%	0.33%
	Patients with at Least One Emergency Department Encounter or Hospital Admission for Fluid Overload	1.57%	1.33%	1.53%	1.36%
Transplants	**Patients on the Transplant Waitlist in a Given Month**	18.4%	18.2%	20.8%	18.9%
	Patients on the Transplant Waitlist with Active Status in a Given Month	11.4%	10.2%	13.6%	10.9%
	Patients on the Transplant Waitlist with Inactive Status in a Given Month	7.0%	8.1%	7.3%	8.0%
	Transplants (per 1,000 patient-months)	4.2	5.5	4.2	5.5
	Live Donor Transplants	3.6	5.0	3.6	5.0
	Deceased Donor Transplants	0.58	0.56	0.58	0.56
	Preemptive Transplants	3.2	6.5	2.9	5.4
Unintended Consequences	**Part D Drug Costs PPPM**	$2,340	$3,274	$2,233	$3,052

Notes: The pre-KCC period covers January 2017–December 2019. PY 2022 covers January 2022–December 2022.
CBE = Consensus-Based Entity; CKCC = Comprehensive Kidney Care Contracting; CKD = chronic kidney disease; ESRD = end-stage renal disease; HD = hemodialysis; PD = peritoneal dialysis; PPPM = per patient per month; PY = performance year; QCP = Quarterly Capitated Payment; SGLT2 = sodium-glucose cotransporter-2.

Exhibit B-17. Impact of the Overall KCC Model

Measures		KCC		Comparison		Differences-in-Differences Estimate					
		Pre-KCC Mean	PY 2022 Mean	Pre-KCC Mean	PY 2022 Mean	DiD	90% Lower CI	90% Upper CI	Percent Change	Trend Test Coefficient	Trend Test P-Value
Dialysis Care	Percentage of Patients with at Least One In-Center HD Session in a Given Month	88.1%	83.3%	89.3%	85.3%	0.73 pp	-1.7 pp	0.22 pp	-0.8%	-0.02 pp	0.15
	Percentage of Patients with at Least One Home Dialysis Session in a Given Month	10.6%	14.1%	9.9%	12.5%	0.88 pp**	0.02 pp	1.7 pp	8.3%	-0.02 pp	0.23
Hospitalizations and Emergency Department Visits	Percentage of Patients with at Least One Acute Care Hospitalization in a Given Month	9.2%	8.1%	9.0%	7.8%	0.10 pp	-0.26 pp	0.46 pp	1.1%	0.00 pp	0.28
	Percentage of Patients with at Least One Readmission within 30 Days of an Index Hospitalization Stay in a Given Month	27.4%	27.0%	26.8%	26.7%	-0.43 pp	-1.4 pp	0.57 pp	-1.6%	-0.02 pp	0.63
	Patients with at Least One Emergency Department Visit in a Given Month	14.7%	13.0%	14.9%	12.9%	0.20 pp	-0.20 pp	0.60 pp	1.4%	0.00 pp	0.86
Medicare Payments (PPPM)	Total Parts A & B excluding Payments for CKD QCP Services	$4,163	$4,393	$4,103	$4,359	-$26	-$110	$57	-0.6%	$0.21	0.84

Notes: The pre-KCC period covers January 2017–December 2019. CY 2022 covers January 2022–December 2022. Each impact estimate is based on a DiD analysis and reflects the difference in the risk-adjusted mean outcome for beneficiaries aligned to KCC practices in the intervention period and pre-KCC period relative to the same difference over time for beneficiaries aligned to matched KCC comparison practices. This is calculated by first estimating the KCF and CKCC DiD impact estimates using SUR and then taking the weighted average of the DiD estimates between the two options. Weights are calculated by the total sample weight of each option in each sample. Significance of the DiD impact estimate is indicated next to 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. CI = confidence interval; CKCC = Comprehensive Kidney Care Contracting; CKD = chronic kidney disease; DiD = difference-in-differences; HD = hemodialysis; KCF = Kidney Care First; pp = percentage point; PPPM = per patient per month; PY = performance year; QCP = Quarterly Capitated Payment; SUR = seemingly unrelated regression.

Exhibit B-18. Impact of the KCF Model Option

Measures		KCF		Comparison		Differences-in-Differences Estimate					
		Pre-KCC Mean	PY 2022 Mean	Pre-KCC Mean	PY 2022 Mean	DiD	90% Lower CI	90% Upper CI	Percent Change	Trend Test Coeff.	Trend Test P-Value
Dialysis Care	Number of Outpatient Dialysis Sessions PPPM	12.0	11.7	12.0	11.8	-0.04	-0.20	0.11	-0.30%	0.00	0.37
	Home Dialysis (percentage with at least one)	10.3%	15.2%	10.5%	13.3%	2.1 pp**	0.38 pp	3.7 pp	19.9%	0.02 pp	0.39
	Home HD (percentage with at least one)	1.2%	2.6%	2.0%	3.6%	-0.22 pp	-1.3 pp	0.83 pp	-17.6%	-0.02 pp	0.13
	PD (percentage with at least one)	9.1%	12.8%	8.5%	9.8%	2.3 pp**	0.81 pp	3.8 pp	25.5%	0.04 pp	0.12
	In-Center HD (percentage with at least one)	88.4%	80.6%	88.2%	84.0%	-3.6 pp**	-6.4 pp	-0.7 pp	-4.1%	-0.01 pp	0.68
	Nursing Facility Dialysis (percentage with at least one)	0.11%	0.29%	-0.07%	0.04%	0.08 pp	-0.25 pp	0.40 pp	72.3%	0.00 pp	0.18
	Dialysis Training (percentage with at least one)	0.38%	0.57%	0.58%	0.65%	0.12 pp	-0.03 pp	0.27 pp	32.5%	0.00 pp	0.28
Hospitalizations and Emergency Department Visits	Patients with at Least One Acute Care Hospitalization in a Given Month	9.2%	8.3%	8.3%	7.6%	-0.2 pp	-0.76 pp	0.36 pp	-2.2%	0.01 pp	0.37
	Patients with at Least One Readmission within 30 Days of an Index Hospitalization Stay in a Given Month	27.8%	28.1%	27.4%	27.6%	0.15 pp	-1.9 pp	2.2 pp	0.54%	-0.01 pp	0.80
	Patients with at Least One Emergency Department Visit in a Given Month	14.8%	13.1%	14.4%	13.0%	-0.31 pp	-1 pp	0.42 pp	-2.1%	0.00 pp	0.79
	Patients with at Least One Outpatient Emergency Department Visit in a Given Month	8.8%	7.7%	9.2%	8.0%	0.08 pp	-0.44 pp	0.60 pp	0.92%	0.00 pp	0.95

Measures		KCF		Comparison		Differences-in-Differences Estimate					
		Pre-KCC Mean	PY 2022 Mean	Pre-KCC Mean	PY 2022 Mean	DiD	90% Lower CI	90% Upper CI	Percent Change	Trend Test Coeff.	Trend Test P-Value
Medicare Payments (PPPM)	**Total Medicare Parts A & B excluding Payments for CKD QCP Services**	$4,025	$4,162	$3,900	$4,172	-$134	-$311	$42	-3.3%	-$4	0.23
	Total Medicare Parts A & B including Payments for CKD QCP Services	$4,074	$4,222	$3,944	$4,221	-$128	-$306	$49	-3.2%	-$4	0.24
	Total Medicare Part A	$1,584	$1,514	$1,459	$1,391	-$2	-$77	$73	-0.12%	-$0.70	0.60
	Acute Care Hospitalization Payments	$1,066	$1,052	$979	$986	-$21	-$63	$21	-2.0%	$0.81	0.42
	Readmission Payments	$2,337	$2,480	$2,326	$2,464	$6	-$143	$155	0.25%	-$1	0.78
	Institutional Post-Acute Care Payments†	$254	$229	$227	$204	-$2	-$18	$14	-0.69%	-$1	0.01
	Home Health Payments	$140	$141	$125	$124	$2 †	-$4	$9	1.8%	-$0.21	0.23
	Total Medicare Part B Payments	$2,458	$2,631	$2,470	$2,743	-101* †	-$196	-$6	-4.1%	-$3	0.04
	Hospital Outpatient Payments	$354	$394	$404	$465	-$20	-$47	$8	-5.6%	$0.20	0.66
	Evaluation and Management Payments	$72	$86	$69	$82	$1	-$2	$4	1.6%	$0.00	0.97
	Payments for CKD QCP Services	$94	$116	$89	$108	$3	-$2	$7	2.9%	-$0.03	0.66
	Total Dialysis Payments	$2,811	$2,841	$2,840	$2,919	-$49 †	-$140	$41	-1.8%	-$4	0.06
	Home Dialysis Payments	$266	$410	$284	$384	$45***	$27	$63	16.9%	$0.15	0.65
	PD Payments	$233	$328	$218	$258	$54*** †	$40	$68	23.1%	$0.88	0.00
	Home HD Payments	$20	$84	$54	$122	-$4 †	-$15	$7	-18.5%	-$0.53	0.00
Quality of Care	**Optimal ESRD Starts CBE #2594**	41.2%	36.0%	39.8%	34.5%	0.08 pp	-7.4 pp	7.5 pp	0.19%	-0.26 pp	0.29
	Statin Medication Use	34.7%	40.7%	33.3%	41.2%	-1.8 pp	-4.5 pp	0.96 pp	-5.1%	0.05 pp	0.76
	Hypertension Medication Use	32.1%	34.2%	29.9%	32.0%	-0.07 pp	-2.9 pp	2.7 pp%	-0.22%	0.01 pp	0.85
	Diabetes Medication Use (SGLT2)	0.15%	5.3%	0.09%	4.6%	0.66 pp	-0.85 pp	2.2 pp	4.3%	0.00 pp	0.43
	Diabetes Medication Use (metformin)	0.37%	0.52%	0.30%	0.55%	-0.10 pp	-0.29 pp	0.09 pp	-27.7%	0.00 pp	0.51
	Testing/Labs	84.7%	82.5%	85.3%	82.7%	0.33 pp	-0.62 pp	1.3 pp	0.40%	0.00 pp	0.97
	Number of CKD QCP List Services PPPM	1.5	1.4	1.4	1.3	0.02	-0.05	0.10	1.6%	0.00	0.54
	Patients with ESRD with No Nephrology Care	0.06%	0.12%	0.07%	0.14%	-0.001 pp	-0.05 pp	0.05 pp	-1.3%	0.00 pp	0.21

Measures		KCF		Comparison		Differences-in-Differences Estimate					
		Pre-KCC Mean	PY 2022 Mean	Pre-KCC Mean	PY 2022 Mean	DiD	90% Lower CI	90% Upper CI	Percent Change	Trend Test Coeff.	Trend Test P-Value
Quality of Care (cont.)	**Patients with at Least One Hospitalization for Vascular Access Complications in a Given Month**	0.84%	1.0%	0.87%	1.0%	0.05 pp	-0.10 pp	0.20 pp	5.6%	0.00 pp	0.79
	Patients with at Least One Hospitalization for ESRD Complications in a Given Month	0.85%	1.1%	0.72%	0.89%	0.07 pp	-0.13 pp	0.27 pp	8.1%	0.00 pp	0.66
	Fistula Use (percentage of patients in a given month who had a fistula)	60.9%	50.2%	58.7%	53.3%	-5.3 pp**	-9.7 pp	-0.88 pp	-8.7%	-0.10 pp	0.16
	Graft Use (percentage of patients in a given month who had a graft)	18.3%	18.5%	19.5%	16.0%	3.6 pp** †	0.68 pp	6.6 pp	19.8%	0.11 pp	0.04
	Percentage of Patients with Greater Than 80% of Days Covered for Phosphate Binder Prescription in a Given Month	44.30%	50.8%	48.40%	55.70%	-0.77 pp	-3.2 pp	1.7 pp	-1.7%	-0.10 pp	0.27
	Patients with At Least One Emergency Department Encounter for Hospital Admission for Hyperkalemia	0.35%	0.33%	0.30%	0.30%	-0.02 pp	-0.08 pp	0.04 pp	-6.00%	0.00 pp	0.79
	Patients with At Least One Emergency Department Encounter or Hospital Admission for Fluid Overload	1.5%	1.4%	1.4%	1.3%	0.01 pp	-0.19 pp	0.2 pp	0.48%	0.00 pp	0.39
Transplants	**Patients on the Transplant Waitlist in a Given Month**	23.8%	21.4%	23.0%	20.6%	0.01 pp	-3.5 pp	3.5 pp	0.03%	-0.02 pp	0.78
	Patients on the Transplant Waitlist with Active Status in a Given Month	13.0%	11.9%	13.1%	11.4%	0.60 pp	-1.6 pp	2.8 pp	4.6%	-0.03 pp	0.41
	Patients on the Transplant Waitlist with Inactive Status in a Given Month	10.8%	9.5%	9.9%	9.2%	-0.59 pp	-3.3 pp	2.1 pp	-5.4%	0.01 pp	0.83
	Transplants (per 1,000 patient-months)	5.2	5.8	4.3	6.0	-0.98	-2.3	0.35	-19.0%	-0.02	0.34
	Live Donor Transplants	1.0	0.96	0.50	0.76	-0.31	-0.68	0.06	-30.6%	-0.01	0.58
	Deceased Donor Transplants	4.2	4.9	3.8	5.2	-0.68	-2.0	0.64	-16.2%	-0.01	0.53
	Preemptive Transplants	3.9	5.2	1.6	2.4	0.64	-2.7	4.0	16.5%	-0.05	0.63

Measures		KCF		Comparison		Differences-in-Differences Estimate					
		Pre-KCC Mean	PY 2022 Mean	Pre-KCC Mean	PY 2022 Mean	DiD	90% Lower CI	90% Upper CI	Percent Change	Trend Test Coeff.	Trend Test P-Value
Unint. Conseq.	Part D Drug Costs PPPM	$725	$855	$752	$866	$15	-$60	$90	2.1%	-$1	0.55

Notes: The pre-KCC period covers January 2017–December 2019. PY 2022 covers January 2022–December 2022. Each impact estimate is based on a DiD analysis and reflects the difference in the regression-adjusted mean outcome for patients aligned to KCF Practices in the intervention period and the pre-KCC period relative to the same difference over time for patients aligned to matched KCF comparison practices. Significance of the DiD impact estimate is indicated next to 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. CBE = Consensus-Based Entity; CI = confidence interval; CKD = chronic kidney disease; DiD = difference-in-differences; ESRD = end-stage renal disease; HD = hemodialysis; KCF = Kidney Care First; PD = peritoneal dialysis; pp = percentage point; PPPM = per patient per month; PY = performance year; QCP = Quarterly Capitated Payment; SGLT2 = sodium-glucose cotransporter-2.

