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Evaluation of the Primary Care First Model

Third Annual Report

May 2025

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EXECUTIVE SUMMARY

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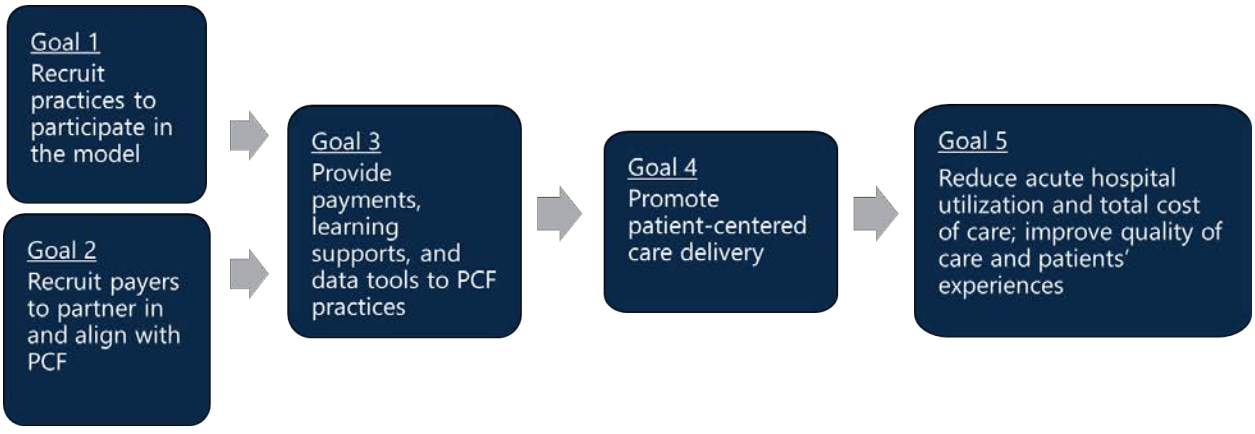
In 2021, the Center for Medicare & Medicaid Innovation, part of the Centers for Medicare & Medicaid Services (CMS), launched the Primary Care First (PCF) Model in 26 regions across the United States. PCF tests the impact of financial risk incentives and performance-based payments on advanced primary care practices, aiming to reduce acute hospitalizations, lower total Medicare fee-for-service (FFS) expenditures, and improve patient health outcomes. This third annual report covers the evaluation's findings through the end of 2023. Exhibit ES.1 provides an overview of PCF's goals.

Exhibit ES.1. Overview of PCF goals



CMS designed PCF as a multi-payer model in which Medicare Advantage plans, commercial health insurers, state Medicaid agencies, and Medicaid managed care plans commit to aligning with PCF's payment methodology for Medicare FFS beneficiaries to increase the reach of the model and help achieve a critical mass of aligned support to drive practice-level transformation. The PCF Model was meant to provide practices with the flexibility to leverage their self-reported advanced primary care capabilities, enabling them to transform and tailor their approach to meet the needs of their patient population. The model requires practices to have at least 125 attributed Medicare FFS beneficiaries and have primary care services comprise at least 50 percent of billing based on revenue. The PCF Model

defines a practice as a legal entity that furnishes patient care services at a particular "brick-and-mortar" physical location. Practices that met the eligibility criteria could join the model in 2021 as part of Cohort 1 or in 2022 as part of Cohort 2. Each cohort has a five-year period of performance. In 2021, 846 Cohort 1 practices began participating in the PCF Model, and another 2,228 practices joined in 2022 as Cohort 2, for a total of 3,074 practices.

Features of the PCF Model and model background

PCF represents a shift in the Innovation Center's primary care models away from detailed care delivery requirements and reliance on the FFS reimbursement structure. Instead, PCF emphasizes flexibility and outcomes—particularly reducing acute hospitalizations—with a greater level of reimbursement from population-based payments (PBPs) than FFS reimbursement. PCF's predecessor, the Comprehensive Primary Care Plus (CPC+) model, ended in 2021 as PCF launched. An independent evaluation estimated that CPC+ led to modest reductions in emergency department visits, hospitalizations, and acute inpatient expenditures and improvement on some claims-based quality-of-care measures (O'Malley et. al 2023). Just under half of CPC+ practices raised concerns, however, that payments across payers were insufficient for the work CPC+ required. Various stakeholders noted that CPC+ relied too much on traditional Medicare FFS billing and did too little to reduce the billing and quality reporting burdens on primary care practices or to shift clinicians' focus to outcomes of care. The PCF Model seeks to address these concerns by offering participating primary care practices a simplified payment structure designed to reduce administrative burden and reward performance.

The main components of the PCF payment model include a total primary care payment consisting of a PBP and a flat visit fee (FVF), paid FFS, for certain primary care services as well as a performance-based adjustment (PBA) tied to outcome measures. The PBP is subject to a payment accuracy adjustment (PAA).

The PBA took effect in April 2022 for Cohort 1 practices and April 2023 for Cohort 2 practices. The PBP was adjusted by the practice's quarterly PAA beginning in July 2022 for Cohort 1 practices and July 2023 for Cohort 2 practices.

PCF payment structure

- **Flat visit fee** for Medicare FFS beneficiaries' face-to-face and telehealth visits for primary care services
- **Population-based payment** to provide prospective payment per beneficiary per month (paid quarterly); practices are assigned to one of four risk groups based on the medical complexity of their Medicare patients, and PBP amounts vary by risk group
- **Performance-based adjustment** based on performance measures, ranging from 10 percent decrease to 50 percent increase of total primary care payment, based on performance on acute hospital utilization or total per-capita cost, depending on risk group, and a set of clinical quality and patient experience of care measures
- **Payment accuracy adjustment** to adjust population-based payment to account for qualifying primary care services furnished outside of the PCF practice

Key takeaways from the evaluation's third annual report

We summarize our key findings for the PCF evaluation through 2023 as they relate to each of the five goals of the PCF Model's goals:

- **Goal 1. Recruit practices to participate in the Model.** While the PCF Model initially recruited large numbers of practices, it had substantial practice attrition through 2023, primarily because of concerns related to financial aspects of the model.
- **Goal 2. Recruit payers to partner in and align with PCF.** Multi-payer participation and alignment continued to be limited through 2023.
- **Goal 3. Provide payments, learning supports, and data tools to PCF practices.** The PCF Model's payments were not the main motivating factor or funding source for many of the changes in care delivery that PCF practices reported under PCF; practices also were motivated by their involvement in other value-based contracting arrangements.
- **Goal 4. Promote patient-centered care delivery.** Practices continued to implement, and often modified, existing care delivery strategies, especially care management, and added new strategies, focused on comprehensiveness of and access to care.
- **Goal 5. Reduce acute hospital utilization and total cost of care and improve quality of care and patients' experiences.** PCF did not reduce acute hospitalization rates among Medicare FFS beneficiaries, and it increased Medicare expenditures (including model payments) by 1 percent.

A combination of three factors likely led to us not observing improvements in primary outcomes. First, PCF practices reported advanced care delivery capabilities when they applied to PCF and therefore started the model with high performance. Second, PCF participation was only one factor among many that influenced changes to practices' care delivery activities and strategies. Third, CMS anticipated detectable reductions in Medicare expenditures starting only in year four of the model.

Overview of the evaluation approach

The goal of the independent evaluation is to determine whether the PCF Model leads to better care for Medicare FFS beneficiaries and lower costs for CMS. We used mixed methods to analyze primary and secondary data, describe the participating practices and their experiences through 2023, and estimate impacts of the model on Medicare FFS expenditures and service use, including acute hospitalizations. We estimated the impacts of PCF on a range of primary and secondary outcomes for Medicare FFS beneficiaries served by PCF practices. We measured all outcomes using Medicare claims, which reflect health care services that clinicians provided to Medicare FFS beneficiaries and billed to the Medicare program. Our intervention group included all practices that started PCF, regardless of whether they later left the model, and we compared their outcomes with the outcomes of a matched comparison group of primary care practices in PCF regions that did not participate in PCF but had similar characteristics to PCF practices when the model began.

The third annual evaluation report examines the characteristics of practices (and payers) that continued to participate in PCF compared with those that left, the role that the PCF Model's incentives and supports played in the strategies and activities practices adopted to improve care delivery, and how the

trajectory of the care delivery strategies and activities practices implemented have transformed over time. The evaluation report includes six chapters. Primary data sources included data reported by PCF practices through the PCF Model portal (a CMS platform created for the model), interview data, and the evaluation's PCF practice survey (a new data source in 2023). Secondary data sources include Medicare FFS claims and model payments, clinical quality and patient experience of care measures that determine eligibility for a positive PBA, and practice and payer applications.