Exhibit B-19. Impact of the CKCC Model Option

Measures		CKCC		Comparison		Differences-in-Differences Estimate					
		Pre-KCC Mean	PY Mean	Pre-KCC Mean	PY Mean	DiD	90% Lower CI	90% Upper CI	Percent Change	Trend Test Coeff.	Trend Test P-Value
Dialysis Care	Number of Outpatient Dialysis Sessions per Beneficiary per Month	12.0	11.8	11.9	11.8	0.01	-0.03	0.05	0.10%	0.00	0.64
	Home Dialysis (percentage with at least one)	10.7%	14.0%	9.8%	12.4%	0.76 pp	-0.01 pp	1.5 pp	7.2%	0.02 pp	0.28
	Home HD (percentage with at least one)	1.9%	3.5%	1.9%	3.5%	0.03 pp	-0.41 pp	0.47 pp	1.8%	0.00 pp	0.87
	PD (percentage with at least one)	8.8%	10.6%	7.9%	8.9%	0.74 pp*	0.06 pp	1.4 pp	8.4%	0.01 pp	0.28
	In-Center HD (percentage with at least one)	88.1%	83.6%	89.4%	85.4%	-0.45 pp	-1.29 pp	0.39 pp	-0.51%	-0.02 pp	0.16
	Nursing Facility Dialysis (percentage with at least one)	0.001%	0.49%	0.08%	0.69%	-0.12 pp	-0.38 pp	0.13 pp	-8879.8%	0.00 pp	0.92
	Dialysis Training (percentage with at least one)	0.48%	0.70%	0.40%	0.47%	0.15 pp***	0.07 pp	0.23 pp	32.3%	0.03 pp	0.50
Hospitalizations and Emergency Department Visits	Patients with at Least One Acute Care Hospitalization in a Given Month	9.2%	8.1%	9.1%	7.8%	0.13 pp	-0.2 pp	0.46 pp	1.4%	0.00 pp	0.39
	Patients with at Least One Readmission within 30 Days of an Index Hospitalization Stay in a Given Month	27.4%	26.8%	26.7%	26.6%	-0.49 pp	-1.39 pp	0.42 pp	-1.8%	0.01 pp	0.59
	Patients with at Least One Emergency Department Visit in a Given Month	14.7%	13.0%	14.9%	12.9%	0.25 pp	-0.11 pp	0.62 pp	1.7%	0.00 pp	0.91
	Patients with at Least One Outpatient Emergency Department Visit in a Given Month	8.6%	7.6%	9.0%	7.8%	0.1 pp	-0.14 pp	0.34 pp	1.2%	0.00 pp	0.69

Measures		CKCC		Comparison		Differences-in-Differences Estimate					
		Pre-KCC Mean	PY Mean	Pre-KCC Mean	PY Mean	DiD	90% Lower CI	90% Upper CI	Percent Change	Trend Test Coeff.	Trend Test P-Value
Medicare Payments (PPPM)	**Total Medicare Parts A & B excluding Payments for CKD QCP Services**	$4,178	$4,417	$4,124	$4,379	-$15	-$90	$60	-0.36%	$0.60	0.59
	Total Parts A & B including Payments for CKD QCP Services	$4,227	$4,476	$4,171	$4,434	-$13	-$88	$61	-0.31%	$0.60	0.59
	Total Medicare Part A	$1,589	$1,509	$1,569	$1,489	-$1	-$45	$44	-0.03%	$0.10	0.88
	Acute Care Hospitalization Payments	$1,052	$1,030	$1,039	$1,009	$8	-$11	$27	0.75%	$0.46	0.35
	Readmissions Payments	$2,307	$2,400	$2,249	$2,402	-$61	-$135	$13	-2.7%	$0.05	0.98
	Institutional Post-Acute Care Payments	$265	$242	$265	$248	-$7 †	-$14	$1	-2.5%	-$0.32	0.06
	Home Health Payments	$139	$146	$128	$137	-$1	-$5	$3	-1.0%	-$0.08	0.27
	Total Medicare Part B	$2,597	$2,901	$2,568	$2,877	-$5	-$38	$28	-0.19%	$0.23	0.73
	Evaluation and Management Payments	$76	$93	$74	$90	$1.22*	$0.20	$2	1.6%	-$0.01	0.52
	CKD QCP Services Payments	$103	$127	$99	$122	$1	-$1	$2	0.54%	-$0.01	0.88
	Hospital Outpatient Payments	$314	$367	$331	$385	-$1	-$14	$12	-0.38%	-$0.06	0.80
	Total Dialysis Payments	$2,818	$2,934	$2,825	$2,912	$28**	$8	$48	1.0%	-$0.20	0.77
	Home Dialysis Payments	$286	$400	$261	$358	$17*** †	$9	$25	5.9%	$0.44	0.00
	PD Payments	$227	$283	$202	$242	$16*** †	$10	$22	7.1%	$0.30	0.01
	Home HD Payments	$53	$112	$49	$117	-$8**	-$15	-$2	-15.9%	$0.04	0.52
Quality of Care	**Optimal ESRD Starts CBE #2594**	43.9%	60.2%	38.7%	48.1%	6.9 pp**	1.9 pp	11.8 pp	15.6%	-0.08 pp	0.40
	Statin Medication Use	33.8%	40.0%	33.6%	40.5%	-0.63 pp †	-1.7 pp	0.39 pp	-1.9%	0.06 pp	0.04
	Hypertension Medication Use	30.2%	32.0%	28.8%	30.8%	-0.25 pp	-1.8 pp	1.3 pp	-0.83%	0.01 pp	0.71
	Diabetes Medication Use (SGLT2)	0.18%	4.7%	0.00%	4.5%	0.01 pp	-0.58 pp	0.59 pp	3.0%	0.00 pp	0.64
	Diabetes Medication Use (metformin)	0.39%	0.47%	0.42%	0.51%	-0.02 pp	-0.11 pp	0.07 pp	-5.2%	0.00 pp	0.22
	Testing/Labs	85.4%	85.1%	85.5%	84.3%	0.83 pp*	0.05 pp	1.6 pp	1.0%	0.01 pp	0.78
	Number of CKD QCP List Services PPPM	1.5	1.5	1.5	1.5	0.02	-0.02	0.05	1.0%	0.00	0.44
	Patients with ESRD with No Nephrology Care	0.07%	0.16%	0.04%	0.13%	0.004 pp	-0.02 pp	0.03 pp	5.6%	0.00 pp	0.39

Measures		CKCC		Comparison		Differences-in-Differences Estimate					
		Pre-KCC Mean	PY Mean	Pre-KCC Mean	PY Mean	DiD	90% Lower CI	90% Upper CI	Percent Change	Trend Test Coeff.	Trend Test P-Value
Quality of Care (cont.)	Patients with at Least One Hospitalization for Vascular Access Complications in a Given Month	0.86%	1.0%	0.83%	0.97%	-0.003 pp	-0.09 pp	0.09 pp	-0.31%	0.00 pp	0.18
	Patients with at Least One Hospitalization for ESRD Complications in a Given Month	0.89%	0.88%	0.94%	0.90%	0.03 pp	-0.06 pp	0.12 pp	3.5%	0.00 pp	0.48
	Fistula Use (percentage of patients in a given month who had a fistula)	61.0%	54.1%	62.1%	55.9%	-0.64 pp	-1.9 pp	0.59 pp	-1.0%	-0.01 pp	0.65
	Graft Use (percentage of patients in a given month who had a graft)	18.5%	17.6%	17.7%	16.3%	0.48 pp	-0.59 pp	1.55 pp	2.6%	-0.02 pp	0.36
	Percentage of Patients with Greater than 80% of Days Covered for Phosphate Binder Prescription in a Given Month	47.6%	53.3%	47.2%	52.9%	0.13 pp †	-1.5 pp	1.8 pp	0.26%	0.06 pp	0.09
	Patients with at Least One Emergency Department Encounter for Hospital Admission for Hyperkalemia	0.33%	0.33%	0.36%	0.34%	0.03 pp	-0.02 pp	0.07 pp	7.9%	0.00 pp	0.31
	Patients with at Least One Emergency Department Encounter or Hospital Admission for Fluid Overload	1.6%	1.3%	1.5%	1.4%	-0.07 pp †	-0.16 pp	0.02 pp	-4.5%	0.00 pp	0.05

Measures		CKCC		Comparison		Differences-in-Differences Estimate					
		Pre-KCC Mean	PY Mean	Pre-KCC Mean	PY Mean	DiD	90% Lower CI	90% Upper CI	Percent Change	Trend Test Coeff.	Trend Test P-Value
Transplants	**Patients on the Transplant Waitlist in a Given Month**	19.8%	19.1%	20.6%	17.6%	2.3 pp*** †	0.94 pp	3.6 pp	11.4%	0.05 pp	0.05
	Percentage of Patients on the Transplant Waitlist with Active Status in a Given Month	11.9%	11.4%	13.0%	10.7%	1.8 pp***	0.73 pp	2.9 pp	15.2%	0.03 pp	0.22
	Percentage of Patients on the Transplant Waitlist with Inactive Status in a Given Month	7.9%	7.7%	7.6%	6.9%	0.45 pp	-0.32 pp	1.2 pp	5.7%	0.03 pp	0.11
	Transplants	4.6	5.7	4.6	5.9	-0.14	-0.75	0.47	-3.1%	0.01	0.91
	Live Donor Transplants	0.72	0.63	0.67	0.61	-0.02	-0.19	0.15	-3.1%	0.01	0.39
	Deceased Donor Transplants	3.8	5.1	3.9	5.3	-0.12	-0.73	0.49	-3.1%	0.01	0.77
	Preemptive Transplants	3.4	7.1	2.3	4.1	1.9	-0.07	3.9	57.0%	0.03	0.84
Unint. Conseq.	**Part D Drug Costs PPPM**	$785	$880	$762	$844	$12	-$23	$47	1.6%	$0.87	0.26

Notes: The pre-KCC period covers January 2017–December 2019. PY 2022 covers January 2022–December 2022. Each impact estimate is based on a DiD analysis and reflects the difference in the regression-adjusted mean outcome for patients aligned to CKCC practices in PY 2022 and the pre-KCC period relative to the same difference over time for patients aligned to matched CKCC comparison practices. Significance of the DiD impact estimate is indicated next to 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. 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; HD = hemodialysis; PD = peritoneal dialysis; pp = percentage point; PPPM = per patient per month; PY = performance year; QCP = Quarterly Capitated Payment; SGLT2 = sodium-glucose cotransporter-2.

B.6.3. Sensitivity Analyses

This section describes the sensitivity analyses that we conducted of the impact estimates. In **Exhibits B-20** and **B-21**, we present the results for the sensitivities for the KCF and CKCC options, respectively. In general, across the sensitivities, estimated impacts of the KCF and CKCC options on the key outcomes considered were consistent with our primary specification.

Sensitivity #1: Dropping participant practices that are larger than the largest comparator practices. For both the KCF and CKCC analyses, we conducted a sensitivity in which we dropped participating practices and their matched comparison practices if the participating practice was larger in terms of number of aligned patient-months in 2019, the last year of the pre-KCC period, than the largest practice in the comparison group. For CKCC, if one or both of the dropped large participating practices was matched to the same comparison practice as another CKCC Participant, we reallocated the non-participant's weights in the regression.

This restriction resulted in dropping one KCF Practice and its matched comparison, accounting for about 12% of the patient-months in the KCF analytic file. After we applied this restriction, there were 24 remaining KCF Practices and 24 remaining comparison practices in the KCF sample. For CKCC, this restriction resulted in dropping 20 CKCC practices and one unique comparison practice, accounting for about 27% of the patient-months in the CKCC analytic file. After the restriction, there were 190 remaining participating practices and 234 unique comparison practices.

For the key outcomes we considered, KCF results were largely unchanged relative to our primary specification. For the CKCC group, the estimated impact of the CKCC option on home dialysis utilization and PD utilization, while still positive, were larger in magnitude and statistically significant after applying this sensitivity than the main specification. Similarly, we also found positive, statistically significant impacts for the likelihood of an ED visit in a given month and specifically, the likelihood of an ED visit that does not lead to a hospitalization. An increase in ED visits without a hospitalization would represent an unintended consequence of the model, and we will continue to monitor this in futural annual reports.

Sensitivity #2: Year fixed effects instead of year-by-month fixed effects. We tested the sensitivity of the impact estimates to the inclusion of different levels of time fixed effects. Our main specification uses year-by-month fixed effects to capture seasonality and any time-varying shock that affects the treatment and comparison groups. We ran an alternative model where we only included year fixed effects. For the key outcomes we considered, both KCF and CKCC results were largely unchanged relative to our primary specification.

Sensitivity #3: Dropping outlier KCF Practice and its match. Through descriptive analyses, we identified an outlier KCF Practice in terms of aligned patients with ESRD and dialysis measures. Specifically, for one KCF Practice, we identified that no dialysis claims for any modality were submitted after July 2022 for a group of patients with ESRD added at this same point in time. In this sensitivity analysis, we excluded this KCF Practice and its match. After we applied this restriction, there were 24 remaining KCF Practices and 24 remaining comparison practices in the KCF sample.

For the key outcomes we considered, KCF results were largely unchanged relative to our primary specification. The KCF impact on home dialysis use was smaller in magnitude than our primary specification but still negative and statistically significant.

Exhibit B-20. KCF Sensitivity Analysis

Measures		Main Specification			Sensitivity #1: Dropping Large Practices and Their Match			Sensitivity #2: Year Fixed Effects			Sensitivity #3: Dropping KCF Practice Outlier and Its Match		
		DiD	Lower CI	Upper CI	DiD	Lower CI	Upper CI	DiD	Lower CI	Upper CI	DiD	Lower CI	Upper CI
Dialysis Utilization	In-Center HD (percentage with at least one)	-3.6 pp**	-6.4 pp	-0.74 pp	-4.29 pp *	-7.9 pp	-0.71 pp	-3.6 pp **	-6.5 pp	-0.69 pp	-2.06** pp	-3.7 pp	-0.39 pp
	Home Dialysis (percentage with at least one)	2.1 pp**	0.38 pp	3.7 pp	2.14* pp	0.11 pp	4.2 pp	2.0 pp **	0.36 pp	3.7 pp	2.16** pp	0.48 pp	3.8 pp
	Home HD (percentage with at least one)	-0.22 pp	-1.3 pp	0.83 pp	0.10 pp	-1.1 pp	1.3 pp	-0.22 pp	-1.3 pp	0.83 pp	-0.17 pp	-1.2 pp	0.90 pp
	PD (percentage with at least one)	2.3 pp**	0.81 pp	3.8 pp	2.07 pp *	0.32 pp	3.8 pp	2.3 pp **	0.79 pp	3.8 pp	2.39** pp	0.88 pp	3.9 pp
Hospitalizations and Emergency Department Visits	Patients with at Least One Hospitalization in a Given Month	-0.20 pp	-0.76 pp	0.36 pp	-0.18 pp	-0.80 pp	0.44 pp	-0.22 pp	-0.77 pp	0.34 pp	-0.30 pp	-0.86 pp	0.27 pp
	Patients with at Least One Readmission within 30 Days of an Index Hospitalization Stay in a Given Month	0.15 pp	-1.9 pp	2.2 pp	0.41 pp	-1.8 pp	2.6 pp	0.18 pp	-1.8 pp	2.2 pp	-0.09 pp	-2.1 pp	2.0 pp
	Patients with at Least One Emergency Department Visit in a Given Month	-0.31 pp	-1.0 pp	0.42 pp	-0.23 pp	-1.0 pp	0.55 pp	-0.33 pp	-1.1 pp	0.40 pp	-0.42 pp	-1.1 pp	0.30 pp
	Patients with at Least One Outpatient Emergency Department Visit in a Given Month	0.08 pp	-0.44 pp	0.60 pp	0.15 pp	-0.39 pp	0.69 pp	0.07 pp	-0.46 pp	0.60 pp	-0.02 pp	-0.50 pp	0.53 pp
Medicare Payments (PPPM)	Total Medicare Parts A & B excluding Payments for CKD QCP Services	-$134	-$311	$42	-$154	-$349	$40	-$140	-$317	$37	-$139	-$320	$42

Notes: Each impact estimate is based on a DiD analysis and reflects the difference in the regression-adjusted mean outcome for patients aligned to KCF Practices in PY 2022 and the pre-KCC period relative to the same difference over time for patients aligned to matched KCF comparison practices. Significance of the DiD impact estimate is indicated next to each outcome, where * implies significance at the 10% level, ** at the 5% level, and *** at the 1% level assuming a two-tailed test. Dropping participant practices that are larger than the largest comparator practices: We dropped participating practices larger in terms of number of aligned patient-months during the baseline period and their matched comparison practices. Dropping outlier KCF Practice and its match: We identified an outlier KCF Practice in terms of aligned patients with ESRD and dialysis measures. In this sensitivity analysis, we excluded this KCF Practice and its match. After we applied this restriction, there were 24 remaining KCF Practices and 24 remaining comparison practices in the KCF sample. CI = confidence interval; CKD = chronic kidney disease; DiD = difference-in-differences; HD = hemodialysis; KCF = Kidney Care First; PD = peritoneal dialysis; pp = percentage point; PPPM = per patient per month; QCP = Quarterly Capitated Payment.

Exhibit B-21. CKCC Sensitivity Analysis

Measures		Main Specification			Sensitivity #1: Dropping Large Practices and Their Match			Sensitivity #2: Year Fixed Effects		
		DiD	Lower CI	Upper CI	DiD	Lower CI	Upper CI	DiD	Lower CI	Upper CI
Dialysis Utilization	In-Center HD (percentage with at least one)	-0.45 pp	-1.3 pp	0.39 pp	-0.72 pp	-1.7 pp	0.22 pp	-0.44 pp	-1.3 pp	0.40 pp
	Home Dialysis (percentage with at least one)	0.76 pp	-0.01 pp	1.5 pp	1.09 pp **	0.24 pp	1.9 pp	0.77 pp	-0.01 pp	1.5 pp
	Home HD (percentage with at least one)	0.03 pp	-0.41 pp	0.47 pp	-0.12 pp	-0.55 pp	0.31 pp	0.03 pp	-0.40 pp	0.47 pp
	PD (percentage with at least one)	0.74 pp*	0.06 pp	1.4 pp	1.22 pp ***	0.48 pp	2.0 pp	0.75 pp*	0.06 pp	1.4 pp
Hospitalizations and Emergency Department Visits	Patients with at Least One Hospitalization in a Given Month	0.13 pp	-0.20 pp	0.46 pp	0.20 pp	-0.07 pp	0.46 pp	0.11 pp	-0.21 pp	0.44 pp
	Patients with at Least One Readmission within 30 Days of an Index Hospitalization Stay in a Given Month	-0.49 pp	-1.4 pp	0.42 pp	-0.05 pp	-0.98 pp	0.88 pp	-0.49 pp	-1.4 pp	0.41 pp
	Patients with at Least One Emergency Department Visit in a Given Month	0.25 pp	-0.11 pp	0.62 pp	0.42 pp **	0.12 pp	0.72 pp	0.23 pp	-0.13 pp	0.60 pp
	Patients with at Least One Outpatient Emergency Department Visit in a Given Month	0.10 pp	-0.14 pp	0.34 pp	0.32 pp **	0.11 pp	0.52 pp	0.09 pp	-0.16 pp	0.33 pp
Medicare Payments (PPPM)	Total Medicare Parts A & B excluding Payments for CKD QCP Services	-$15	-$90	$60	$18	-$51	$87	-$20	-$95	$54

Notes: Each impact estimate is based on a DiD analysis and reflects the difference in the regression-adjusted mean outcome for patients aligned to CKCC practices in PY 2022 and pre-KCC period relative to the same difference over time for patients aligned to matched CKCC comparison practices. Significance of the DiD impact estimate is indicated next to each outcome, where * implies significance at the 10% level, ** at the 5% level, and *** at the 1% level assuming a two-tailed test. Dropping participant practices that are larger than the largest comparator practices: We dropped participating practices larger in terms of number of aligned patient-months during the baseline period and their matched comparison practices. If one or both of the dropped large participating practices was matched to the same comparison practice as another CKCC Participant, we re-allocated the non-participant's weights in the regression. CI = confidence interval; CKCC = Comprehensive Kidney Care Contracting; CKD = chronic kidney disease; DiD = difference-in-differences; HD = hemodialysis; PD = peritoneal dialysis; pp = percentage point; PPPM = per patient per month; QCP = Quarterly Capitated Payment.

B.6.4. Net Impacts

This section describes how we calculated estimates of the net impact to Medicare. The accounting for net impacts to Medicare from the KCC Model includes payments made during the performance year and financial reconciliation, in addition to our estimation of the change in payments for specific components. The estimate of net impacts to Medicare can be broken down into two components: (1) estimated changes in payments for Total Medicare Parts A & B services and (2) costs of the KCC Model (see **Exhibit B-22**).

Exhibit B-22. Stylized Net Impacts Calculation

Note: CKD = chronic kidney disease; NP = nephrology professional; QCP = Quarterly Capitated Payment.

Estimated change in payments. Our main DiD estimate represents the PPPM change in Total Medicare Parts A & B payments, excluding the CKD QCP list services for patients with CKD.[18] We report this estimate in the first row of **Exhibit B-23**. Because we used standardized payments for our estimation, to reduce bias from regional variation in prices, we applied a ratio of nonstandardized-to-standardized payments (for each model) to get the nonstandardized impact estimate. To calculate the total annual change in Medicare payments, we multiplied by the number of reconciliation months. This yielded a change of –$33 million (90% CI: –$123 million, $57 million) for KCC, with just over half coming from the CKCC option. To account for changes in total payments for CKD QCP list services made by providers who are not nephrology professionals (that is, any provider not on the KCC Universe List from the implementation contractor), we separately estimated the effect of the model on total CKD QCP list services by non-nephrology professionals. Combining the total reduction in payments outside of CKD QCP list services with the PY 2022 change in CKD QCP list services by non-nephrology professionals yielded a total decrease in payments, or gross savings, of $32 million (90% CI –$124 million, $59 million) for the KCC Model (see **Exhibit B-23**).

[18] Services on this list account for less than 1.5% of Total Medicare Parts A & B payments for eligible patients in the KCC Model.

Exhibit B-23. Estimated Change in Total Payments for Part A & B Services from Payments outside the CKD QCP List

Group	Calculation Process	KCC	KCF	CKCC
Change from Total Parts A & B Payments (except for CKD QCP list [regardless of provider])	Change in Medicare Payments PPPM Due to KCC Model (DiD estimate)	-$26 (-$96, $44)	-$134 (-$302, $33)	-$15 (-$90, $60)
	Times: 1 + Ratio Adjustment for Nonstandardized Medicare Payments*	1.1	1.1	1.1
	Times: Patient-months in 2022 (N)	1,173,547	104,921	1,068,626
	Equals: Total Change in Medicare Payments excluding Payments for Services on CKD QCP List due to KCC Model	**-$33.2 M (-$123.4 M, $57.1 M)**	**-$15.7 M (-$35.4 M, $3.9 M)**	**-$17.4 M (-$104.3 M, $69.4 M)**
Change in non-Nephrology CKD QCP List Payments	Change in Medicare Payments for Services on CKD QCP List to Non-nephrologists PPPM Due to the KCC Model (DiD estimate)	$2 (-$0.50, $4)	$6 ($1, $11)	$1 (-$1, $3)
	Times: CKD Patient-months in 2022 (N)	634,437	59,487	574,950
	Equals: Total Change in Medicare Payments for CKD QCP List Services to Non-nephrologists due to KCC Model	**$1.0 M (-$0.3 M, $2.3 M)**	**$0.4 M ($0.1 M, $0.7 M)**	**$0.6 M (-$0.7 M, $1.9 M)**
Combined	**Sum Equals: Change in Total A & B Payments (except for CKD QCP list by nephrology professionals)**	**-$32.2 M (-$124 M, $59 M)**	**-$15.4 M (-$35 M, $5 M)**	**-$16.8 M (-$105 M, $71 M)**

Notes: 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. Patient-month data were obtained from the implementation contractor after annual reconciliation. The standardization ratio is not applied to the estimate of the change in Medicare payments for CKD QCP list services to non-nephrologists because there is minimal difference between standardized and nonstandardized payments for these services. Because the calculation involves multiple regressions where the errors across equations are expected to be correlated, we use a seemingly unrelated regression estimation to accurately combine confidence intervals across the point estimates and provide an aggregate net impact. * The standardization ratio is not applied to the estimate of the change in Medicare payments for CKD QCP list services to non-nephrologists because there is minimal difference between standardized and nonstandardized payments for these services. CI = confidence interval; CKCC = Comprehensive Kidney Care Contracting; CKD = chronic kidney disease; DiD = difference-in-differences; KCF = Kidney Care First; M = million; PPPM = per patient per month; PY = performance year; QCP = Quarterly Capitated Payment.

Costs of the KCC Model. The first cost of the model that we accounted for is the difference between the capitation payment under KCC and what Medicare would have spent on these services by nephrology professionals had the model not existed. To compute this amount, we leveraged our DiD framework and parallel trends assumption. We ran a regression on total payments for CKD QCP list services using the framework and covariates described in **Section B.6**. In the pre-KCC period, the KCC group had average payments for CKD QCP list services that were $4 PPPM greater than the comparison group. During PY 2022, the comparison group mean was $118, so following the parallel trends assumption, the KCC group would have PPPM payments of $122 (or $4 greater) absent the model. We multiplied this PPPM amount by the number of CKD patient-months and by the estimated share of CKD QCP list services that were billed by nephrology professionals to obtain a PY 2022 estimate of the amount that would have been billed for CKD QCP list services by nephrology professionals absent the model. This amount, $16 million, represents what Medicare would have paid for these services absent the model (see Exhibit **B-24**).[19] Under the capitation payment system, Medicare paid $36 million more ($46 million prospectively and $6 million in alignment-based adjustments and leakage during financial reconciliation) than it would if the model had not existed.

Exhibit B-24. Estimated FFS Counterfactual for CKD QCP List Services Absent the KCC Model

Calculation	KCC	KCF	CKCC
PY 2022 Estimate of FFS CKD QCP Services from Nephrology Professionals	$16.1 M ($15.7 M, $16.4 M)	$1.3 M ($1.3 M, $1.4 M)	$14.7 M ($14.4 M, $15.0 M)
Minus: CKD QCP Prospectively Paid	$46.0 M	$4.4 M	$41.6 M
Minus: Alignment and Leakage Adjustments	$5.8 M	$0.6 M	$5.2 M
Equals: Difference in CKD QCP List Services by Nephrology Professionals Paid under Capitation Relative to FFS Counterfactual*	**-$35.8 M (-$36.1 M, -$35.4 M)**	**-$3.7 M (-$3.7 M, -$3.6 M)**	**-$32.1 M (-$32.4 M, -$31.8 M)**

Notes: 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. Patient-month data were obtained from the implementation contractor after annual reconciliation. Columns and rows may not add exactly, as numbers are rounded. * This amount also includes a small adjustment for the change in the Health Professional Shortage Area (HPSA) bonus, representing the change in the amount paid for the HPSA bonus given the change in CKD QCP list services under the model. CMS pays the capitated amount for the CKD QCP list services, which are eligible for the bonus, and the bonus amount is paid during reconciliation. CKCC = Comprehensive Kidney Care Contracting; CKD = chronic kidney disease;

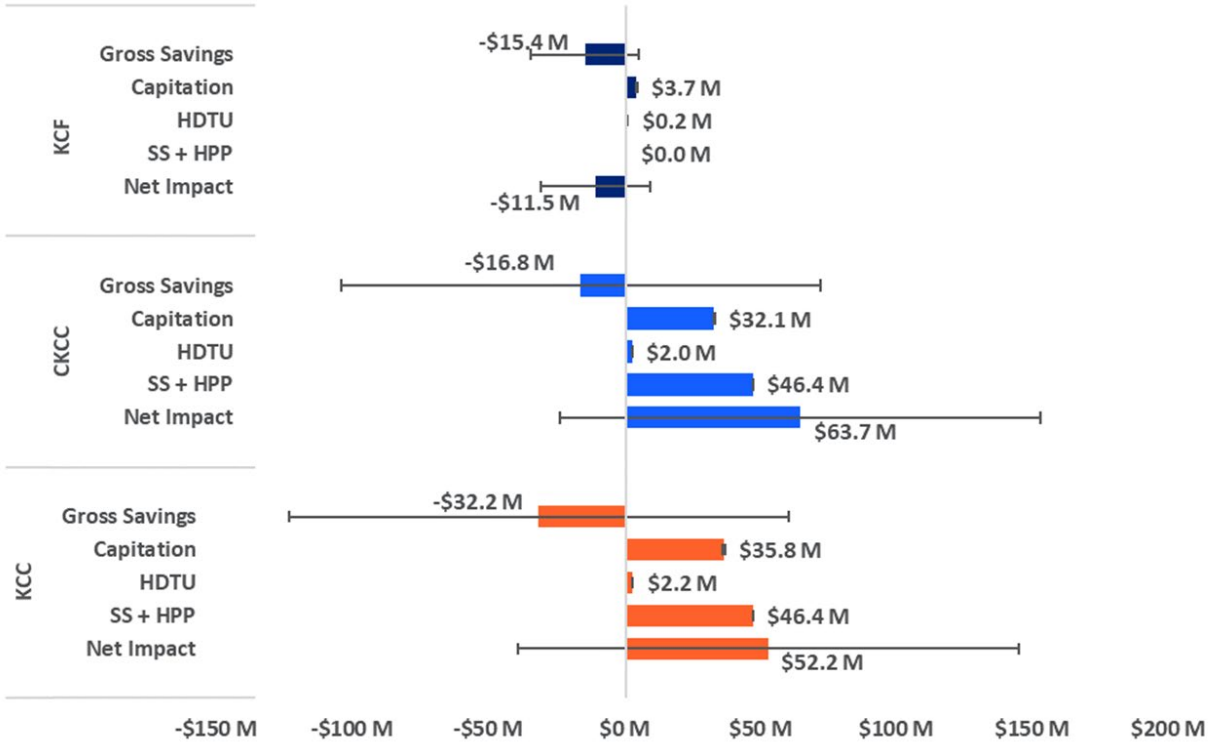
[19] We estimate this share based on claims in the baseline year 2019 for all eligible CKD beneficiaries aligned to our selected treatment and comparison providers. The denominator is the sum of paid nonstandardized amounts for services on the CKD QCP list. The numerator restricts this summation to only those amounts on claims submitted by a nephrology professional as defined by the KCC Universe List from the implementation contractor. Notably, in sensitivity assessments, this share was relatively stable over the years prior to the KCC Model and within treatment and comparison groups.

DiD = difference-in-differences; FFS = fee-for-service; KCF = Kidney Care First; M = million; PY = performance year; QCP = Quarterly Capitated Payment.