Road map to the third annual report of the PCF evaluation

- Chapter 1. Introduction
- Chapter 2. Changes in practice and payer participation
- Chapter 3. Practices' responses to the PCF Model's incentives and supports
- Chapter 4. Care delivery and the trajectories of change among PCF practices
- Chapter 5. Estimated impacts of PCF on outcomes during the first three years of the model
- Chapter 6. Conclusion

Summary of findings

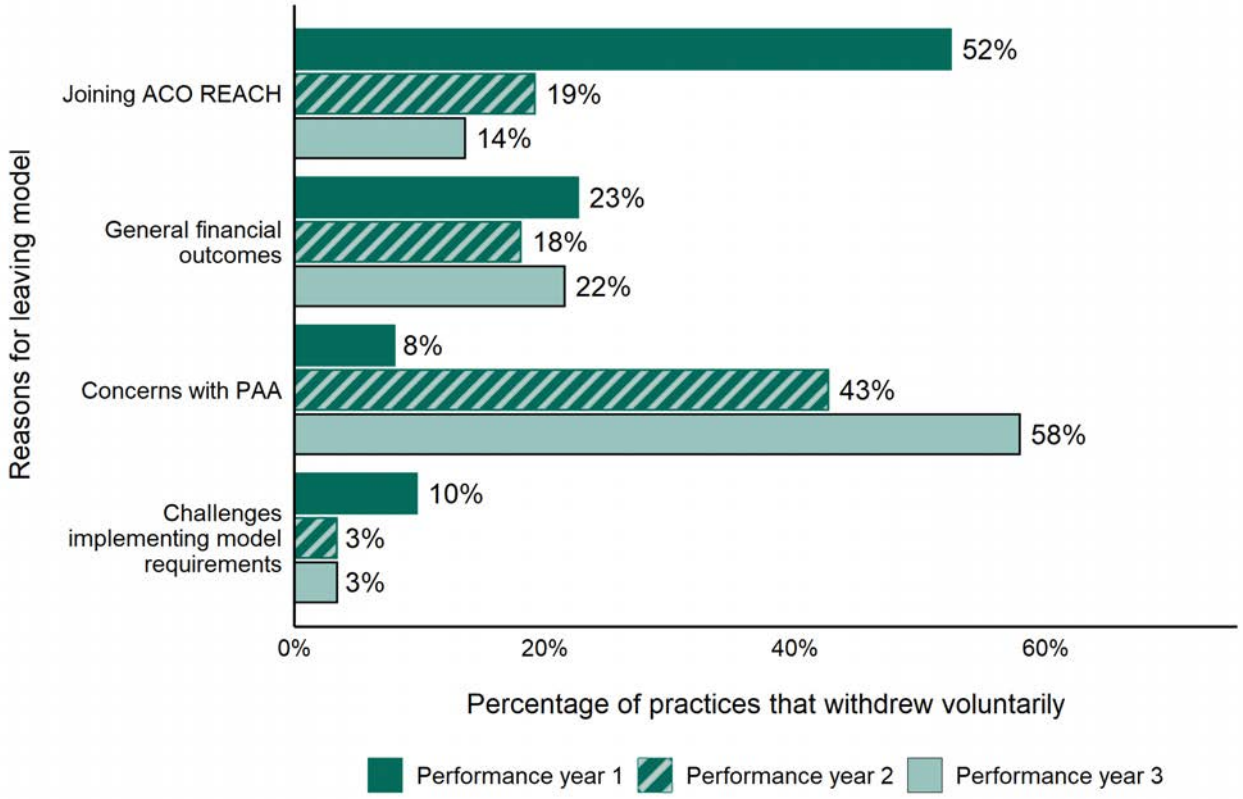
The PCF Model had substantial practice attrition through 2023, primarily because of concerns related to financial aspects of the model.

Attrition increased over time, with 27 percent of PCF practices leaving the PCF Model in the first three years since it launched. In comparison, 13 percent of practices in the Comprehensive Primary Care Initiative and 19 percent of practices in CPC+ withdrew over the lifetimes of those models. Attrition has not been evenly distributed across PCF regions.

Practices that voluntarily withdrew from the PCF Model differed from practices that remained in the model on important dimensions, and these differences in characteristics were consistent over time. Practices choosing to leave the model were more likely to be smaller, independent, or located in rural areas or areas with lower median household income. Practices that voluntarily withdrew from the model also had a less favorable impression of the PCF Model than practices that stayed, and those withdrawing practices reported in the evaluation's survey that their changes in care delivery were less likely to be motivated by PCF.

Reasons for voluntarily leaving the model changed over time. In the first performance year, about half of withdrawing practices voluntarily left to join another Innovation Center model, and 10 percent reported withdrawing because of challenges implementing the PCF Model requirements. Performance year 1 corresponds to calendar year 2021 for Cohort 1 and 2022 for Cohort 2. In the second and third performance years (Cohort 1 only), about half of practices that voluntarily withdrew reported leaving the model because of concerns with the PAA, which was introduced in performance year 2 (Exhibit ES.2). We did not, however, observe differences in model performance as measured by PBA (and PAA) applied to PCF payments between practices that withdrew from the model in 2023 and those that remained.

Exhibit ES.2. The top reason practices left the PCF Model differed in the first performance year and the second and third performance years



Source: Mathematica's analysis of PCF Model Practice Roster provided by the Payment, Operations, Monitoring, and Quality Contractor, January 2024.

Notes: This analysis included 667 practices from both cohorts that voluntarily withdrew from the PCF Model. The exhibit shows the top reasons for voluntarily withdrawing from the PCF Model. The performance year-specific percentages do not add up to 100 percent because practices reported a variety of other operational challenges, and concern with PECS as reasons for voluntarily withdrawing that are not included. Performance year 3 does not include Cohort 2 practices because they have only participated in the model for two performance years as of December 31, 2023.

ACO REACH = Accountable Care Organization Realizing Equity, Access, and Community Health; PAA = payment accuracy adjustment; PCF = Primary Care First; PECS = Patient Experience of Care Survey; PY = performance year.

Multi-payer participation and payer alignment was limited through 2023.

As reported in prior years, PCF payer partners' participation was limited because of the small number of participating national and regional payers. The number of payer partners in PCF has continued to be modest, especially compared with CPC+. Because PCF payer partners' reach is limited at the national and regional levels, we expect practices will have fewer resources and support to implement PCF-related changes for a larger proportion of their patients.

Payer partners were largely modifying payment models that predated PCF. Similar to previous years, PCF payer partners made minimal changes to their PCF approach in 2023, and the lack of more robust payer partner participation likely reduced the scale and scope of changes PCF practices could implement. Some modifications partners made include changing measure sets or improving data feedback. More than three-fourths of PCF practices reported that they did not observe any changes to payer partners' reimbursement approaches. Some practices noted that PCF payer partnership did not provide additional benefits or present any challenges because nothing about these payers' contracts had changed.

From 2021 to 2023, six of the starting 23 payer partners withdrew from the PCF Model, including a national payer that was in nearly every region. In addition, one payer paused its participation because of few participating PCF practices in its region. Payer partners that left the model reported that PCF was not a priority compared with their own initiatives. Although they saw collaboration and partnership with CMS and Innovation Center models as valuable, they preferred prioritizing their own programs and initiatives over PCF. They planned to continue to work on value-based payment methods in their own internal programs.

Payer partners also noted technological issues as a reason for withdrawing from the model. For example, payer partners reported difficulty paying out capitated payments for PCF using their current billing systems and said it was too expensive to resolve the issue to support their participation.

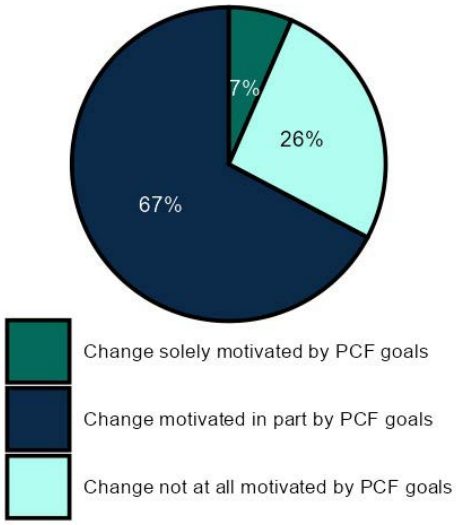
Payer partners cited limited internal capacity to support participation in the model as a reason for withdrawing. In one state, two payer partners reported they decided to leave the PCF Model after many practices in the region left PCF to join the Accountable Care Organization Realizing Equity, Access, and Community Health (ACO REACH) model. One payer partner described joining PCF to align with its community and improve quality of care in its community. Yet many of the practices in its region elected to participate in ACO REACH instead of PCF. Payer partners that remained in the model also reported similar technology and capacity challenges, such as managing data for the Model and working with other payers in the region.

$ The PCF Model's payments were not the main motivating factor or funding source for many of the changes in care delivery activities.

PCF practices typically reported that care delivery changes they made since joining PCF were only partially motivated by PCF's goals. On average, two-thirds of the care delivery changes PCF practices reported making between joining PCF and 2023 were motivated in part by PCF, according to responses to the PCF Practice Survey (Exhibit ES.3). Yet practices rarely reported that the changes they made were motivated solely or mostly by PCF's goals, and, occasionally, they reported that their changes were not at all motivated by PCF's goals. In interviews, most practices said that although they were making changes for PCF, they likely would have made similar changes to help them meet the requirements of other value-based contracting arrangements. These findings suggest that PCF motivation can be characterized as having a broad reach but limited influence. Although most practices reported that they were at least somewhat motivated by PCF, PCF was rarely the sole factor in practices' decisions to change care delivery. If the PCF Model is not a major motivational or financial factor for practice change, then we cannot conclude that PCF is driving changes in patient outcomes.

Together with PCF, the goals and incentives of other value-based contracting arrangements also motivated practices' decisions to change care delivery. Nearly all (92 percent) of PCF practices reported participating in at least one other value-based contracting arrangement such as accountable care organizations, commercial value-based care programs with shared savings or risk, or other Innovation Center models such as Bundled Payments for Care Improvement Advanced. Among practices participating in other value-based contracting arrangements, 91 percent reported that they were making care delivery changes to support PCF and other programs at the same time. In interviews, half of practices noted they made payer-agnostic resource allocation decisions for all patients rather than focusing solely on Medicare beneficiaries attributed to PCF. In other words, these practices noted that they would have made these changes even if they were not participating in PCF.