To calculate the total costs of KCC, we combined the QCP costs with the incentive and bonus payments made in the model (see **Exhibit B-25**). For the KCF option, this amounted to $0.2 million in Home Dialysis True-Up (HDTU) payments. KCEs received $2 million in HDTU payments, $26 million in shared savings payments, and $20 million in high performers pool payments.

Net impacts. After subtracting model costs from the payment reductions (gross savings), we estimated a net loss of $52 million to Medicare due to KCC, although this result is not statistically significant.

Exhibit B-25. Net Impacts of the KCC Model



Note: CKCC = Comprehensive Kidney Care Contracting; HDTU = Home Dialysis True-Up; HPP = high performers pool; KCF = Kidney Care First; M = million; SS = shared savings.

B.7. Quality of Care for Patients with CKD Stage 4 or 5: Medication Analyses

Patients with CKD Stage 4 or 5 are at increased risk for cardiovascular disease, including myocardial infarction and stroke. HMG Co-A reductase inhibitors (statins) can reduce this risk irrespective of lipid levels, and the Kidney Disease Improving Global Outcomes 2013 Lipid guidelines recommend statin use for patients who are at least 50 years of age with a glomerular filtration rate of less than 60 ml/min and who are not treated with dialysis or kidney

transplantation.[20] Ensuring that patients with CKD Stage 4 or 5 are prescribed a statin medication is a potential mechanism to reduce hospitalizations for major cardiovascular adverse events. Both the KCF and CKCC options and their matched comparison groups experienced similar increases in statin prescriptions between the pre-KCC period and PY 2022 (see **Exhibits B-18** and **B-19**). Patients in the KCF option experienced a non-statistically significant decrease of 1.8 percentage points relative to the comparison group in PY 2022. Similarly, patients in the CKCC option experienced a non-statistically significant decrease of 0.63 percentage points relative to the comparison group in PY 2022; however, data from the pre-KCC period indicated that patients aligned to the CKCC group and the comparison group were not following parallel trends, and this result should be interpreted with caution. The relatively low use of statins in this high-risk population (pre-KCC mean of 34.7% for the KCF option and 33.8% for the CKCC option) may reflect nephrology providers either deferring prescription writing to other providers (that is, primary care, cardiology) who may not be aware of current guidelines or focusing efforts on other interventions (see below).

Use of angiotensin-converting enzyme (ACE) inhibitors and angiotensin receptor blockers (ARBs) have been the mainstay in antihypertensive therapy for patients with CKD as they have been demonstrated to slow disease progression in those with proteinuric CKD.[21] With advanced CKD, risks of side effects such as hyperkalemia increase and can limit their use in the population with CKD Stage 4 or 5, but there is no lower bound of GFR for which these medications should be discontinued. Therefore, even in CKD, the use of ACE/ARB medications can delay the need for renal replacement therapy, which would align with model incentives. Overall, the KCC Model did not have a significant impact on the proportion of patients with CKD Stage 4 or 5 prescribed hypertension medications. The DiD estimate for the KCF option was a relative decrease of 0.07 percentage points, which was not statistically significant (see **Exhibit B-26**). Results were similar for patients in the CKCC option relative to the comparison groups. Patients in the CKCC option had a relative decrease of 0.25 percentage points, which is less than 1% of the pre-KCC mean and is not statistically significant.

More recently, studies have demonstrated that sodium-glucose cotransporter-2 (SGLT2) inhibitors can significantly delay progression of proteinuric CKD.[22,23] Although these medications are generally not prescribed when the GFR is less than 25 ml/min, they can be continued for CKD if started earlier. Even for patients with CKD Stage 4 who are referred to a nephrology provider, there may be a brief window of opportunity to start these medications before the GFR is too low. This timing issue could potentially limit the model's impact on

[20] Wanner, C., Tonelli, M., & Kidney Disease: Improving Global Outcomes Lipid Guideline Development Work Group Members. (2014). KDIGO clinical practice guideline for lipid management in CKD: Summary of recommendation statements and clinical approach to the patient. *Kidney International, 85*(6), 1303–1309.

[21] Proteinuric CKD is CKD presenting with proteinuria, or excessive protein in urine. It is often a sign of kidney malfunction and an early indicator of CKD.

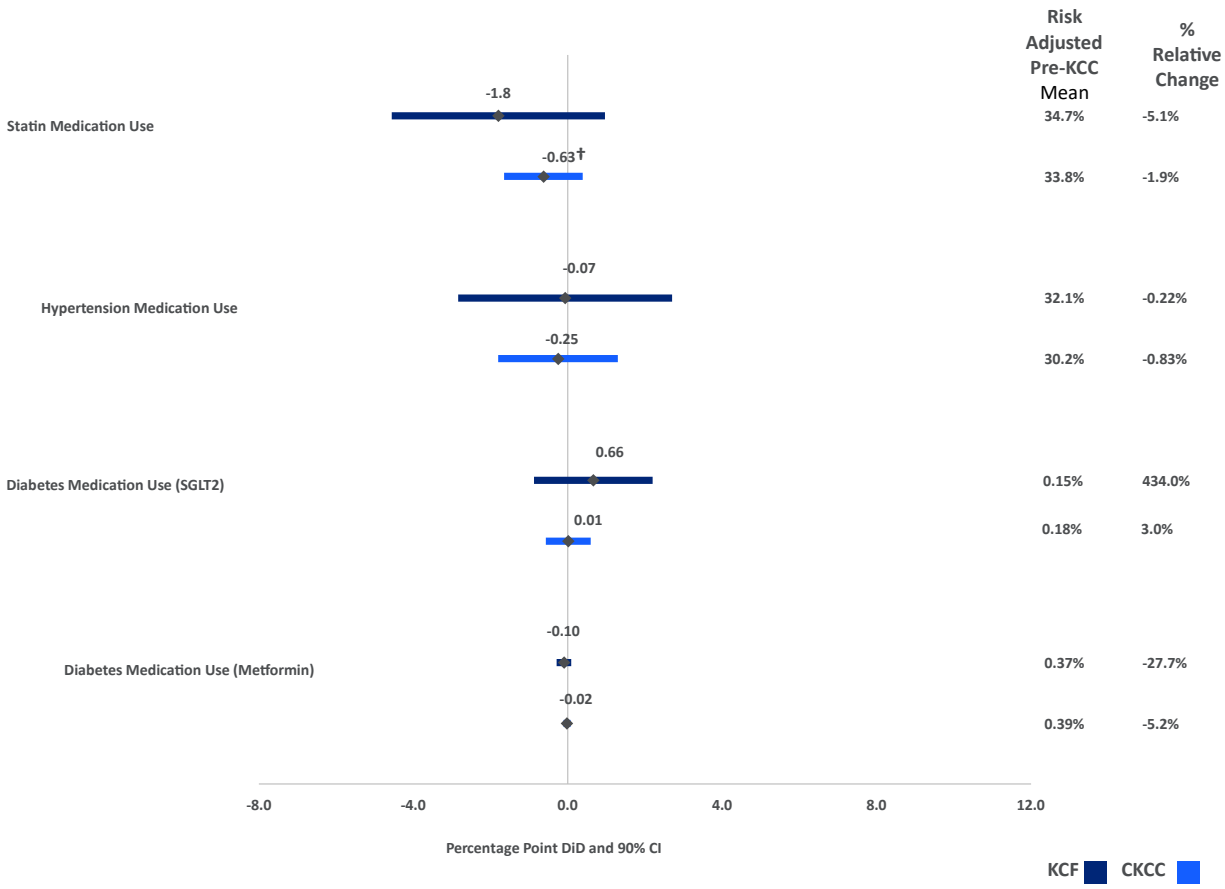
[22] Wanner, C., Inzucchi, S. E., Lachin, J. M., Fitchett, D., von Eynatten, M., Mattheus, M., Johansen, O. E., Woerle, H. J., Broedl, U. C., Zinman, B., & EMPA-REG OUTCOME Investigators (2016). Empagliflozin and progression of kidney disease in Type 2 diabetes. *The New England Journal of Medicine, 375*(4), 323–334.

[23] Heerspink, H. J. L., Stefánsson, B. V., Correa-Rotter, R., Chertow, G. M., Greene, T., Hou, F. F., Mann, J. F. E., McMurray, J. J. V., Lindberg, M., Rossing, P., Sjöström, C. D., Toto, R. D., Langkilde, A. M., Wheeler, D. C., & DAPA-CKD Trial Committees and Investigators (2020). Dapagliflozin in patients with chronic kidney disease. *The New England Journal of Medicine, 383*(15), 1436–1446.

slowing disease progression relative to ACE/ARB use. As expected, SGLT2 use was quite low during the pre-KCC period across both the KCF and CKCC options and the comparison groups (see **Exhibits B-18** and **B-19**). Overall, the KCC Model did not affect the use of SGLT2 inhibitors. Among patients with CKD in the KCF option, SGLT2 use increased from 0.2% to 5%. There were similar increases in the comparison group from 0.1% to 5%, yielding a not statistically significant relative impact of 0.66 percentage points (see **Exhibit B-26**). The CKCC option results were similar, with an increase from 0.2% to 5% and an increase in the comparison from about 0% to 5% at the end of PY 2022. The CKCC option led to a small and not statistically significant increase of 0.01 percentage points.

Metformin is a commonly used medication to treat diabetes, but due to the risk of lactic acidosis in CKD, this medication is specifically contraindicated if the GFR is less than 30 ml/min. We selected this medication as a prescribing safety indicator because it is often incumbent on the nephrology provider to recommend stopping this medication in CKD Stage 4 and 5. The percentage of patients prescribed metformin was low in the KCC group and comparison groups during the pre-KCC period and PY 2022 (see **Exhibit B-18** and **B-19**). In PY 2022, there was a relative decrease of 0.10 percentage points in the proportion of KCF patients prescribed metformin relative to the comparison group (see **Exhibit B-26**). Although this is an estimated 28% relative change, the pre-KCC mean is near zero, and the impact estimate is not statistically significant. Similar findings were estimated for the CKCC option. In PY 2022, there was a relative decrease of 0.02 percentage points among CKCC patients relative to the comparison group. This impact accounts for about 5% of the pre-KCC mean and is not statistically significant.

Exhibit B-26. Impact of KCF and CKCC on Quality of Care for Patients with CKD



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, *** 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 = chronic kidney disease; DiD = differences-in-differences; KCF = Kidney Care First; PY = performance year; SGLT2 = sodium-glucose cotransporter-2.

Appendix C: Power Calculation Methodology

The sensitivity of a model to detect differences between the treatment and comparison group is measured by statistical power. In this section, we describe our power calculation methodology, which is to determine the smallest detectable difference, given the fixed sample size and other parameters. We set the probability of Type I error, α, (that is, falsely concluding that the model has an effect when it does not) at an acceptable level of 0.1 and computed power under this specification.

To compute power, we used a Stata user-generated command "clasmpsi," developed by Batistatou et al. (2014).[24] The authors use a formula based on a non-central F distribution as described by Moser et al. (1989).[25]

$$1-\beta=\Phi\left[\frac{\delta}{\sqrt{\left[\frac{\sigma_t^2}{N_t}\left\{1+\left(\bar{m}+\frac{\sigma_{\bar{m}}^2}{\bar{m}}\right)\rho_t\right.\right.}+\sqrt{\left[\frac{\sigma_t^2}{N_t}\left\{1+\left(\bar{m}+\frac{\sigma_{\bar{m}}^2}{\bar{m}}\right)\rho_t\right.\right.}}-z_\alpha\right] \quad (5)$$

Here, δ denotes various effect sizes for potential changes in the outcome. ρ_t and ρ_c are intra-cluster correlation coefficients (ICCs), which measure how related the clustered observations are for the treatment and control groups, respectively. Furthermore, we also considered how the fit of an estimated regression model would affect power by adjusting the variance and ICC factors using an assumed R^2 of 0.3.[26] The term $\frac{\sigma_{\bar{m},t,c}^2}{\bar{m}}$ corresponds to the variation in the size of clusters, which has been shown by Guittet et al. (2006) to heavily influence power when there is large variation. $\bar{m}$ refers to the average number of individuals per cluster.[27] Finally, $\sigma_t^2, N_t, \sigma_c^2$, and N_c are the outcome variance and the total sample size for each trial arm (t: treatment, c: control), and z_α is the one-tailed z-statistic corresponding to an α of 0.1. Combining these factors, we generated two terms commonly referred to as the *design effect*.

We calculated values of the factors discussed above for the outcome variables: Total Medicare Parts A & B payments and home dialysis usage using the matched beneficiary data. A key component of equation (1) is the ICC, which depends on how observations are clustered. Clustered designs are common in a DiD framework. For each group, we clustered by aligned practice identified in the matched sets, which corresponded to 50 (25 KCF and 25 comparison) cluster units for KCF analyses and 445 (210 CKCC and 235 comparison) cluster units for CKCC analyses. As a result, the power calculations did not take into consideration the repeated nature

[24] Batistatou, E., Roberts, C., & Roberts, S. (2014). Sample size and power calculations for trials and quasi-experimental studies with clustering. *Stata Journal, 14*(1), 159–175

[25] Moser, B.K., Stevens, G.R., & Watts, C.L. (1989). The two-sample t test versus Satterthwaite's approximate F test. *Communications in Statistics - Theory and Methods, 18*(11), 3963–3975.

[26] The R^2 value provides an indication of how well the covariates of the regression explain the variation in the outcome of interest. Thus, the greater the value of the R^2, the lower the necessary sample size needed to reach a desired level of power.

[27] Guittet, L., Ravaud, P., & Giraudeau, B. (2006). Planning a cluster randomized trial with unequal cluster sizes: Practical issues involving continuous outcomes. *BMC Medical Research, 6*(1), 17.

of the data, which would only improve power if all other calculations and assumptions were maintained.

For this first annual report, the number of participants and patients provided reasonable confidence that the analysis would detect modest impacts on Medicare service use and costs for all patients. Due to the difference in number of participants, the analysis could detect more modest impacts for CKCC than for KCF. For the percentage of home dialysis usage in a given month, in which the analytic sample was restricted to patient-months with ESRD, the analyses were powered at 0.80 to detect a 24% difference for KCF and to detect a 10% difference for CKCC. For Total Medicare Parts A & B payments, the analyses were powered at 0.80 to detect a 10% difference for KCF and to detect a 4% difference for CKCC.

Appendix D: ICH CAHPS® Analysis Supplement

D.1. Data Sources

We used the In-Center Hemodialysis Consumer Assessment of Healthcare Providers and Systems (ICH CAHPS) Survey data for 2017–2019 (pre-KCC) and PY 2022 (post-KCC) to assess the impact of the KCC Model on patients' self-reported experiences with in-center hemodialysis. For our analyses, we used facility-survey-wave-level ICH CAHPS data from CMS.

As part of CMS' ESRD Quality Incentive Program, all Medicare-certified in-center ESRD facilities that do not qualify for an exemption from participating in the ICH CAHPS Survey must contract with an approved ICH CAHPS Survey vendor to administer the survey twice each year: once in the spring (April to early July) and once in the fall (October to early January).[28] The survey is fielded to a sample of the facility's hemodialysis patients at least 18 years of age who have received outpatient hemodialysis for at least 3 months at the ESRD facility, drawing from patients who received in-center dialysis in October through December of the previous year for the spring survey and April through June of the current year for the fall survey.[29] Results are publicly reported on CMS' Care Compare site and updated each April and October.