Exhibit ES.3. Most changes were motivated in part by PCF

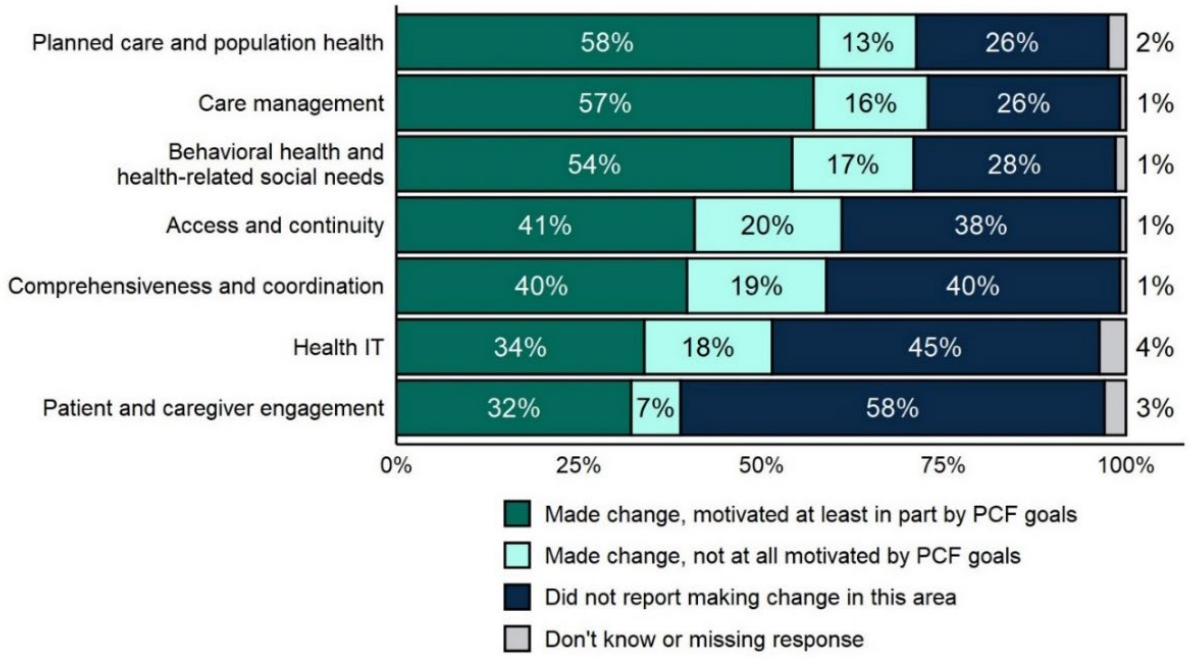


PCF = Primary Care First.

More than half of PCF practices were motivated by PCF's goals to make changes to care management (Exhibit ES.4). Since 2021, practices have consistently reported that longitudinal care management and episodic care management are their primary strategies for reducing acute hospitalizations, underscoring additional motivation for making these changes.

More than half of PCF practices were motivated by PCF's goals to make changes to planned care and population health as well as behavioral health and health-related social needs integration (Exhibit ES.4). In previous years, interviewed practices consistently reported making changes related to comprehensiveness and coordination, including to integrating behavioral health, addressing health-related social needs, and coordinating care with medical specialists, and practices anticipated these changes could help reduce acute hospitalizations and total cost of care.

Exhibit ES.4. Practices most commonly reported being motivated by PCF goals to make care delivery changes related to planned care and population health, care management, and behavioral health and health-related social needs



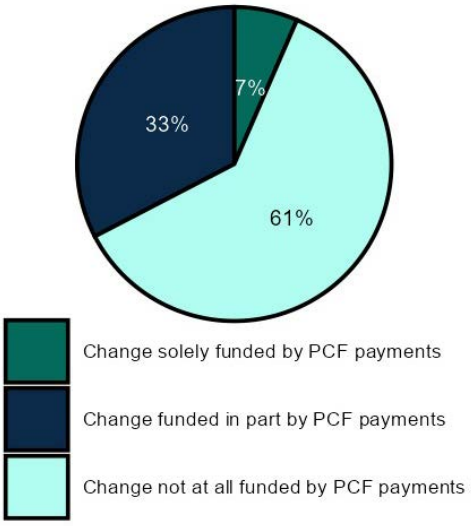
Source: Mathematica's analysis of PCF Practice Survey data (2023). Total N = 1,155 (both cohorts).

Note: This exhibit focuses on what motivated practices to make changes and not the actual changes that were the focus of the practice interviews. The exhibit shows a combined count of practices that responded yes to "Changes motivated solely or mostly by PCF's goals" or "Changes motivated in part by PCF's goals." If a practice reported that PCF's goals solely or in part motivated change to any care delivery activity in a domain, we count them in the "made change motivated by PCF's goals" bar for that domain. Some rows might not sum to 100 because of rounding.

IT = information technology. PCF = Primary Care First.

Most PCF practices reported that care delivery changes were not funded by PCF payments. On average, only around one-third of the care delivery changes PCF practices reported making since joining PCF were funded in part by PCF payments, and practices rarely reported the changes were funded solely by PCF payments (Exhibit ES.5). Although practices used PCF funds (along with other funding sources) to support care delivery changes, only about one-third of PCF practices indicated that PCF payments were adequate, considering the amount of work PCF required.

Exhibit ES.5. Most changes were not funded by PCF



PCF = Primary Care First.

In interviews, practices reported that the payments were unpredictable because of the PAA and PBA, making it challenging to plan for changes. Practices saw themselves as having little control over the PAA, and few practices reported trying to improve the PAA. Similarly, one-quarter of practices said they were not making efforts to improve their PBA because they had limited understanding of the PBA methodology or did not believe they could control the factors contributing to their performance adjustment. In addition, practices reported challenges leveraging CMS data sources to improve their financial performance, consistent with findings from prior years. Practices mentioned the need for additional supports from PCF, including more support from CMS to help them understand the data and make improvements, and more information on how to use the data feedback tool and claim and claim line feed. The perceived inadequacy of CMS' data supports deepened the sentiment that PCF payments are unpredictable.

We found that many practices' PAA increased and fewer practices earned positive PBAs over time. More practices saw their PAA increase across the four quarters of 2023 rather than decrease, which means that a greater proportion of revenue was lost because of patients receiving care from other practices. In addition, fewer practices earned positive PBAs because of the design of the incentive. About 60 percent of Cohort 1 practices earned a positive PBA from CMS in the second half of 2022. However, by the second half of 2023, less than a third of practices received a positive PBA and more than half of practices received a negative PBA. This decrease in the proportion of Cohort 1 practices receiving a positive PBA likely resulted from the automatic adjustments that went into effect in quarter 3 for practices failing the Quality Gateway (see text box), including the Patient Experience of Care Survey measure, which practices felt they had little control over.

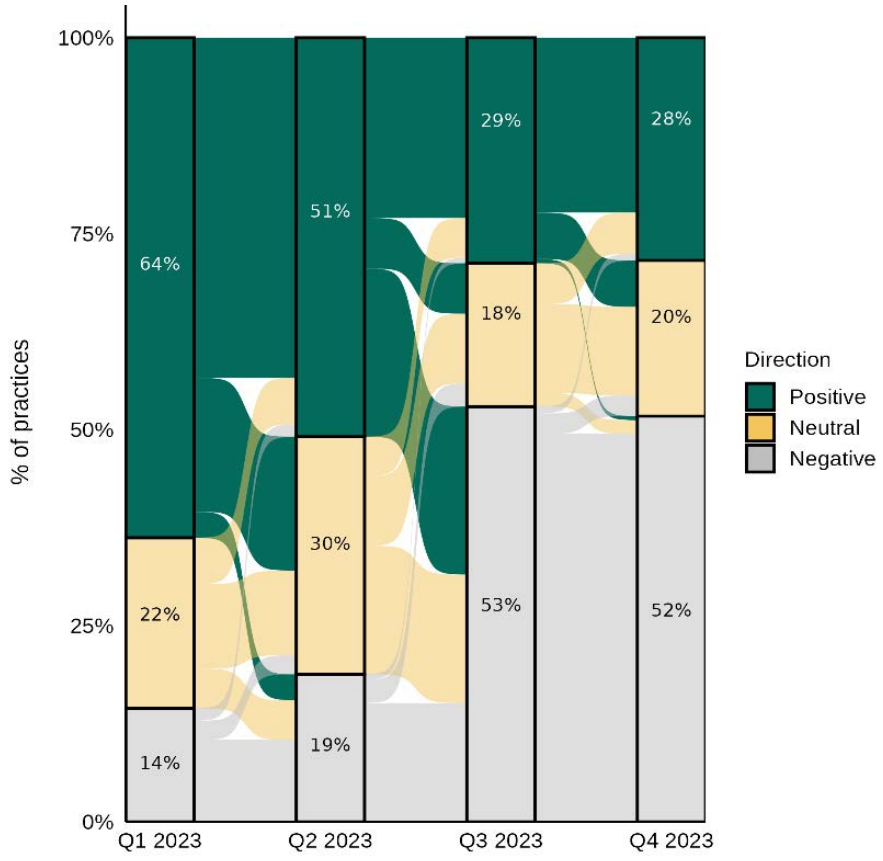
Quality Gateway

The Quality Gateway is a set of clinical quality and patient experience of care measures that determine eligibility for a positive PBA. Each performance year, practices must meet the benchmark for each of the measures to be eligible for an upward PBA. Practices received the PBA quarterly, starting in quarter 2 of performance year 2, based on their measured performance during a rolling 12-month period beforehand.

Starting in the third quarter of performance year 2, practices failing the Quality Gateway received a maximum PBA of 0 percent (a neutral adjustment). Starting in the third quarter of performance year 3, practices failing the Quality Gateway received an automatic PBA of negative 10 percent.

Exhibit ES.6 shows how the proportion of Cohort 1 practices that received a positive PBA decreased over time. In between the bars, flows show how each category feeds into the subsequent quarter, depicting the proportion of practices that (1) remained positive, (2) changed to neutral, and (3) changed to negative. Notably, the decrease in positive PBAs is observed alongside an increase in negative PBAs between quarters 2 and 3.

Exhibit ES.6. Cohort 1 PCF practices saw their PBA amounts decrease significantly in 2023



Source: Mathematica's analysis of 2023 PCF payment data to Cohort 1 practices.
PBA = performance-based adjustment; PCF = Primary Care First; Q = quarter.

Practices continued to implement, and often modified, existing care delivery strategies.

Nearly all participating practices the evaluation team interviewed continued efforts to improve care delivery after their first year in the PCF Model, modifying or sustaining their first-year strategies related to the model's five primary care functions. Practices most commonly modified and expanded many of the strategies and activities they implemented in their first year of model participation, which often predated the practices' participation in the model. Because many practices started PCF by building on existing care management strategies, interviewed practices frequently discussed continuing to modify these strategies. Practices also modified strategies under the planned care and population health function, with a focus on continuous quality improvement.

Five PCF primary care functions

- Access and continuity
- Care management
- Comprehensiveness and coordination
- Patient and caregiver experience
- Planned care and population health

Practices also improved care delivery by pursuing new strategies or reflecting on changes implemented during the first year of participation. More than half of interviewed practices reported adding at least one new strategy (and often more than one) after their first year of participation. Practices added strategies focused on improving comprehensiveness of care, such as addressing health-related social needs, integrating behavioral health, and improving coordination of referrals. Conversely, about half of interviewed practices said they had stopped making changes to at least one strategy or activity they implemented during their first year of participation (for example, stopped making changes related to advising practice improvements through patient and family advisory councils), often because these strategies were working well and did not need further changes. A couple of practices reported discontinuing strategies or activities that they implemented or planned in their first year of participation (behavioral health and podiatry services) due to financial constraints.

Care delivery changes focused on three areas of activities: workflows, staffing, and data and technology. Three factors—strengthening existing infrastructure, learning from experience with other initiatives, and creating community partnerships—helped practices remain engaged in practice transformation and to expand and improve care delivery. First, several practices identified electronic health record functionality and staff capacity as important drivers of ongoing changes in care delivery. Second, practices said lessons learned from their experiences participating in other value-based contracting arrangements and affiliation with hospital-based systems informed the activities they undertook to

> "[The social worker] just has a greater knowledge base to be able to get the patient or family exactly what they need. Whereas we can try to filter through resources and look stuff up online, help as much as we can…she'll just know something off the bat that would be helpful for them and can get the ball rolling way faster than we would be able to."
>
> — Care manager

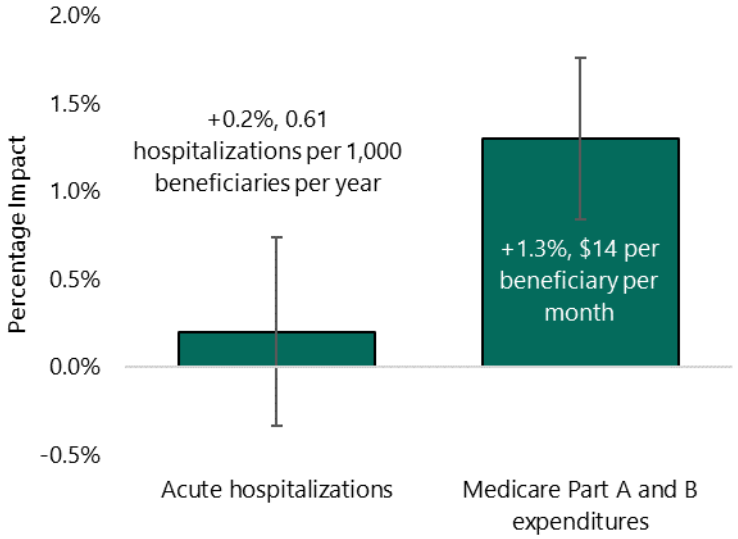
expand and improve care delivery. Third, several practices said establishing relationships with community resources to facilitate changes in care delivery, particularly related to addressing patients' health-related social needs, helped them expand the range of services they could offer their patients.

PCF did not reduce acute hospitalization rates among Medicare FFS beneficiaries, and it increased Medicare expenditures by 1 percent.

Acute hospitalization rates and Medicare Part A and B expenditures are the primary outcomes for this evaluation. We estimated the impact of PCF on these outcomes by comparing changes over time in PCF practices' outcomes to the changes in outcomes for a matched comparison group (a difference-in-differences regression model). The evaluation's comparison group is made up of primary care practices that did not participate in PCF, but are located in PCF regions and had similar practice and patient characteristics to the PCF practices when PCF began.

Our estimates show PCF did not reduce acute hospitalization rates among Medicare FFS beneficiaries, and counter to the model's goals, increased Medicare Part A and B expenditures including (non-claims-based) model payments. Exhibit ES.7 shows the average estimated impacts across performance years 1 and 2. The estimate for acute hospitalizations was not statistically significantly different from zero. The estimate for Medicare Part A and B expenditures was statistically significant. We estimate that PCF increased these expenditures by an average of $14 per beneficiary per month (1.3 percent) across performance years 1 and 2.

Exhibit ES.7. Estimated impacts of PCF on primary outcomes (performance years 1 and 2 average)



Source: Mathematica's analysis of Medicare claims data from January 2019 to December 2023.
Note: Black bars represent 90 percent confidence interval.
PCF = Primary Care First.

We also estimated the *probability* that PCF led to favorable impacts in acute hospitalizations and Medicare expenditures (using a Bayesian statistical technique). These findings indicated that PCF was just as likely to have reduced (49 percent) acute hospitalizations relative to the comparison group as it was to have increased them (51 percent). In addition, there was a high probability (72 percent) that PCF increased expenditures by at least 1 percent relative to the comparison group.

We find little evidence that PCF's impacts differed by practice and beneficiary characteristics. In general, results for the subgroups of practices and beneficiaries we examined resembled estimated impacts for the overall study population.

CMS hypothesized that PCF would not result in detectable cost savings to Medicare until performance year 4, so it is possible PCF could have impacts on these primary outcomes in later years of the model. Nevertheless, the lack of favorable findings for these primary outcomes is also consistent with findings that PCF participation led to little or no improvement in other measures like the proportion of eligible beneficiaries who adhere to medications prescribed for multiple chronic conditions or telehealth use that we would expect to see improve early in the model if PCF is to lower acute hospitalizations and Medicare spending. In addition, PCF did not meaningfully impact a range of secondary expenditure and service use outcomes such as inpatient expenditures and primary-care substitutable emergency department visits that we hypothesized could be affected through the same care delivery changes expected to influence primary outcomes.

Conclusion

Our findings indicate that changes PCF practices have implemented because of the model have not improved outcomes relative to a group of similar practices not participating in PCF. The findings for primary outcomes are consistent with findings that PCF participation led to little or no improvement in measures we would expect to see improve if the model is to lower acute hospitalizations and Medicare spending. These results do not necessarily imply that PCF practices' care delivery changes have no effects on outcomes but rather that their changes do not lead to substantively different effects than activities undertaken by a group of similar practices not participating in PCF.

A combination of three factors likely led to us not observing improvements in primary outcomes. First, PCF practices started the model with high performance in acute hospitalizations, potentially leaving little room for improvement. Second, PCF participation was only one factor among many influencing practices' changes to care delivery activities and strategies. Third, CMS anticipated detectable reductions in Medicare expenditures starting only in Year 4 of the model.

Looking ahead

Mathematica will continue collecting data to estimate model effects through the end of the model in 2026. We also will analyze new data to better understand practices' ability to use data to inform care delivery decisions and predict payments, as well as PCF's influence on staffing changes. In addition, we will identify factors and describe strategies that might contribute to practices' high performance in reducing acute hospitalizations.

1. Introduction

A. Overview of the Primary Care First Model

In 2021, the Center for Medicare & Medicaid Innovation, part of the Centers for Medicare & Medicaid Services (CMS), launched the Primary Care First (PCF) Model in 26 regions across the United States. PCF tests the impact of financial risk incentives and performance-based payments on advanced primary care practices, aiming to reduce acute hospitalizations, lower total Medicare fee-for-service (FFS) expenditures, and improve patient health outcomes. CMS designed PCF as a multi-payer model in which Medicare Advantage plans, commercial health insurers, state Medicaid agencies, and Medicaid managed care plans commit to aligning with PCF's payment methodology to increase the reach of the model and help achieve a critical mass of aligned support to drive practice-level transformation. Practices that met the eligibility criteria could join the model in 2021 as part of Cohort 1 or in 2022 as part of Cohort 2. Each cohort has a five-year period of performance.