In spring 2020, CMS also issued an Extraordinary Circumstances Exception (ECE) due to the COVID-19 PHE.[30] During the ECE, facilities were not required to conduct the spring 2020 wave of the ICH CAHPS Survey so that they could instead allocate resources to patient care and ensure the safety of their staff.[20] Given the ECE and the COVID-19 PHE's potential effect on response rates for the fall wave, we excluded all 2020 and 2021 ICH CAHPS data from our analyses.

We analyzed nine ICH CAHPS measures that are publicly reported and derived from 35 ICH CAHPS Survey questions. The three global rating measures are each derived from a single ICH CAHPS question and reflect the percentage of respondents who reported a score of 9 or 10 on a scale of 0 (worst) to 10 (best) (see **Exhibit D-1**). The three composite measures are derived from multiple ICH CAHPS questions and reflect the percentage of respondents who reported the most favorable ratings (see **Exhibit D-2**).[31] In addition, we analyzed three measures based on individual survey responses that address other components of quality and relate to key goals of the KCC Model, including transplantation and peritoneal dialysis performed at home (see **Exhibit D-3**). The nine measures were adjusted for survey mode and several patient mix factors by the ICH CAHPS Data Center contractor, including overall health; overall mental health; heart disease; difficulty hearing; visual impairment; difficulty concentrating, remembering, or making decisions; difficult dressing or bathing; age; sex; education; language other than English spoken at home; whether or not someone helped complete the survey; and number of years on dialysis.[20]

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[28] Centers for Medicare & Medicaid Services. (2023). *ICH CAHPS Survey: Survey administration and specifications manual version 11.0.* https://ichcahps.org/Portals/0/SurveyMaterials/ICH_SurveyAdminManual.pdf.

[29] Additional criteria for determining ICH CAHPS Survey eligibility for in-center dialysis patients include not using hospice services or living in a long-term facility.

[30] Centers for Medicare & Medicaid Services. (2020). *End-Stage Renal Disease Quality Incentive Program (ESRD QIP) frequently asked questions: Exceptions for dialysis facilities affected by COVID-19*. https://www.cms.gov/files/document/covid-qip-esrd-faqs.pdf.

[31] Centers for Medicare & Medicaid Services. (2022). *Patient-mix coefficients and star ratings for the In-Center Hemodialysis CAHPS (ICH CAHPS) Survey results publicly reported in October 2022.* https://ichcahps.org/Portals/0/PublicReporting/ICHCAHPS_PublicReportingCoefficients_Spring2021Fall2021.pdf.

Exhibit D-1. In-Center Hemodialysis Patient Experience of Care Global Rating Measures and their Corresponding ICH CAHPS Questions

Global Measure	ICH CAHPS Question	Interpretation
Rating of Kidney Doctors This corresponds to the following measure reported on CMS' Care Compare website: "Patients who gave their kidney doctors a rating of 9 or 10 on a scale of 0 to 10"	Q8: Using any number from 0 to 10, where 0 is the worst kidney doctors possible and 10 is the best kidney doctors possible, what number would you use to rate the kidney doctors you have now?	This global measure reflects the percentage of patients who gave a score of 9 or 10 on a scale of 0 (worst possible) to 10 (best possible).
Rating of Dialysis Center Staff This corresponds to the following measure reported on CMS' Care Compare website: "Patients who gave the dialysis center staff a rating of 9 or 10 on a scale of 0 to 10"	Q32: Using any number from 0 to 10, where 0 is the worst dialysis center staff possible and 10 is the best dialysis center staff possible, what number would you use to rate your dialysis center staff?	This global measure reflects the percentage of patients who gave a score of 9 or 10 on a scale of 0 (worst possible) to 10 (best possible).
Rating of Dialysis Center This corresponds to the following measure reported on CMS' Care Compare website: "Patients who gave the dialysis center a rating of 9 or 10 on a scale of 0 to 10"	Q35: Using any number from 0 to 10, where 0 is the worst dialysis center possible and 10 is the best dialysis center possible, what number would you use to rate this dialysis center?	This global measure reflects the percentage of patients who gave a score of 9 or 10 on a scale of 0 (worst possible) to 10 (best possible).

Note: ICH CAHPS = In-Center Hemodialysis Consumer Assessment of Healthcare Providers and Systems.

Source: Centers for Medicare & Medicaid Services. (2023). *ICH CAHPS Survey: Survey administration and specifications manual version 11.0.* https://ichcahps.org/Portals/0/SurveyMaterials/ICH_SurveyAdminManual.pdf

Exhibit D-2. In-Center Hemodialysis Patient Experience of Care Composite Measures and Their Corresponding ICH CAHPS Questions

Composite Measure	ICH CAHPS Questions	Interpretation of Measure
Nephrologists' Communication and Caring This corresponds to the following measure reported on CMS' Care Compare website: "Patients who reported that kidney doctors 'always' communicated well and cared for them as a person"	Q3: In the last 3 months, how often did your kidney doctors listen carefully to you?	This composite measure reflects the percentage of patients who provided the most favorable ratings to the corresponding six ICH CAHPS questions.
	Q4: In the last 3 months, how often did your kidney doctors explain things in a way that was easy for you to understand?	
	Q5: In the last 3 months, how often did your kidney doctors show respect for what you had to say?	
	Q6: In the last 3 months, how often did your kidney doctors spend enough time with you?	
	Q7: In the last 3 months, how often did you feel your kidney doctors really cared about you as a person?	
	Q9: Do your kidney doctors seem informed and up to date about the health care you receive from other doctors?	

Composite Measure	ICH CAHPS Questions	Interpretation of Measure
Quality of Dialysis Center Care and Operations This corresponds to the following measure reported on CMS' Care Compare website: "Patients who reported that dialysis center staff 'always' communicated well, kept patients as comfortable and pain-free as possible, behaved in a professional manner, and kept the center clean"	Q10: In the last 3 months, how often did the dialysis center staff listen carefully to you?	This composite measure reflects the percentage of patients who provided the most favorable ratings to the corresponding 17 ICH CAHPS questions.
	Q11: In the last 3 months, how often did the dialysis center staff explain things in a way that was easy for you to understand?	
	Q12: In the last 3 months, how often did the dialysis center staff show respect for what you had to say?	
	Q13: In the last 3 months, how often did the dialysis center staff spend enough time with you?	
	Q14: In the last 3 months, how often did you feel the dialysis center staff really cared about you as a person?	
	Q15: In the last 3 months, how often did dialysis center staff make you as comfortable as possible during dialysis?	
	Q16: In the last 3 months, did dialysis center staff keep information about you and your health as private as possible from other patients?	
	Q17: In the last 3 months, did you feel comfortable asking the dialysis center staff everything you wanted about dialysis care?	
	Q21: In the last 3 months, how often did dialysis center staff insert your needles with as little pain as possible?	
	Q22: In the last 3 months, how often did dialysis center staff check you as closely as you wanted while you were on the dialysis machine?	
	Q24: In the last 3 months, how often was the dialysis center staff able to manage problems during your dialysis?	
	Q25: In the last 3 months, how often did dialysis center staff behave in a professional manner?	
	Q26: In the last 3 months, did dialysis center staff talk to you about what you should eat and drink?	
	Q27: In the last 3 months, how often did dialysis center staff explain blood test results in a way that was easy to understand?	

Composite Measure	ICH CAHPS Questions	Interpretation of Measure
Quality of Dialysis Center Care and Operations (cont.)	Q33: In the last 3 months, when you arrived on time, how often did you get put on the dialysis machine within 15 minutes of your appointment or shift time?	
	Q34: In the last 3 months, how often was the dialysis center as clean as it could be?	
	Q43: In the last 12 months, how often were you satisfied with the way they handled these problems?	
Providing Information to Patients This corresponds to the following measure reported on CMS' Care Compare website: "Patients who reported that YES their kidney doctors and dialysis center staff gave them the information they needed to take care of their health"	Q19: The dialysis center staff can connect you to the dialysis machine through a graft, fistula, or catheter. Do you know how to take care of your graft, fistula, or catheter?	This composite measure reflects the percentage of patients who provided the most favorable ratings to the corresponding nine ICH CAHPS questions.
	Q28: As a patient you have certain rights. For example, you have the right to be treated with respect and the right to privacy. Did this dialysis center ever give you any written information about your rights as a patient?	
	Q29: Did dialysis center staff at this center ever review your rights as a patient with you?	
	Q30: Has dialysis center staff ever told you what to do if you experience a health problem at home?	
	Q31: Has any dialysis center staff ever told you how to get off the machine if there is an emergency at the center?	
	Q36: You can treat kidney disease with dialysis at a center, a kidney transplant, or with dialysis at home. In the last 12 months, did your kidney doctors or dialysis center staff talk to you as much as you wanted about which treatment is right for you?	
	Q38: In the last 12 months, has a doctor or dialysis center staff explained to you why you are not eligible for a kidney transplant?	
	Q39: Peritoneal dialysis is dialysis given through the belly and is usually done at home. In the last 12 months, did either your kidney doctors or dialysis center staff talk to you about peritoneal dialysis?	
	Q40: In the last 12 months, were you as involved as much as you wanted in choosing the treatment for kidney disease that is right for you?	

Note: ICH CAHPS = In-Center Hemodialysis Consumer Assessment of Healthcare Providers and Systems.

Exhibit D-3. In-Center Hemodialysis Patient Experience of Care Individual ICH CAHPS Survey Questions

Outcome	ICH CAHPS Question	Interpretation
Discussions about Right Treatment for Patient	Q36: You can treat kidney disease with dialysis at a center, with a kidney transplant, or with dialysis at home. In the last 12 months, did your kidney doctors or dialysis center staff talk to you as much as you wanted about which treatment is right for you?	This outcome reflects the percentage of patients who reported "yes," their kidney doctors or dialysis center staff talked to them as much as they wanted about which treatment was right for them (dialysis at a center, a kidney transplant, or dialysis at home)
Patient Received an Explanation for Why They were Ineligible for Kidney Transplant	Q38: In the last 12 months, has a doctor or dialysis center staff explained to you why you are not eligible for a kidney transplant?	This outcome reflects the percentage of patients who reported "yes," a doctor or dialysis center staff explained why they were ineligible for kidney transplant
Discussions about Peritoneal Dialysis	Q39: Peritoneal dialysis is dialysis given through the belly and is usually done at home. In the last 12 months, did either your kidney doctors or dialysis center staff talk to you about peritoneal dialysis?	This outcome reflects the percentage of patients who reported "yes," their kidney doctors or dialysis center staff talked to them about peritoneal dialysis in the last 12 months.

Note: ICH CAHPS = In-Center Hemodialysis Consumer Assessment of Healthcare Providers and Systems.

Source: Centers for Medicare & Medicaid Services. (2023). *ICH CAHPS Survey: Survey administration and specifications manual version 11.0.* https://ichcahps.org/Portals/0/SurveyMaterials/ICH_SurveyAdminManual.pdf.

D.2. Study Populations

We defined our population as patients who responded to the ICH CAHPS Survey and dialyzed at ESRD facilities that partnered with a KCE (that is, the treatment group) or patients in the matched comparison group for CKCC who dialyze at ESRD facilities not partnered with KCC entities. CMS does not report ICH CAHPS data for facilities with fewer than 30 completed surveys in the two most recent survey periods and suppresses ICH CAHPS data for facilities that have fewer than 10 completed surveys.[32] Similarly, ESRD facilities that served 29 or fewer survey-eligible patients in the previous year are not required to participate in the ICH CAHPS Survey. A total of 2,217 dialysis facilities partnered with KCEs (43 out of 55 KCEs). Of the total partnerships, 1,243 (56%) of the dialysis facilities (43 KCEs) had sufficient ICH CAHPS Survey responses and additional data necessary for risk adjustment[33] 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 responses and data necessary for risk adjustment.[34] Survey responses from KCEs account for about 16% of the 7,074 dialysis facilities

[32] Centers for Medicare & Medicaid Services. (2023). *ICH CAHPS® Survey: Survey administration and specifications manual version 11.0.* https://ichcahps.org/Portals/0/SurveyMaterials/ICH_SurveyAdminManual.pdf.

[33] ICH CAHPS is already risk-adjusted for patient characteristics. We further adjusted for market- and dialysis facility-level characteristics.

[34] 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.

with ICH CAHPS data in the pre-KCC period (PY 2017–PY 2020), while survey responses from comparison group dialysis facilities represent about 28% of all dialysis facilities with ICH CAHPS data in the pre-KCC period (see **Exhibit D-4**).

The ICH CAHPS response rates of surveyed patients also decreased in the sample, dropping from 31% in spring 2017 to a low of 23% in fall 2022. The response rate decreased for both the spring and fall waves in 2022 and continued to be lower than the pre-KCC period for both KCE dialysis facilities and comparison group facilities in fall 2022 (23% and 24%, respectively; see **Exhibit D-5**). These declines also reflect differences between the earliest and latest waves in terms of the number of facilities (1,100 vs. 986) and of completed surveys (88,849 vs. 74,968; see **Exhibits D-4** and **D-5**).

Exhibit D-4. Characteristics of ESRD Facilities Used in the ICH CAHPS Analyses, Pre-KCC

Characteristic	Pre-KCC Dialysis Facilities (N=7,074)											
	Spring 2017		Fall 2017		Spring 2018		Fall 2018		Spring 2019		Fall 2019	
	KCC	Non-KCC	KCC	Non-KCC	KCC	Non-KCC	KCC	Non-KCC	KCC	Non-KCC	KCC	Non-KCC
ESRD Facilities in Sample with ICH CAHPS Data	1,100	2,004	1,085	1,985	1,073	1,955	1,105	2,015	1,105	2,029	1,101	2,044
ESRD Facilities with ICH CAHPS Data*	16%	28%	15%	28%	15%	28%	16%	28%	16%	29%	16%	29%
ICH CAHPS Sampled Patients across Facilities	88,849	147,391	88,143	146,623	83,200	137,711	86,026	144,544	87,926	148,029	86,932	148,726
ICH CAHPS Survey Responses across Facilities	27,963	49,142	26,155	45,828	24,549	42,716	25,037	44,741	24,181	42,813	23,094	41,629
Response Rate	31%	33%	30%	31%	30%	31%	29%	31%	28%	29%	27%	28%

Notes: * There were a total of 7,074 ESRD facilities with ICH CAHPS data. ESRD = end-stage renal disease; ICH CAHPS = In-Center Hemodialysis Consumer Assessment of Healthcare Providers and Systems.

Exhibit D-5. Characteristics of ESRD Facilities Used in the ICH CAHPS Analyses, Post-KCC

Characteristic	Post-KCC Dialysis Facilities (N=7,074)			
	Spring 2022		Fall 2022	
	KCC	Non-KCC	KCC	Non-KCC
ESRD Facilities in Sample with ICH CAHPS Data	1,180	2,184	986	1,770
ESRD Facilities with ICH CAHPS Data*	17%	31%	14%	25%
Sampled Patients across Facilities	90,539	153,315	74,968	125,113
ICH CAHPS Survey Responses across Facilities	22,423	39,789	17,406	30,108
Response Rate	25%	26%	23%	24%

Notes: * There were a total of 7,074 ESRD facilities. The percentage of ESRD facilities with ICH CAHPS data is based on this denominator. ESRD = end-stage renal disease; ICH CAHPS = In-Center Hemodialysis Consumer Assessment of Healthcare Providers and Systems.

D.3. Analytic Methods

D.3.1. Assessing Balance of the ICH CAHPS Sample

For our facility-survey-wave-level analysis, we used the six survey waves (spring 2017–fall 2019) for our pre-KCC period and the two survey waves (spring–fall 2022) for the post-KCC period. We assessed the balance of the facilities included in the ICH CAHPS analysis by calculating SMDs for key characteristics and using a standard threshold value of 0.2 to understand the extent of any differences between the KCE dialysis facilities and comparison group facilities. Broadly, KCE and comparison group dialysis facilities were well balanced across facility-, patient-, and market-level characteristics that were used as covariates (discussed below) in the analyses (see **Exhibit D-6**). The exceptions included a lower percentage of KCE dialysis facilities located in the Midwest census region (7% relative to 19%). KCEs also had a higher percentage of Fresenius-affiliated dialysis facilities relative to the comparison group (53% relative to 35%), a lower proportion of white patients (35% relative to 43%), and higher rates of MA penetration (41% relative to 38%).

Exhibit D-6. Annual Means and Standard Errors for Covariates Used in the ICH CAHPS Analyses

Characteristic	Pre-KCC					PY 2022				
	CKCC Dialysis Partners N=1,243		Comparison Dialysis Facilities N=2,303		SMD	CKCC Dialysis Partners N=1,243		Comparison Dialysis Facilities N=2,303		SMD
	Mean	SD	Mean	SD		Mean	SD	Mean	SD	
Survey Wave	1.50	0.50	1.50	0.50	0.00	1.50	0.50	1.50	0.50	0.00
Census Region										
Midwest	6.9%	25.3%	18.9%	39.2%	**-0.26**	7.1%	25.7%	19.6%	39.7%	**-0.26**
Northeast	16.4%	37.0%	15.1%	35.8%	0.02	16.5%	37.2%	14.9%	35.6%	0.03
South	47.8%	50.0%	42.5%	49.4%	0.08	46.6%	49.9%	42.0%	49.4%	0.07
West	28.9%	45.3%	23.5%	42.4%	0.09	29.8%	45.7%	23.6%	42.4%	0.10
Total Patients Receiving Care at End of Survey Period	106.7	44.8	101.7	46.0	0.08	97.20	41.30	93.85	41.81	0.06
Facility Chain/Ownership										
Hospital-based Facility Chains	0.00%	0.00%	2.3%	15.1%	-0.15	0.00%	0.00%	2.3%	15.1%	-0.15
Other For Profit	8.0%	27.2%	9.5%	29.3%	-0.04	8.0%	27.2%	9.5%	29.3%	-0.04
Davita	35.0%	47.7%	41.9%	49.3%	-0.10	35.0%	47.7%	41.9%	49.3%	-0.10
Fresenius	52.7%	49.9%	35.2%	47.8%	**0.25**	52.7%	49.9%	35.2%	47.8%	**0.25**
Nonprofit	4.3%	20.3%	10.3%	30.3%	-0.16	4.3%	20.3%	10.3%	30.3%	-0.16
Independent/Non-Chain For Profit	0.00%	0.00%	3.2%	17.5%	-0.18	0.00%	0.00%	3.2%	17.5%	-0.18
Facility RUCC										
Metro	91.3%	28.2%	88.3%	32.1%	0.07	90.7%	29.0%	87.8%	32.7%	0.07
Urban	8.5%	27.9%	11.5%	31.9%	-0.07	9.1%	28.7%	11.9%	32.4%	-0.07
Rural	0.19%	4.3%	0.23%	4.8%	-0.01	0.19%	4.3%	0.25%	4.9%	-0.01
Medicare Shared Savings Program	99.7%	5.7%	99.7%	5.4%	0.00	99.6%	6.1%	99.8%	4.9%	-0.02
ESRD Treatment Choices Model	31.0%	46.2%	33.4%	47.2%	-0.04	31.2%	46.4%	33.2%	47.1%	-0.03
APMs										
CEC	79.0%	40.7%	72.1%	44.9%	0.11	78.8%	40.9%	71.6%	45.1%	0.12
Next Generation ACO	68.5%	46.5%	56.9%	49.5%	0.17	67.8%	46.7%	57.3%	49.5%	0.15
COVID-19 Incidence Rate	0.0	0.0	0.0	0.0	N/A	-183.4	4482.5	-286.5	2391.8	0.02

Characteristic	Pre-KCC					PY 2022				
	CKCC Dialysis Partners N=1,243		Comparison Dialysis Facilities N=2,303		SMD	CKCC Dialysis Partners N=1,243		Comparison Dialysis Facilities N=2,303		SMD
	Mean	SD	Mean	SD		Mean	SD	Mean	SD	
ADI	50.5	23.6	56.4	22.5	-0.18	50.5	23.6	56.4	22.5	-0.18
Dually Eligible for Medicare and Medicaid	49.1%	18.4%	48.2%	16.4%	0.04	49.1%	18.4%	48.2%	16.4%	0.04
Patient Race										
White	35.4%	24.5%	42.9%	27.1%	**-0.20**	35.6%	24.5%	43.6%	27.2%	**-0.22**
Black or African American	35.9%	27.3%	34.0%	29.3%	0.05	35.4%	27.1%	33.1%	29.0%	0.06
American Indian/Alaska Native	0.6%	3.9%	1.4%	8.0%	-0.09	0.66%	4.0%	1.4%	7.9%	-0.09
Asian	6.26%	10.3%	4.2%	8.7%	0.15	6.3%	10.3%	4.4%	8.8%	0.15
Native Hawaiian/Pacific Islander	1.7%	4.7%	1.1%	3.6%	0.10	1.7%	4.9%	1.1%	3.7%	0.10
Other/Unknown Race	0.48%	1.0%	0.38%	0.84%	0.08	0.48%	1.0%	0.39%	0.87%	0.07
Patient Hispanic Ethnicity	19.6%	22.4%	16.0%	21.6%	0.12	19.7%	22.7%	16.0%	21.5%	0.12
MA Penetration	41.5%	12.1%	37.7%	13.6%	**0.21**	41.4%	12.2%	37.5%	13.6%	**0.21**

Note: ACO = Accountable Care Organization; ADI = Area Deprivation Index; APM = Alternative Payment Model; CEC = Comprehensive End-Stage Renal Disease Care; CKCC = Comprehensive Kidney Care Contracting; ESRD = end-stage renal disease; ICH CAHPS = In-Center Hemodialysis Consumer Assessment of Healthcare Providers and Systems; MA = Medicare Advantage; PY = performance year; RUCC = Rural-Urban Continuum Codes; SMD = standardized mean difference; SD = standard deviation.

D.3.2. Impact Estimation Approach for the ICH CAHPS Analysis

For each measure, we estimated two separate impact models to assess the change from the pre-KCC to the post-KCC period. The first model implemented a DiD design and identified treatment based on dialysis facilities that formed partnerships with KCEs with the specification

$$Y_{it} = \beta_1 CKCC_i + \beta_2 Year_{2022} + \beta_{DiD} CKCC_i * Year_{2022} + \theta'_{it} + \varepsilon_{it.} \quad (6)$$

For the second model, we used a dose–response design, which allowed us to assess whether a higher "dose" of the KCC Model affected survey response at a given dialysis facility by specifying the form

$$Y_{it} = \delta_t + \eta_i + \beta D_i * Year_t + \theta'_{it} + \varepsilon_{it}. \quad (7)$$

For both impact model designs, we weighted each observation by the number of survey respondents at the corresponding facility and clustered standard errors at the facility level. Although the facility-wave data are risk-adjusted for patient characteristics, as described above, our impact analyses included the following covariates summarized at the facility level to control for (θ) potential differences between the KCC and comparison groups (patient characteristics reflect overall patient population derived from the Medicare administrative data):

- Survey wave
- Census region of the ESRD facility
- ESRD facility size (that is, number of patients)
- Hospital ownership of the ESRD facility
- Chain/ownership of the ESRD facility
- Rural/urban location of the ESRD facility
- ESRD facility's participation in selected Alternative Payment Models, including ETC for 2022
- ESRD facility's county-level yearly average COVID-19 incidence rate
- Area Deprivation Index for the location of the ESRD facility
- Percentage of ESRD facility's patients who are dually eligible for Medicare and Medicaid
- Percentage of ESRD facility's patient race and ethnicity
- ESRD facility's county-level yearly average for MA penetration

D.3.3. Assessing Parallel Trends: Differential Linear Trends Test

We estimated a linear differential trend test to examine the parallel trend assumption by testing whether there is a significant effect on the interaction of time and the CKCC group during the pre-KCC period (spring 2017–fall 2019). We applied the same risk adjustment as in the DiD specification discussed in **Section D.3.2**. If the coefficient on the interaction of time and the CKCC group is statistically different from zero ($p<0.1$), it would suggest that there is a lack of

parallel trends in the outcomes for the two groups over the pre-KCC period. One of the nine patient experience of care measures (Kidney Doctors' Communication and Caring) was statistically different from zero (see **Exhibit D-7**), suggesting that most outcomes exhibited parallel trends.

Exhibit D-7. Assessing Parallel Trends: DiD Estimates for ICH Patient Experience of Care Measures

Outcome	Linear Trend Test	
	Coefficient	P-Value
Rating of Kidney Doctors	-0.06	0.53
Rating of Dialysis Facility Staff	-0.05	0.62
Rating of Dialysis Center	-0.09	0.38
Kidney Doctors' Communication and Caring	-0.16**	0.04
Quality of Dialysis Center Care and Operations	-0.03	0.67
Providing Information to Patients	-0.07	0.16
Discussions about Right Treatment for Beneficiary	-0.06	0.49
Beneficiary Received an Explanation for Why They Were Ineligible for Kidney Transplant	-0.10	0.58
Discussions about PD	0.04	0.73

Notes: This analysis includes spring 2017–fall 2019 ICH CAHPS Surveys. Significance is indicated next to each outcome, where * implies significance at the 10% level, ** at the 5% level, and *** at the 1% level assuming a two-tailed test. To examine the parallel trend assumption, we tested for a differential linear trend between KCE dialysis partners and non-KCE dialysis partners. DiD = difference-in-differences; ICH CAHPS = In-Center Hemodialysis Healthcare Providers and Systems; KCE = Kidney Contracting Entity; PD = peritoneal dialysis.

D.3.4. Impact Analysis Findings

We present impact estimates for both methods and all outcomes in **Exhibits D-8**. We also performed a sensitivity analysis, which included KCF-aligned patients as part of the dose–response calculation (see **Exhibit D-9)**. 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. 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; $p \leq 0.01$).

Exhibit D-8. Impact of the KCC Model on ICH Patient Experience of Care Measures Post-KCC

Group	Outcome	Model	Model Estimates			
			DiD	p-value	Lower 90% CI	Upper 90% CI
Global Ratings	Rating of Kidney Doctors	DiD	0.14	0.73	-0.55	0.84
		Dose	0.19	0.78	-0.94	1.32
	Rating of Dialysis Center Staff	DiD	-0.07	0.87	-0.81	0.67
		Dose	0.89	0.22	-0.30	2.08
	Rating of Dialysis Center	DiD	-0.24	0.60	-0.99	0.52
		Dose	0.83	0.27	-0.40	2.06
Composite Scores	Kidney Doctors' Communication and Caring	DiD †	0.05	0.87	-0.48	0.59
		Dose	-0.44	0.40	-1.29	0.42
	Quality of Dialysis Center Care and Operations	DiD	-0.17	0.55	-0.65	0.30
		Dose	0.40	0.39	-0.37	1.17
	Providing Information to Patients	DiD	-0.07	0.77	-0.43	0.30
		Dose	0.24	0.51	-0.35	0.82
Individual Survey Questions	Discussions about Right Treatment for the Patient	DiD	0.08	0.81	-0.48	0.65
		Dose	-0.14	0.80	-1.03	0.75
	Patient Received an Explanation for Why They Were Ineligible for Kidney Transplant	DiD	-0.27	0.69	-1.36	0.83
		Dose	0.32	0.77	-1.49	2.13
	Discussions about PD	DiD	0.52	0.28	-0.27	1.32
		Dose	2.12***	0.007	0.83	3.41

Notes: DiD sample size = 23,477 unique facility-survey wave observations among 3,358 unique ESRD facilities with sufficient risk adjustment and ICH CAHPS data in both the pre-KCC and post-KCC periods. After weighting to account for the number of responses per facility-survey, responses from 504,390 surveys are represented in the sample. Dose response sample size = 24,721 unique facility-survey wave observations among 3,547 unique ESRD facilities with sufficient data. After weighting to account for the number of responses per facility-survey, responses from 528,682 surveys are represented in the sample. Pre-KCC includes six survey waves spanning 2017 to 2019. Post-KCC includes two survey waves spanning 2022. Significance of the impact estimate is indicated next to 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. CI = confidence interval; DiD = difference-in-differences; ESRD = end-stage renal disease; ICH CAHPS = In-Center Hemodialysis Healthcare Providers and Systems; PD = peritoneal dialysis.

Exhibit D-9. Sensitivity Analysis of the Impact of the KCC Model on ICH Patient Experience of Care Measures Post-KCC

Group	ICH CAHPS Measure	Dose Response CKCC		Dose Response CKCC+KCF	
		Impact Estimate	P-Value	Impact Estimate	P-Value
Global Ratings	Rating of Kidney Doctors	0.19	0.78	0.06	0.93
	Rating of Dialysis Center Staff	0.89	0.22	0.79	0.28
	Rating of Dialysis Center	0.83	0.27	0.63	0.41
Composite Scores	Kidney Doctors' Communication and Caring	-0.44	0.4	-0.49	0.35
	Quality of Dialysis Center Care and Operations	0.4	0.39	0.26	0.59
	Providing Information to Patients	0.24	0.51	0.17	0.63
Individual Survey Questions	Discussions about Right Treatment for the Patient	-0.14	0.8	-0.55	0.31
	Patient Received an Explanation for Why They Were Ineligible for Kidney Transplant	0.32	0.77	0.62	0.58
	Patient Received an Explanation for Why They Were Ineligible for Kidney Transplant	2.1***	0.007	1.6**	0.04

Notes: Dose response sample size = 24,721 unique facility-survey wave observations among 3,547 unique ESRD facilities with sufficient data. After weighting to account for the number of responses per facility-survey, responses from 528,682 surveys are represented in the sample. Pre-KCC includes six survey waves spanning 2017 to 2019. Post-KCC includes two survey waves spanning 2022. Significance of the impact estimate is indicated next to each outcome, where * implies significance at the 10% level, ** at the 5% level, and *** at the 1% level assuming a two-tailed test. CKCC = Comprehensive Kidney Care Contract; ICH CAHPS = In-Center Hemodialysis Healthcare Providers and Systems; KCF = Kidney Care First.

Appendix E: Patient Activation Measure® Analysis Supplement

E.1. Data Sources

The Patient Activation Measure (PAM) survey is a KCC Model quality measure that is tied to financial incentives for both KCF Practices and KCEs.[35] All KCC Participants are required to survey at least 50% of attributed patients based on beneficiary lists at the beginning of the performance year.