PCF represents an evolution in the Innovation Center's primary-care models, shifting away from care delivery requirements and reliance on the FFS reimbursement structure. Instead, PCF emphasizes flexibility and outcomes—particularly reducing acute hospitalizations—with a greater level of reimbursement from population-based payments (PBPs) than FFS reimbursement. PCF's predecessor, the Comprehensive Primary Care Plus (CPC+) model, ended in 2021 as PCF launched. An independent evaluation estimated that CPC+ led to modest reductions in emergency department (ED) visits, hospitalizations, and acute inpatient expenditures and improvement on some claims-based quality-of-care measures (O'Malley et. al 2023). Just under one-half of CPC+ practices raised concerns, however, that payments across payers were insufficient for the work CPC+ required. Various stakeholders noted that CPC+ also relied too heavily on traditional Medicare FFS billing, doing too little to reduce the billing and quality reporting burdens on primary care practices and to shift clinicians' focus to outcomes of care. The PCF Model seeks to address these concerns through its model design.

Several years into the model, we can now assess how its design affects its implementation and estimate whether PCF is beginning to have its intended effects on reducing acute hospitalizations and expenditures. In the next section, we describe features of the model with a focus on those that play an important role in how practices implement the model.

B. Key features of the PCF Model

The PCF Model was designed to provide practices with the flexibility to leverage their advanced primary care capabilities, enabling them to transform and tailor their approach to meet the specific needs of their patient population. What follows is a summary of key features of the model that are relevant to our evaluation. Full details are available in the PCF request for applications (Center for Medicare & Medicaid Innovation 2021) and payment and methodology paper (CMS 2023).

1. Participating practices and attributed beneficiaries

CMS designed PCF for primary care practices capable of delivering advanced primary care as measured by questions on the PCF application. The model requires practices to have at least 125 attributed Medicare FFS beneficiaries and that primary care services comprise at least 50 percent of billing based on revenue. Most often, a beneficiary is attributed via Medicare claims. A beneficiary is attributed to the practice that furnished their Welcome to Medicare Visit or their most recent Annual Wellness Visit. In the absence of these visits, the beneficiary is attributed to the practice that billed for the plurality of qualifying primary care visits in the year. Medicare FFS beneficiaries with end-stage renal disease (ESRD), enrolled in hospice, or residing in a long-term care institution are not eligible for attribution to a PCF practice. Beneficiaries can also voluntarily attribute themselves to a practice.

2. Payment structure

The PCF payment structure centers on a PBP to provide more flexibility in the provision of patient care along with flat visit fees (FVFs) that encourage face-to-face visits, with the potential for an upward or downward adjustment to the total primary care payment based on a practice's performance on quality and utilization or expenditure measures.

CMS anticipates that the PCF total primary care payment, comprising quarterly prospective risk-adjusted PBPs and FVFs, will encourage PCF practices to promote access to both visit-based and non-visit-based primary care services, resulting in care delivery changes that will reduce acute care utilization and lower Medicare Parts A and B spending. The PCF payments are subject to two PCF-specific adjustments: (1) a payment accuracy adjustment (PAA) applied to a practice's PBP to account for primary care services furnished outside the attributed practice and (2) a performance-based adjustment (PBA) applied to a practices total primary care payment, based on the practice's performance on utilization, total costs, and quality.

Attribution and PCF risk groups

CMS created four risk groups based on practices' average Hierarchical Condition Category risk score for attributed beneficiaries. Attribution is determined hierarchically based on beneficiaries' voluntary attestation, where beneficiaries have received select services such as their most recent Annual Wellness Visit, or where beneficiaries received the plurality of their eligible primary care visits. The PBP is lowest for risk group 1 and highest for risk group 4 to compensate practices for the resources required to treat more complex patients.

PBP and FVF. The PBP is designed to support the many elements of primary care not effectively compensated by Medicare FFS, such as round-the-clock access, non-face-to-face encounters, coordinated and comprehensive care, and in-depth patient engagement (Berenson and Rich 2010). The complexity of a practice's attributed patient panel places the practice into one of four risk groups, which determines the amount of the PBP (see the text box called Attribution and PCF risk groups). The PBP is based on the total number of Medicare FFS beneficiaries attributed to each practice and ranges from $28 to $175 per beneficiary per month (PBPM), depending on the practice's assigned risk group. The FVF, which replaces FFS reimbursement for eligible services that are defined in the payment and attribution methodology documents (CMS 2023), is paid

when attributed beneficiaries have an in-office or qualifying telehealth visit. The FVF is intended to encourage face-to-face visits between patients and clinicians, and to reduce billing burden on practices. The PBP and FVF are subject to geographic, the Merit-based Incentive Payment System (MIPS), and sequestration adjustments. National base rate adjustments are also applied to the FVF.

CMS anticipates this visit-based revenue, combined with the PBP, would approximate the overall reimbursement that these practices historically would have received under Medicare FFS for practices whose beneficiary panel has an average risk based on the Hierarchical Condition Category (HCC) scores, though it would be somewhat higher for practices with a higher-risk beneficiary panel (Center for Medicare & Medicaid Innovation 2021).

PBA. A practice's PBA is based on its performance relative to a peer group and the practice's improvement over time. To receive a positive PBA, a practice must first meet or exceed performance on every quality measure in the Quality Gateway (see the text box called Quality Gateway). The PBA can increase the highest-performing practices' total primary care payment by up to 50 percent and reduce the lowest-performing practices' payments by up to 10 percent. Practices receive their first PBA in the second quarter of the second performance year. Cohort 1 received its first PBA mid-2022 and Cohort 2 in mid-2023.

Quality Gateway

The Quality Gateway is a set of clinical quality and patient experience of care measures that determine eligibility for a positive PBA. Each performance year, practices must meet the benchmark for each of the measures to be eligible for an upward PBA.

Starting in the third performance year, practices that do not meet the Quality Gateway will automatically receive a negative 10 percent PBA.

Details on the measures and benchmarks are available in the payment and attribution methodology documents (CMS 2023).

PAA. The PAA reduces a practice's PBP by the percentage of qualifying primary care visits and services covered by the PBP that are furnished outside a beneficiary's attributed practice relative to overall primary care utilization. A goal of the PAA is to eliminate redundant CMS payments for qualifying services covered under the PBP to the participating practice and via Medicare FFS payment to the provider that furnished the primary care service outside the beneficiary's attributed practice. An additional goal is to incentivize continuity of care between clinicians and their attributed beneficiaries. Practices were subject to their first PAA in the third quarter of the second performance year (2022 for Cohort 1 and 2023 for Cohort 2).

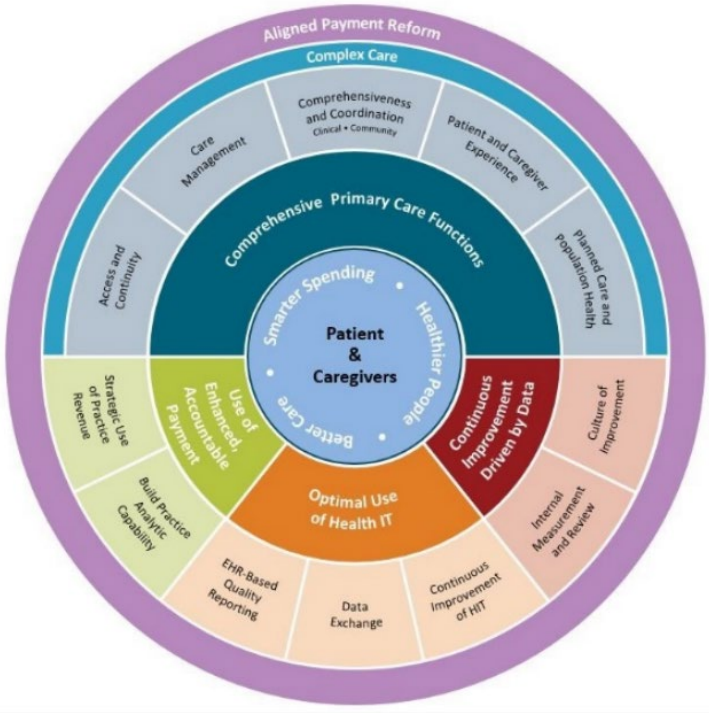
3. Data and supports

CMS provides participating practices with a suite of data to aid them in performing clinical activities such as care coordination or developing quality improvement strategies. Through a data feedback tool, practices can access, for example, quarterly beneficiary and practice-level information on expenditures, diagnoses, and service utilization. In addition to aggregated quarterly reports, CMS provides Medicare claim line data to practices. CMS believes practices will be able to use actionable data to improve care delivery activities.

C. PCF's theory of change and logic model

CMS hypothesized that the PCF Model will reduce acute hospitalizations—and, ultimately, Medicare FFS expenditures—by supporting practices when they provide comprehensive and continuous care that meets the needs of their patient population (Center for Medicare & Medicaid Innovation 2021). The five comprehensive primary care functions, as shown in the PCF driver diagram (Exhibit 1.1), help deliver advanced primary care and underpin the practitioner–patient relationship. These functions are (1) access and continuity, (2) care management, (3) comprehensiveness and coordination, (4) patient and caregiver experience, and (5) planned care and population health. Three supportive drivers provide the tools and supports to practices and clinicians as they provide comprehensive care to their patients: enhanced accountable payments, optimal use of information technology (IT), and continuous improvement driven by data.