We used PY 2022 PAM survey data provided by Insignia®, the measure steward for PAM, to assess the impact of the KCC Model on patient activation—that is, the extent to which a patient is able to manage and make informed decisions regarding their health. High-quality care should result in gains in a patient's ability to manage their health over time. A positive change in PAM scores is interpreted as an increase in patient activation. According to the PAM Consensus-Based Entity measure specification, "a 'passing' score for eligible patients would be to show an average net three-point PAM score increase in a 6- to 12-month period. An 'excellent' score for eligible patients would be to show an average net 6-point PAM score increase in a 6- to 12-month period."[36] For each completed survey by a KCC Participant patient, we were provided with KCC patient PAM scores (continuous score ranging from 0 to 100), resulting PAM level (integer ranging from 1 to 4), and the individual survey responses. The source data also contained information about patients who refused or were determined to be ineligible to take the PAM survey by the affiliated KCC participating entity.

E.1.1. KCC AR1 Patient Activation Gains Measure Description

While PAM is a measure not specific to any population, it captures how well patients in the KCC model understand and are therefore able to manage their CKD and ESRD-related health conditions.[37] A detailed numerator and denominator definition for the PAM survey measure can be found in **Exhibit E-1**.

[35] PAM is one of the KCC quality measures. For more information, see KCC Model request for applications for PY 2023: Centers for Medicare & Medicaid Services. (2022). *PY2023 request for applications (RFA).* https://www.cms.gov/priorities/innovation/media/document/kcc-py23-rfa

[36] Centers for Medicare & Medicaid Services. (2023). *Quality ID #503 (CBE 2483): Gains in Patient Activation Measure (PAM) scores at 12 months*. https://qpp.cms.gov/docs/QPP_quality_measure_specifications/CQM-Measures/2024_Measure_503_MIPSCQM.pdf

[37] Certain measures in the KCC Model are owned and copyrighted by the National Committee for Quality Assurance (NCQA). Full copyright, disclaimer and use provisions related to the NCQA measures can be found at: https://innovation.cms.gov/notices-disclaimers.

Exhibit E-1. Patient Activation Gains Measure Description

Measure Concept	Definition
Measure Description	The PAM CBE #2483 is based on a survey that measures a person's fundamental knowledge, skills, and confidence necessary for an individual to manage his or her health care. According to Insignia Health, the steward of this measure, "PAM segments individuals into one of four activation levels along an empirically derived 100-point scale. Each level provides insight into an extensive array of health-related characteristics, including attitudes, motivators, and behaviors. Individuals in the lowest activation level do not yet understand the importance of their role in managing their own health and have significant knowledge gaps and limited self-management skills. Individuals in the highest activation level are proactive with their health, have developed strong self-management skills, and are resilient in times of stress or change."* Even single-point changes in patient activation are meaningful. This measure captures how well Medicare beneficiaries in the intervention group understand, and are therefore able to manage, their chronic conditions. The outcome measured is a change in activation scores over time. The change in score indicates a change in a beneficiary´s knowledge, skills, and confidence for self-management. A positive change would mean the patient is gaining in their ability to manage their health.
Measure Numerator	The aggregate score change for eligible patients. The change score would be calculated from a baseline score and then a second score taken within 12 months and at least 4 months from the baseline score. The change score is the difference between the baseline and the second score in a 12-month period. The aggregate score would be the total score for the eligible patient population.
Measure Denominator	The sample is limited to exclude adults without two PAM scores and patients at least at Level 4 baseline (unable to gain in activation over time), as well as adults with a dementia diagnosis or cognitive impairments.
Data Sources	Insignia

Notes: * Insignia Health. (n.d.). Patient Activation Measure®. https://memberconnect.phreesia.com/rs/753-LZD-147/images/PAYER%20-%201%20pager%20-%20Patient%20Activation%20Measure%20-%20PAM%20UK.pdf.
CBE = consensus-based entity; PAM = Patient Activation Measure.

E.1.2. Description of PAM Survey Questions

The PAM survey questions and response rates are described in **Exhibit E-2.** There was a high percentage of "Agree" or "Strongly Agree" responses for PAM survey questions among KCC AR1 respondents who completed at least two PAM surveys and met the KCC quality measure inclusion criteria.

Exhibit E-2. PAM Survey Questions and Percent Agreement among KCC AR1 Survey Respondents

PAM Survey Questions	First Survey Percent Agree or Strongly Agree (N=39,389)	Last Survey Percent Agree or Strongly Agree (N=39,389)	Percent Change from First to Last Survey
1. When all is said and done, I am the person who is responsible for taking care of my health.	93.7%	96.2%	2.7%
2. Taking an active role in my own health care is the most important thing that affects my health.	95.3%	97.5%	2.3%
3. I am confident I can help prevent or reduce problems associated with my health.	88.3%	92.7%	5.0%
4. I know what each of my prescribed medications do.	82.2%	88.2%	7.3%
5. I am confident that I can tell whether I need to go to the doctor or whether I can take care of a health problem myself.	88.8%	94.1%	5.9%
6. I am confident that I can tell a doctor concerns I have even when he or she does not ask.	93.9%	96.9%	3.1%
7. I am confident that I can follow through on medical treatments I may need to do at home.	91.9%	94.9%	3.3%
8. I understand my health problems and what causes them.	84.8%	91.4%	7.9%
9. I know what treatments are available for my health problems.	81.4%	90.3%	10.9%
10. I have been able to maintain (keep up with) lifestyle changes, like eating right or exercising.	77.6%	86.4%	11.3%
11. I know how to prevent problems with my health.	82.5%	89.6%	8.6%
12. I am confident I can figure out solutions when new problems arise with my health.	73.9%	84.7%	14.5%
13. I am confident that I can maintain lifestyle changes, like eating right and exercising, even during times of stress.	78.8%	87.0%	10.4%

Notes: Population is limited to KCC survey respondents who completed at least two PAM surveys in PY 2022, were aligned to KCC at the month and year of both completed surveys, did not score a PAM level of 4 at the time of their first survey, and did not submit two PAM surveys with different scores on the same day at the same time. Survey scored on 5-point Likert scale. Response options include "Strongly Agree," "Agree," "Disagree," "Strongly Disagree," and "N/A".
AR = annual report; PAM = Patient Activation Measure.

E.2. Study Population

The analytic dataset included survey data from samples of patients attributed to a KCF or CKCC entity during PY 2022. To be included in this analysis, patients had to be aligned to the KCC Model at the time they completed both PAM surveys, score a PAM level of 4 or less on their first survey, and take their PAM surveys less than 4 months apart. These specifications mirror the KCC quality measure methods. We also excluded patients with two PAM surveys submitted on the same day at the same time with different scores from this analysis. We assessed the sensitivity of the results by relaxing the restriction to include patients who scored a Level 4 on their first PAM survey in the second regression.

In **Exhibit E-3**, we provide a breakdown of PAM activation level by various patient characteristics. Patients who were fully dually eligible, were Black or African American, were 75 years of age or older, or had CKD were slightly more likely to have a PAM level of 1 (low patient activation) on their first survey. Those who were less likely to score a PAM level of 1 on their first PAM survey include Hispanic patients, patients less than 65 years of age, or those with ESRD or a kidney transplant. All groups showed an increase in PAM level from their first to last survey. Transplant and KCF patients had higher mean PAM level changes, although both of these groups had small sample sizes. Males, patients who were partially dually eligible, and patients older than 75 years of age had the smallest average increases in PAM level from first to last PAM survey.

Exhibit E-3. Patient Characteristics by PAM Level at First and Last Survey

Group	Characteristic	PAM Level at First Survey				PAM Level at Last Survey					Unadjusted Change in PAM Level
		N	Level 1	Level 2	Level 3	N	Level 1	Level 2	Level 3	Level 4	
Overall		39,389	12.8%	45.8%	41.5%	39,389	6.1%	27.0%	42.0%	24.9%	0.57
Sex	Male	20,804	12.6%	46.2%	41.2%	20,804	6.5%	27.8%	41.1%	24.6%	0.55
	Female	18,585	13.0%	45.3%	41.8%	18,585	5.7%	26.1%	43.0%	25.2%	0.59
Dual Status	Non-Dual Status	28,674	12.6%	45.2%	42.2%	28,505	6.0%	26.8%	42.2%	25.1%	0.57
	Partial Dual Status	2,243	11.7%	43.4%	44.9%	2,253	4.9%	28.5%	40.4%	26.1%	0.54
	Full Dual Status	8,472	13.5%	48.5%	38.0%	8,631	6.9%	27.3%	41.8%	24.0%	0.58
Race or Ethnicity	Non-Hispanic White	22,820	12.9%	45.3%	41.9%	22,820	6.2%	27.1%	41.7%	25.0%	0.56
	Black or African American	9,400	13.2%	43.6%	43.1%	9,400	6.5%	25.7%	43.3%	24.5%	0.56
	Hispanic	4,383	11.3%	51.7%	37.0%	4,383	5.2%	28.8%	40.9%	25.1%	0.60
	Other	2,786	12.7%	47.7%	39.6%	2,786	5.3%	27.7%	41.9%	25.1%	0.60
Years of Age	Less Than 65 Years	8,392	10.1%	44.1%	45.7%	8,392	4.9%	23.9%	42.7%	28.5%	0.59
	65 to 74 Years	11,484	11.4%	45.5%	43.1%	11,484	5.1%	26.0%	42.6%	26.4%	0.59
	75 Years or More	19,513	14.7%	46.6%	38.7%	19,513	7.3%	28.9%	41.3%	22.5%	0.55
Patient Type	CKD	21,309	13.7%	45.7%	40.6%	20,398	6.2%	27.5%	41.9%	24.4%	0.58
	ESRD	17,989	11.7%	45.9%	42.5%	18,673	6.1%	26.7%	42.0%	25.2%	0.56
	Transplant	91	8.8%	50.5%	40.7%	318	2.2%	17.6%	45.6%	34.6%	0.75
KCC Model Option	CKCC	36,369	12.9%	46.1%	41.0%	36,369	6.2%	27.5%	41.9%	24.4%	0.56
	KCF	3,020	11.5%	41.8%	46.8%	3,020	5.2%	21.0%	42.9%	30.9%	0.64

Notes: Patients who scored a PAM level of 4 (high patient activation) at the time of their first survey, patients who completed their surveys closer than 4 months apart, patients who completed two PAM surveys on the same day at the same time with different score results, and patients who only completed one PAM survey in PY 2022 were excluded from these descriptives. CKCC = Comprehensive Kidney Care Contracting; CKD = chronic kidney disease; ESRD = end-stage renal disease; KCF = Kidney Care First; PAM = Patient Activation Measure; PY = performance year.

Patients who completed the PAM survey could either respond with the assistance of a care partner or self-administer the survey. We examined patients overall and by subgroup to determine whether certain patients were more likely to answer via care partner (see **Exhibit E-4**). In total, 4% of patients submitted their first PAM survey with the assistance of a care partner. Patients with full dual eligibility for Medicare and Medicaid and patients with their race or ethnicity listed as "Other" or "Hispanic" had slightly higher rates of care partner–administered surveys. As age group increased, the percentage of surveys completed by a care partner also increased; individuals who were less than 65 years of age had only 2% of surveys completed by a care partner, while individuals who were 75 years of age or older had 5% of surveys completed by a care partner.

Exhibit E-4. KCC Patient Characteristics by PAM Survey Modality

Group	Characteristic	All Administered	Self-Administered		Care Partner Administered	
		N	N	Percent	N	Percent
Overall		78,476	75,576	96.3%	2,900	3.7%
Sex	Male	41,608	40,092	96.4%	1,516	3.6%
	Female	37,170	35,771	96.2%	1,399	3.8%
Dual Status	Non-Dual Status	57,179	55,289	96.7%	1,890	3.3%
	Partial Dual Status	4,496	4,392	97.7%	104	2.3%
	Full Dual Status	17,103	16,182	94.6%	921	5.4%
Race or Ethnicity	Non-Hispanic White	45,640	44,120	96.7%	1,520	3.3%
	Black or African American	18,800	18,251	97.1%	549	2.9%
	Hispanic	8,766	8,280	94.5%	486	5.5%
	Other	5,572	5,212	93.5%	360	6.5%
Years of Age	Less Than 65 Years	16,784	16,512	98.4%	272	1.6%
	65 to 74 Years	22,968	22,406	97.6%	562	2.4%
	75 Years or More	39,026	36,945	94.7%	2,081	5.3%
Patient Type	CKD	41,707	39,676	95.1%	2,031	4.9%
	ESRD	36,662	35,794	97.6%	868	2.4%
	Transplant	409	393	95.8%	16	3.9%
KCC Model Option	CKCC	72,738	69,980	96.2%	2,758	3.8%
	KCF	6,040	5,883	97.4%	157	2.6%

Notes: Patients who scored a PAM level of 4 (high patient activation) at the time of their first survey, patients who completed their surveys closer than 4 months apart, patients who completed two PAM surveys on the same day at the same time with different score results, and patients who only completed one PAM survey in PY 2022 were excluded from these descriptives. CKCC = Comprehensive Kidney Care Contracting; CKD = chronic kidney disease; ESRD = end-stage renal disease; KCF = Kidney Care First; PAM = Patient Activation Measure; PY = performance year.

E.2.1. Patients Not Included in the KCC PY 2022 PAM Survey Analyses

There were several groups of aligned patients for whom patient activation was not able to be assessed: patients who were excluded by their participating providers due to clinical exclusion criteria, patients who were refused to take the PAM survey, patients who only completed one PAM survey, and patients who took their PAM surveys less than 4 months apart or patients who scored a Level 4 or higher on their PAM survey.

To understand whether certain patient subgroups were being excluded from our main analysis at a higher rate, we assessed patient demographics by race and ethnicity, sex, age, disease status, KCC Model, and dual eligibility status. These breakdowns are summarized in **Exhibit E-5.** Six percent of aligned unique patients surveyed were excluded from the PAM survey, 1% refused to take the survey, 39% were excluded for only taking one survey, and 4% were excluded for completing two surveys but having a baseline PAM level of 4, taking the surveys closer than 4 months together, or completing two surveys on the same day and at the same time with different scores.

Following the construction for the KCC quality measure, patients with high baseline activation were excluded from the main risk-adjusted mean estimate. We assessed whether certain subgroups of patients had higher activation at baseline (see **Exhibit E-6**). Overall, 3% of aligned patients who completed at least two PAM surveys were excluded from the KCC quality measure calculation due to scoring a PAM level of 4 on their first PAM survey. Patients who received a kidney transplant and KCF patients had slightly higher rates of exclusion than average. Patients included in the other category for race or ethnicity and those who were at least 75 years of age had slightly lower rates of exclusion due to high baseline PAM levels than average.

Exhibit E-5. KCC Patient Characteristics of Survey Non-respondents versus Respondents

Group	Characteristic	Total	Excluded Based on Clinical Criteria (N=4,686)	Refused (N=856)	Respondents with Only One PAM Survey (N=31,085)	Respondents with Two or More Surveys That Were Excluded† (N=2,934)	Respondents with Two or More Surveys That Were Included‡ (N=39,389)
Overall		78,950	5.9%	1.1%	39.4%	3.7%	49.9%
Sex	Male	41,740	5.7%	1.2%	39.6%	3.7%	49.8%
	Female	37,210	6.2%	0.95%	39.1%	3.8%	49.9%
Dual Status	Non-Dual Status	56,662	5.8%	1.1%	38.8%	3.7%	50.6%
	Partial Dual Status	4,424	2.7%	0.95%	42.5%	3.1%	50.7%
	Full Dual Status	17,864	7.2%	1.1%	40.3%	4.0%	47.4%
Race or Ethnicity	Non-Hispanic White	45,558	5.7%	1.14%	39.4%	3.7%	50.1%
	Black or African American	18,678	6.0%	0.99%	39.3%	3.4%	50.3%
	Hispanic	8,799	6.3%	1.1%	38.2%	4.5%	49.8%
	Other	5,915	6.9%	0.90%	41.5%	3.5%	47.1%
Years of Age	Less Than 65 Years	17,442	2.8%	1.2%	43.9%	3.9%	48.1%
	65 to 74 Years	22,426	4.7%	0.92%	39.4%	3.8%	51.2%
	75 Years or More	39,082	8.0%	1.1%	37.3%	3.6%	49.9%
Patient Type	CKD	40,879	5.3%	1.0%	37.6%	4.0%	52.1%
	ESRD	37,597	6.5%	1.1%	41.1%	3.5%	47.8%
	Transplant	474	21.3%	1.9%	54.2%	3.4%	19.2%
KCC Model Option	CKCC	72,659	5.9%	0.94%	39.7%	3.3%	50.1%
	KCF	6,291	5.9%	2.8%	35.1%	8.2%	48.0%

Notes: Total limited to unique patients aligned during the month the survey was offered. †Respondents were excluded from the main risk-adjusted regression if they took their PAM surveys less than 4 months apart, took the PAM survey twice and scored differently on the same day at the same time, or scored a PAM Level 4 on their first survey. ‡Patient characteristics that vary with time (dual status, disease status) were taken from the first PAM survey. CKCC = Comprehensive Kidney Care Contracting; CKD = chronic kidney disease; ESRD = end-stage renal disease; KCF = Kidney Care First; PAM = Patient Activation Measure.

Exhibit E-6. Characteristics of Patients by Activation Level at Time of First PAM Survey

Group	Characteristic	Total	High Activation (PAM level of 4)		Lower Activation (PAM level less than 4)	
			N	Percent	N	Percent
Overall		40,762	1,373	3.4%	39,389	96.6%
Sex	Male	21,510	706	3.3%	20,804	96.7%
	Female	19,252	667	3.5%	18,585	96.5%
Dual Status	Non-Dual Status	29,688	1,014	3.4%	28,674	96.6%
	Partial Dual Status	2,325	82	3.5%	2,243	96.5%
	Full Dual Status	8,749	277	3.2%	8,472	96.8%
Race or Ethnicity	Non-Hispanic White	23,649	829	3.5%	22,820	96.5%
	Black or African American	9,699	299	3.1%	9,400	96.9%
	Hispanic	4,551	168	3.7%	4,383	96.3%
	Other	2,863	77	2.7%	2,786	97.3%
Years of Age	Less Than 65 Years	8,753	361	4.1%	8,392	95.9%
	65 to 74 Years	11,903	419	3.5%	11,484	96.5%
	75 Years or More	20,106	593	2.9%	19,513	97.1%
Patient Type	CKD	22,053	744	3.4%	21,309	96.6%
	ESRD	18,612	623	3.3%	17,989	96.7%
	Transplant	97	6	6.2%	91	93.8%
KCC Model Option	CKCC	37,521	1,152	3.1%	36,369	96.9%
	KCF	3,241	221	6.8%	3,020	93.2%

Notes: Patients who completed their surveys closer than 4 months apart, patients who completed two PAM surveys on the same day at the same time with different score results, and patients who only completed one PAM survey in PY 2022 were excluded from these descriptives. CKCC = Comprehensive Kidney Care Contracting; CKD = chronic kidney disease; ESRD = end-stage renal disease; KCF = Kidney Care First; PAM = Patient Activation Measure; PY = performance year.

E.2.2. Outlier PAM Surveys

Insignia created an outlier indicator that flags both straightline surveys and surveys where there are four or more "N/A" responses. Most of the surveys flagged as outliers were straightline surveys. Straightline surveys occur when a patient submits the same answer throughout the survey. For example, the patient would respond "Agree" to all 13 of the PAM survey questions. Insignia designated these surveys as outliers, but they are not excluded in the KCC quality measure. We determined that 20% of surveys used in our main regression were designated as outlier surveys. Patients who are Hispanic were more likely to submit outlier surveys than average (26% of submitted surveys for this subgroup). Patients who are Black or African American had the lowest rates of outlier survey responses (18%).

E.3. PAM Survey Analysis Methods

To examine the effect of the KCC Model on patient activation, we calculated the risk-adjusted mean difference in PAM scores from the first and the last PAM survey. We defined our population as patients who:

- Responded to the PAM survey at least twice, with surveys taking place at least 4 months apart
- Were aligned to the KCC Model at the time of both their first and last survey
- Scored less than a PAM level of 4 at the time of their first survey
- Did not take their PAM survey more than once in the same day at the same time and receive different scores

The first and last survey completed in PY 2022 were linked to patient and participant characteristics in the KCC AR1 research file. Patient- and practice-level covariates used in the risk adjustment are summarized in **Exhibit E-7.**

Exhibit E-7. Covariate Adjustments Used in PAM Regression Analyses

Patient Level	Practice Level
▪ Age ▪ Female ▪ Race and ethnicity ▪ PAM survey modality ▪ ESRD-HCC score at alignment ▪ Diabetes indicator ▪ Hypertension indicator ▪ Partial dual eligibility ▪ Full dual eligibility ▪ Cancer indicators (breast, lung, endometrial, colorectal) ▪ Original reason for Medicare entitlement ▪ CKD, ESRD, transplant status	▪ Participant geography ▪ KCC Model type

Note: CKD = chronic kidney disease; ESRD = end-stage renal disease; HCC = Hierarchical Condition Category; PAM = Patient Activation Measure.

We conducted several regression analyses to assess the effect of participating in the KCC Model on patient activation scores for each of our patient and participant categories of interest, holding

all other covariates constant. Our main analysis mimicked the KCC quality measure exclusion criteria and included aligned KCC patients who had completed two PAM surveys at least 4 months apart in PY 2022 and did not have a PAM level of 4 (high patient activation) at the time of their first survey. The regression analysis used the PAM survey score as the dependent variable, and the covariates listed above as the independent variable. To assess the change over time, six separate regressions were run to produce each set of results. Each group-specific regression estimate included an interaction between the subgroup of interest and the period the survey was completed (first or second survey).

E.3.1. Results from Additional Sensitivity Analyses

A few additional sensitivity tests were completed in addition to the regression described above. We relaxed the KCC quality measure restrictions imposed on the main analysis to assess whether excluding patients with high baseline activation affected the regression results (see **Exhibit E-8**). We included a regression model that calculated the mean change in survey scores with no risk-adjusters (see **Exhibit E-9**). Additionally, we included a regression model that calculated the mean change in survey scores when all outlier surveys (predominantly straightline) were dropped from the analysis (see **Exhibit E-10)**.

Exhibit E-8. Average Change in PAM Survey Score including High Baseline Activation

Group	Characteristic	N	First Survey Mean	Last Survey Mean	Risk-Adjusted Mean Difference	90% Lower CI	90% Upper CI
Overall		81,524	55.8	64.0	8.2***	7.4	8.9
Sex	Male	43,020	55.6	63.6	8.0***	7.2	8.7
	Female	38,504	55.9	64.3	8.4***	7.7	9.1
Dual Status	Non-Dual Status	59,201	56.2	64.3	8.1***	7.4	8.9
	Partial Dual Status	4,661	55.4	63.5	8.1***	7.0	9.1
	Full Dual Status	17,662	54.4	62.8	8.4***	7.5	9.3
Years of Age	Less Than 65 Years	17,506	57.4	66.2	8.8***	7.9	9.6
	65 to 74 Years	23,806	56.3	64.7	8.4***	7.6	9.3
	75 Years or More	40,212	54.8	62.5	7.8***	7.1	8.5
Patient Type	CKD	43,159	55.7	63.9	8.2***	7.4	9.0
	ESRD	37,930	55.8	64.0	8.2***	7.3	9.0
	Transplant	435	56.0	67.1	11.1***	8.4	13.9
KCC Model Option	CKCC	75,042	55.6	63.7	8.1***	7.3	8.8
	KCF	6,482	57.4	66.9	9.6***	7.7	11.5

Notes: Patients who completed their surveys closer than 4 months apart and patients who completed their first or last PAM survey on the same day at the same time with different score results were excluded from this 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; CKD = chronic kidney disease; ESRD = end-stage renal disease; KCF = Kidney Care First; PAM = Patient Activation Measure.

Exhibit E-9. Average Change in PAM Survey Score with No Risk Adjusters

Group	Characteristic	N	First Survey Mean Score	Last Survey Mean Score	Mean Unadjusted Difference	90% Lower CI	90% Upper CI
Overall		78,778	54.7	63.6	8.8 ***	8.1	9.6
Sex	Male	41,608	54.7	63.4	8.6 ***	7.8	9.4
	Female	37,170	54.7	63.8	9.1 ***	8.3	9.9
Dual Status	Non-Dual Status	57,179	54.9	63.6	8.7 ***	7.9	9.5
	Partial Dual Status	4,496	55.1	63.9	8.8 ***	7.8	9.8
	Full Dual Status	17,103	54.1	63.3	9.2 ***	8.2	10.1
Years of Age	Less Than 65 Years	16,784	55.6	65.1	9.5 ***	8.6	10.4
	65 to 74 Years	22,968	55.1	64.2	9.1 ***	8.3	10.0
	75 Years or More	39,026	54.2	62.5	8.4 ***	7.6	9.1
Patient Type	CKD	41,707	54.5	63.3	8.8 ***	8.0	9.6
	ESRD	36,662	55.0	63.8	8.8 ***	7.9	9.7
	Transplant	409	54.9	67.5	12.6 ***	10.0	15.2
KCC Model Option	CKCC	72,738	54.7	63.3	8.7 ***	7.9	9.5
	KCF	6,040	55.3	66.1	10.8 ***	9.0	12.7

Notes: Patients who scored a PAM level of 4 (high patient activation) at the time of their first survey, patients who completed their surveys closer than 4 months apart, and patients who completed two PAM surveys on the same day at the same time with different score results were excluded from this 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; CKD = chronic kidney disease; ESRD = end-stage renal disease; KCF = Kidney Care First; PAM = Patient Activation Measure.

Exhibit E-10. Average Change in PAM Survey Score excluding Outlier Responses

Group	Characteristic	N	First Survey Mean Score	Last Survey Mean Score	Risk-Adjusted Mean Difference	90% Lower CI	90% Upper CI
Overall		52,632	55.9	63.2	7.4 ***	6.7	8.1
Sex	Male	27,538	55.8	62.8	7.1 ***	6.4	7.8
	Female	25,094	56.0	63.7	7.7 ***	7.0	8.4
Dual Status	Non-Dual Status	38,894	56.2	63.5	7.3 ***	6.6	8.1
	Partial Dual Status	2,961	55.6	63.0	7.4 ***	6.5	8.3
	Full Dual Status	10,777	54.7	62.2	7.5 ***	6.8	8.2
Years of Age	Less Than 65 Years	11,254	57.6	64.9	7.3 ***	6.6	8.0
	65 to 74 Years	15,464	56.4	64.0	7.6 ***	6.8	8.4
	75 Years or More	25,914	54.8	62.1	7.2 ***	6.5	7.9
Patient Type	CKD	27,862	55.8	63.5	7.7 ***	6.9	8.4
	ESRD	24,509	55.9	62.9	7.0 ***	6.3	7.7
	Transplant	261	55.4	66.2	10.9 ***	7.9	13.8
KCC Model Option	CKCC	48,496	55.8	63.1	7.3 ***	6.5	8.0
	KCF	4,136	56.2	64.8	8.6 ***	7.3	9.9

Notes: Patients whose first or last survey were flagged as outliers, patients who scored a PAM level of 4 (high patient activation) at the time of their first survey, beneficiaries who completed their surveys closer than 4 months apart, and patients who completed two PAM surveys on the same day at the same time with different score results were excluded from this 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; CKD = chronic kidney disease; ESRD = end-stage renal disease; KCF = Kidney Care First; PAM = Patient Activation Measure.

All mean differences between the first and last survey remained positive and highly significant for all sensitivity analyses, although the overall mean difference decreased by more than a point when outlier surveys were dropped from the analysis.

Mean differences in first and last survey scores across all analyses are aggregated in **Exhibit E-11.** There was no meaningful change when risk-adjusters were not included in the KCC quality measure patient population. Mean change in PAM survey scores decreased slightly but remained positive when patients with high baseline patient activation were included in the analytic sample. Mean change in PAM survey scores decreased but remained positive when patients with outlier surveys were excluded in the analytic sample.

Exhibit E-11. Mean Change in Survey Scores from Aggregated PAM Survey Analyses

Group	Characteristic	Main Analysis± (N=78,778)	Unadjusted Main Analysis± (N=78,778)	With Level 4 in Baseline† (N=81,524)	Excluding Outlier Surveys‡ (N=52,632)
Overall		8.8 ***	8.8 ***	8.2 ***	7.4 ***
Sex	Male	8.6 ***	8.6 ***	8.0 ***	7.1 ***
	Female	9.0 ***	9.1 ***	8.4 ***	7.7 ***
Dual Status	Non-Dual Status	8.7 ***	8.7 ***	8.1 ***	7.3 ***
	Partial Dual Status	8.7 ***	8.8 ***	8.1 ***	7.4 ***
	Full Dual Status	9.1 ***	9.2 ***	8.4 ***	7.5 ***
Years of Age	Less Than 65 Years	9.5 ***	9.5 ***	8.8 ***	7.3 ***
	65 to 74 Years	9.1 ***	9.1 ***	8.4 ***	7.6 ***
	75 Years or More	8.3 ***	8.4 ***	7.8 ***	7.2 ***
Patient Type	CKD	8.7 ***	8.8 ***	8.2 ***	7.7 ***
	ESRD	8.8 ***	8.8 ***	8.2 ***	7.0 ***
	Transplant	12.8 ***	12.6 ***	11.1 ***	10.9 ***
KCC Model Option	CKCC	8.6 ***	8.6 ***	8.1 ***	7.3 ***
	KCF	10.7 ***	10.8 ***	9.6 ***	8.6 ***

Notes: ±Patients were excluded from this analysis if they scored a PAM level of 4 (high patient activation) at the time of their first survey, completed their surveys closer than 4 months apart, completed two PAM surveys on the same day at the same time with different score results, or only completed one PAM survey in PY 2022. †Patients who scored a PAM level of 4 at the time of their first survey were included in this analysis. All other exclusions from main analysis also apply. ‡ Patients whose first or last PAM survey were flagged as outliers were excluded from this analysis. All other exclusions from the main analysis also apply. 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; CKD = chronic kidney disease; ESRD = end-stage renal disease; KCF = Kidney Care First; PAM = Patient Activation Measure; PY = performance year.