Exhibit 1.1. Primary Care First driver diagram



Source: Centers for Medicare & Medicaid Services. "Primary Care First: Request for Applications, Cohort 2." 2021. https://www.cms.gov/priorities/innovation/media/document/pcf-cohort2-rfa. Accessed September 11, 2024.

EHR = electronic health record; HIT = health information technology.

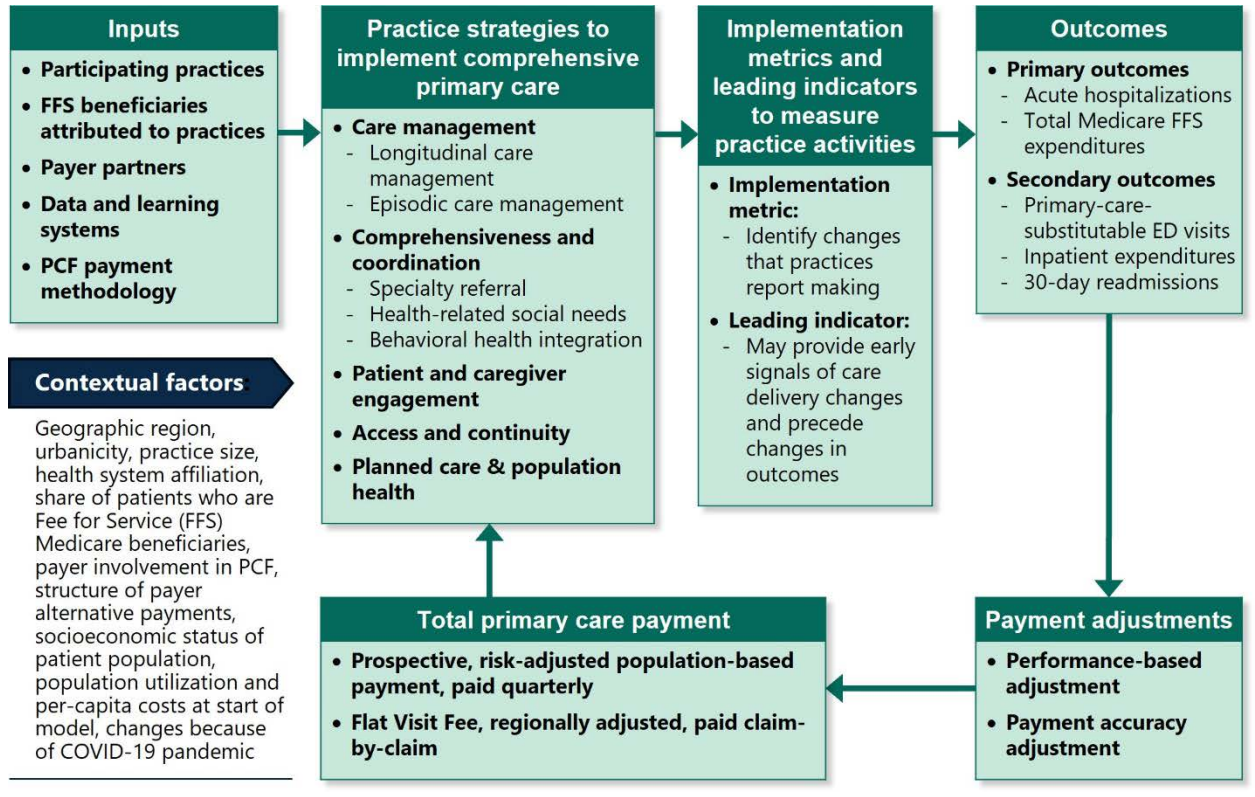
Within these functions are strategies and activities that practices can take up to support the delivery of comprehensive primary care. For this evaluation, we define them as follows:

- **Strategy:** How the practice is implementing the primary care function. For example, episodic care management is a strategy within the care management function.
- **Activity:** What specific actions the practice is taking as part of its larger strategy. For example, a care manager contacting a patient within three days of discharge from a hospital is an example of an activity within the strategy of episodic care management.

The PCF logic model that Mathematica developed (Exhibit 1.2) illustrates how the PCF Model aims to achieve the desired outcomes of fewer hospitalizations and lower Medicare Part A and B expenditures. Inputs for the PCF Model include participating practices and their attributed Medicare FFS beneficiaries, payer partners, learning system support, and data provided to practices. Participating practices receive a total primary care payment that is adjusted through the PBA and PAA and may be reinvested as an input in the logic model.

The flexibility of the PCF Model also means that practices are likely to use different care delivery approaches; the logic model reflects this by aligning the strategies that practices are likely to take with one or more of CMS' five comprehensive primary care functions. In addition, CMS hypothesizes that practices can take advantage of the model's flexible use of payments to invest in strategies that support care delivery such as optimal use of health information technology (HIT) and continuous process improvement driven by data.

Exhibit 1.2. PCF logic model



ED = emergency department; FFS = fee for service.

The logic model includes implementation metrics to measure practices' strategies and the activities supporting those strategies as well as leading indicators to provide early signals of changes in care delivery. The implementation metrics identify the changes the practices report making, such as the number of practices implementing episodic care management. The leading indicators are measures that might be responsive in the short term to the care delivery changes practices made. An example of a leading indicator is adherence to medications for multiple chronic conditions. These signals could precede changes in the primary outcomes (acute hospitalizations and total Medicare Part A and B

expenditures) or secondary outcomes such as inpatient expenditures, post-acute care expenditures, and ED visits.

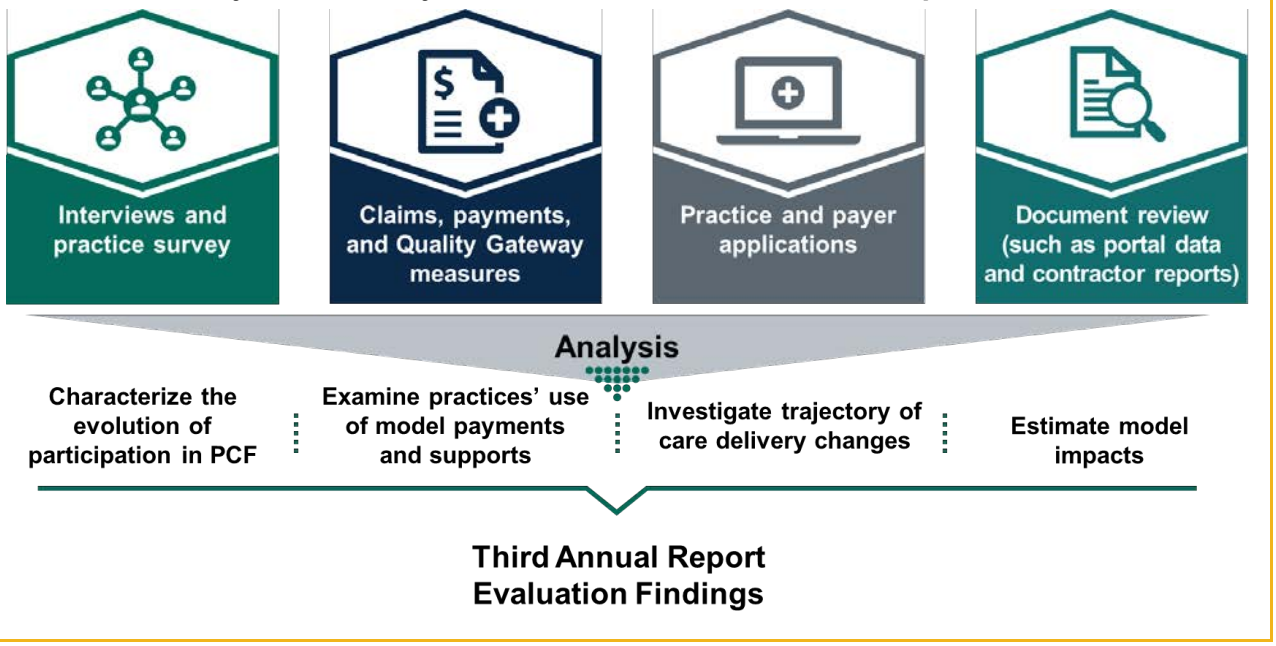
A practice's payments are adjusted by the PBA based on its performance and by the PAA based on where its attributed beneficiaries receive care. The logic model hypothesizes that the PBA will incentivize care delivery changes to reduce acute hospitalizations and that the total primary care payments will be reinvested in strategies to further improve comprehensive primary care delivery.

Contextual factors are external to the model itself but affect the elements in the logic model and influence the relationships among them. Contextual factors could include practice-level factors such as practice size, health system affiliation, and the socioeconomic status of the practice's attributed Medicare population. Contextual factors might also be specific to geographic region, such as regional payer involvement in PCF, regional population utilization, and per-capita Medicare spending at the start of model. Other important contextual events to consider will be national events with broad impacts on care delivery and health outcomes, such as the COVID-19 pandemic. These factors are likely to influence how practices implement the PCF Model. For example, care delivery changes in practices affiliated with a health system or parent organization may be made by the parent organization and not the individual practice.

D. PCF evaluation goals for the third annual report

The goal of the independent evaluation of PCF is to determine whether the model leads to better care for Medicare FFS beneficiaries and lower costs for CMS. We used mixed methods to analyze primary and secondary data, describe the participating practices and their experiences through 2023, and estimate impacts of the model on Medicare FFS expenditures and service use, including acute hospitalizations (Exhibit 1.3).

Exhibit 1.3. Primary and secondary data sources used in this evaluation report



1. Focus of the third annual report

As the model matures, practices start to experience the full effects of the payment structure. For example, Cohort 1 practices received their first PBA in mid-2022, and, starting in 2023, they received an automatic 10 percent downward adjustment on their total primary care payment if they did not pass the Quality Gateway. Cohort 2 practices received their first PBA in mid-2023 and if they did not pass the Quality Gateway received a -10 percent or 0 percent PBA based on their performance relative to benchmarks for acute hospitalization utilization or total per-capita costs. Previous reports focused on characterizing the participants in the model and care delivery changes implemented as they began their participation. Now that we are past the midway point of the model, we compare the characteristics of practices (and payers) that continued to participate compared with those that leave, the role the PCF Model's incentives and supports played in the strategies and activities that practices have adopted to improve care delivery, and how the trajectory of the care delivery strategies and activities implemented by practices have transformed over time. Findings from previous evaluation reports informed the focus of this report, which we describe below.

Summary of key findings from the second evaluation report

- Prior primary care transformation experience and affiliation with larger health care organizations facilitated care delivery changes were common.
- Many practices focused on care coordination activities, specifically longitudinal care management and episodic care management.
- About 15 percent of practices have left PCF since its launch. Common reasons for leaving were the opportunity to join the Accountable Care Organization Realizing Equity, Access, and Community Health (ACO REACH) Model and concerns with the PAA.
- Cohort 1 practices received their first PBA in 2022, with 62 percent of practices receiving a positive adjustment on average over the year. The PBA increased practice payments by 7 percent on average but was insufficient to offset the PAA reductions, which averaged 34 percent on average across quarters three and four of 2022. Despite the PAA, we estimated that PCF practice revenues remained, on average, 33 percent greater than what they would have been under FFS.
- Practices—especially former CPC+ participants—said that model payments were inadequate to support transformation.
- There were minimal effects on reducing hospitalizations and Medicare FFS expenditures.

Changes in practice and payer participation. In previous evaluation reports (Conwell et al. 2022; Schurrer et al. 2024), we described the characteristics of participating practices and found that most are affiliated with a parent organization, rather than independent, and that the majority had some type of prior transformation experience, such as participation in CPC+. Attrition has been non-trivial, with 15 percent of practices leaving the model by the end of 2022. In this report, we further investigate participation in PCF to understand the evolution of the characteristics of practices and payer partners that continue to participate and of those that leave the model, along with their reasons for leaving.

Practice and payer responses to the model payments and supports. Several years into the model and after practices have implemented care delivery changes, a critical question for the evaluation is the degree to which the model is motivating and funding the changes practices undertake. Practices have previously expressed concerns about the payment structure of the model, particularly the inadequacy of the model payments to support transformation and the perceived punitive nature of the PAA. We analyze how PBAs have changed over time, with a focus on the role of the Quality Gateway in determining PBA amounts. We take a deep dive into practices' concerns about how care delivered outside a PCF practice, but by a practice that is part of the same larger health care organization as the PCF practice, impacts practice revenue.

Changes in the trajectory of model implementation. As of 2023, Cohort 1 practices had been participating in the model for three years, and we shift from a point-in-time focus on the strategies and activities they implemented to how they have changed over time. We analyze the degree to which practices continued, modified, or stopped implementing the strategies and activities they undertook when they joined the model. In other words, we are now analyzing the trajectory of the changes practices implemented.

Impacts on primary outcomes, secondary outcome, and leading indicators. The second annual evaluation report presented preliminary impact estimates for a limited set of outcomes and subgroups primarily because we did not anticipate effects early in the model period. With Cohort 1 having three years and Cohort 2 having two years of model experience, we can now expand the set of outcomes and subgroups for which we estimate impacts.

2. New data sources and analyses in this report

In this third evaluation report, we have added new data sources and analyses to complement those included in previous reports, which we continue to use in the evaluation.

- **Practice survey.** We fielded a practice survey to roughly half of participating practices in summer 2023. The survey focused on previously unexplored topics such as whether PCF practices' care delivery changes in the last few years were motivated by PCF goals or supported by PCF payments, and we took a deeper dive into specific topics such as behavioral health and longitudinal care management.
- **"In Focus" and case studies.** The studies provide the opportunity to analyze a particular topic in depth. In response to practices' concerns about the PAA, we conducted a study to understand how the PAA differentially affects practices. Behavioral health integration is a model requirement , and we examine the different strategies and activities practices implement to meet this requirement. Finally, we examine how practices are implementing longitudinal care management—a common care coordination strategy among practices. Case studies provide concrete examples of how individual practices are proceeding along their trajectory of care delivery change.

- **PBA analysis.** The PBA is the mechanism by which CMS rewards (or penalizes) practices for their performance on quality measures and acute hospitalization utilization. In the PBA analysis, we examine the relationship between PBA adjustments and estimated changes in acute hospitalizations at the individual practice level. A goal of this analysis is to understand whether practices that achieve reductions in acute hospitalizations are those that receive positive PBAs.

E. Organization of the report

In the chapters that follow, we analyze the evolution of practice and payer participation in the model (Chapter 2) and how participating practices use the model payments and supports (Chapter 3). We then describe the trajectory of care delivery changes among practices (Chapter 4). Next, we present estimates of PCF's impact on the primary outcomes of Medicare FFS expenditures and acute hospitalization utilization and on secondary outcomes and leading indicators, along with the PBA analysis to understand who the model is rewarding (Chapter 5). The concluding chapter (Chapter 6) brings together the findings from the previous chapters to understand what changes participating practices and payers have made, and how the model's structure has influenced participants' decision making. The chapter concludes with next steps for the evaluation. Exhibit 1.4 provides a road map for the report.

Exhibit 1.4. Road map to the third annual report of the PCF evaluation

Chapter	Content
1. Introduction	• Overview of the PCF Model, evaluation goals, logic model, data sources, and report organization
2. Changes in practice and payer participation	• How has practice participation in the PCF Model evolved over time? • What are the characteristics of practices leaving the PCF Model? How have the characteristics changed over time? • Why do practices leave the PCF Model and have the reasons changed over time?
3. Practices' responses to the PCF Model's incentives and supports	• Are participating PCF practices crediting the PCF Model with motivating care delivery changes more intensely or in a different way than what they would have done otherwise? • How are practices using PCF funds? To what extent are practices using PCF funds to support care delivery changes? • Are practices participating in other value-based programs? How do they perceive PCF goals, requirements, and incentives relative to other value-based programs? • What are practices' overall perceptions of the PCF Model's components, including PAA, PBA, CMS data tools and learning supports, attribution, and payer supports? • Are payer partners crediting the PCF Model with motivating changes to their payer approach relative to what they would have done otherwise?
4. Care Delivery and the Trajectories of Change Among PCF Practices	• Which of the care delivery activities that practices planned in year one to reduce acute hospital utilization and lower total per-capita cost of care remained in year three for Cohort 1 practices? • To what extent have practices continued to modify their originally planned activities? • Have practices abandoned any of their originally planned activities over the three years of participation for Cohort 1 practices? • Have practices added new care delivery activities that were not part of their original implementation plans?

Chapter	Content
5. Estimated impacts of PCF on outcomes during the first three years of the Model	• What are the estimated impacts on acute hospitalizations and total FFS Medicare expenditures among participating PCF practices relative to a matched comparison group? • What are the estimated impacts on leading indicators (a set of measures we expect to improve for PCF practices relative to the matched comparison group if the model is to lower acute hospitalizations and total FFS Medicare expenditures)? • What are the estimated impacts on a range of secondary outcomes that we hypothesized PCF could improve by performance year 3? • Do results differ for primary outcomes and a select set of secondary outcomes by practice or beneficiary subgroups? • What is the relationship between practice-level PBAs and reductions in hospitalizations?
6. Conclusion	• Synthesis of findings across chapter and next steps for the evaluation.

CPC+ = Comprehensive Primary Care Plus; FFS = fee for service; PAA = payment accuracy adjustment; PBA = performance-based adjustment.

2. Changes in practice and payer participation

Key takeaways

- Attrition continued to increase over time, with 27 percent of practices leaving the PCF Model in the three years since it launched, compared with 19 percent of CPC+ practices that withdrew over the lifetime of that model. Most of these practices chose to leave the PCF Model, and voluntary withdrawal increased in the second and third performance years.
- Practices that voluntarily withdrew from the PCF Model differed from practices that remained in the model on important dimensions, and these differences in characteristics were consistent over time. Practices choosing to leave the model were more likely to be smaller, independent, or located in rural areas or areas with lower median household income. Practices that voluntarily withdrew from the model also had a less favorable impression of the PCF Model, and they were less likely to be motivated by PCF to make changes in care delivery compared with practices that stayed in the model.
- Reasons for voluntarily leaving the model changed over time. In the first performance year, about half of practices voluntarily left to join another Innovation Center model, and 10 percent of practices reported withdrawing because of challenges implementing the PCF Model requirements. In the second and third performance years—when the PAA took effect for Cohort 1 and 2 practices, respectively—about half of practices that voluntarily withdrew reported leaving the model because of concerns with the PAA. We did not, however, observe differences in the PAA for practices that withdrew from the model in 2023 and those that remained.
- Financial concerns were cited as a reason for choosing to leave the model by independent practices and practices affiliated with a parent organization, but a larger proportion of practices affiliated with a parent organization reported leaving the model because of concerns with the PAA. Although practices affiliated with a parent organization had higher median PAA in 2023 than independent practices, we did not observe a difference in median PAA between practices affiliated with a parent organization that voluntarily left the model and practices affiliated with a parent organization that remained in the model.
- Six payer partners (26 percent) withdrew from the PCF Model since the start. Payer representatives noted that the PCF Model was not a priority compared with the payers' own initiatives. Other reasons for withdrawal reported by payers included a lack of internal capacity to support model participation, issues with paying out capitated payments using their existing billing systems, high practice attrition in their regions, and challenges with multi-payer collaboration and alignment.

A. Focus of this chapter

In this chapter, we aim to understand how participation has changed since the start of the PCF Model. For context, in 2021, 846 Cohort 1 practices began participating in the PCF Model, another 2,228 practices joined in 2022 as Cohort 2, and 23 payers from across the country partnered with CMS.[1]

Over time, many practices and payer partners have withdrawn from the PCF Model. It is important to understand whether practices that withdrew from the model differ from practices that remain and why practices leave the model. With our evaluation, we aim to produce unbiased estimates of the impact of the PCF Model that can be generalized to the larger universe of primary care practices with advanced care capabilities in the United States. By examining the characteristics of practices that withdrew from the model and comparing them with practices that remain, we can assess whether practices leaving the model could be skewing or limiting the degree to which we can generalize our findings. By investigating reasons for withdrawal, we can understand the model's design features and requirements, as well as the competing priorities practices face, that led to practices withdrawing.

This chapter covers practices and payer partners that left the model as of December 31, 2023.[2] Exhibit 2.1 shows the data sources used in this chapter.

Exhibit 2.1. Data sources used in this chapter

- Practice roster data for 846 Cohort 1 practices and 2,228 Cohort 2 practices for information on participation start and end dates and reasons for withdrawal
- Medicare FFS enrollment and claims for characteristics of beneficiaries served by practices
- PCF Practice Portal data from 2,467 practices in 2023 (see Appendix A.1.1)
- Data from a 2023 survey of 1,155 PCF practices (see Appendix A.1.2)
- Exit interviews with seven practices in 2022, 12 practices in 2023, and 13 practices in 2024 (see Appendix A.1.3)
- Exit interviews with four payer partners collected in November 2023 (see Appendix A.1.4)
- OneKey data (produced by the data and analytics firm IQVIA) for practice characteristics and parent organization information (see Appendix A.2.1)

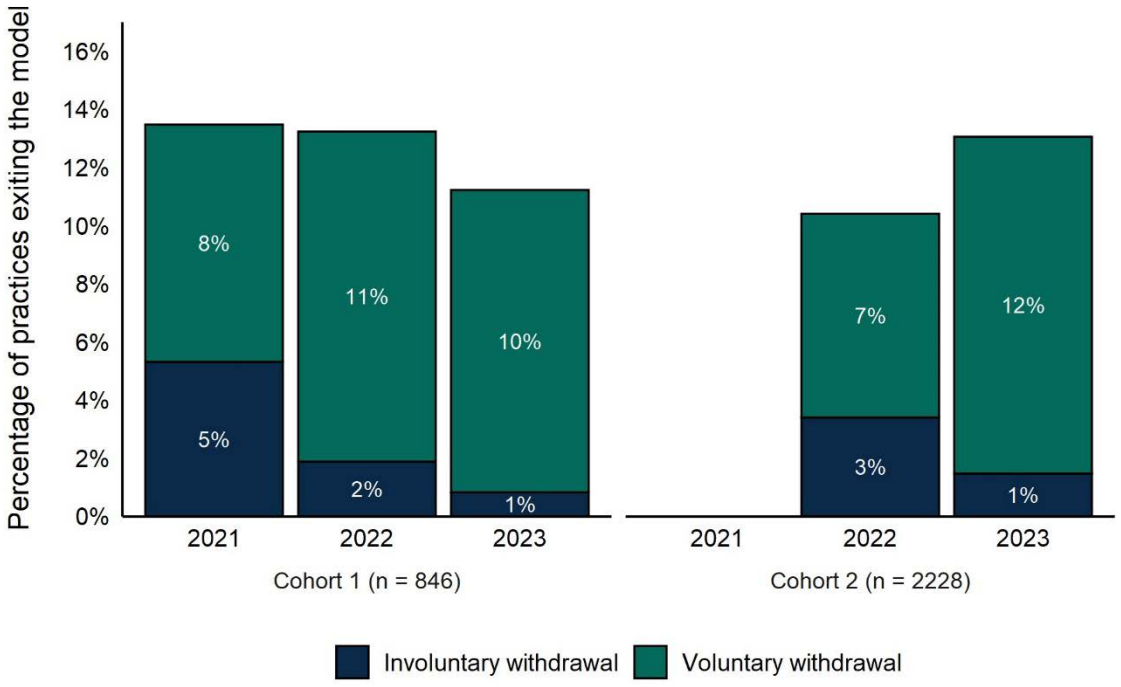
[1] The presented counts of practices are prior to any practice mergers that occurred during PCF participation.

[2] In all, 20 practices in Cohort 1 and 63 practices in Cohort 2 merged with other PCF practices. We still consider practitioners from merged practices to be participating in the PCF Model as part of the practices they merged with, so we do not include them as withdrawals.

B. Practice participation over time

Overall, 27 percent of practices left the model between the model's launch in 2021 and the end of 2023. For comparison, 19 percent of CPC+ practices and 13 percent of practices in the Comprehensive Primary Care initiative withdrew over the lifetimes of those models (Peikes et al. 2018; O'Malley et al. 2023).[3] For each cohort, at least 10 percent of practices left the model each year (Exhibit 2.2). This amounts to roughly 100 practices per year for Cohort 1 and 250 practices per year for Cohort 2. Of those practices that left the model, 79 percent were voluntary withdrawals on the part of the practice (or parent organization), and they made up an increasing share of withdrawals over time.

Exhibit 2.2. Between 10 to 13 percent of practices left the PCF Model annually, with voluntary withdrawal increasing over time



Source: Mathematica's analysis of PCF Model Practice Roster data provided by the Payment, Operations, Monitoring, and Quality Contractor, January 2024.

Notes: We calculated the attrition rate as the number of practices that left the PCF Model by December 31, 2023, for any reason (voluntarily or involuntarily) divided by the total number of PCF practices that ever participated in the model. Involuntary withdrawals included practices CMS terminated from the model as well as practices that left the model because they were acquired or closed. The overall percentage of practices that exited the model is across both cohorts. Cohort-specific data are shown in Exhibit 2.2.

CMS = Centers for Medicare & Medicaid Services; PAA = payment accuracy adjustment; PCF = Primary Care First.

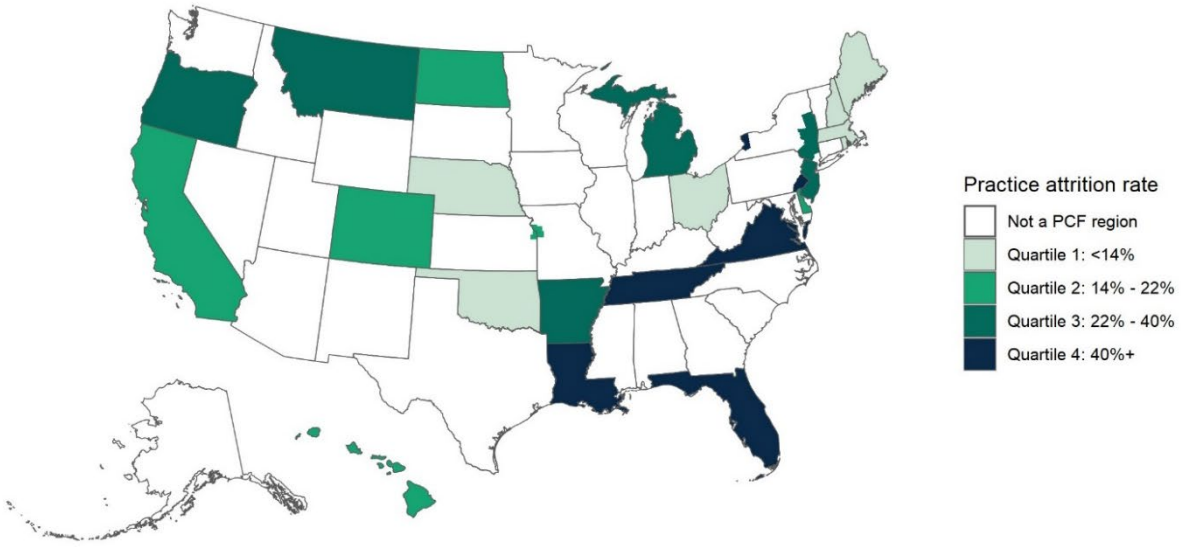
[3] The overall percentage of practices that exited the model is across both cohorts. Cohort-specific data are shown in Exhibit 2.2.

The percentage of practices that involuntarily left the model (that is, those that CMS terminated from the model or those that were acquired or closed) was higher in the first performance year than in later years of the model. Practices are eligible to participate in the model if they had at least 125 attributed Medicare beneficiaries, meaning CMS considered the practice to be the main source of primary care health services for those beneficiaries. More than half of the practices that involuntarily left had attributed beneficiary counts of less than 125 in the quarter before their participation ended; and an additional 30 percent of practices that involuntarily left closed.

Attrition has not been evenly distributed across the country (Exhibit 2.3). For example, 58 percent of Florida's 185 practices voluntarily left the model or were terminated by the end of 2023 compared with 14 percent of Ohio's 539 practices. The reasons practices voluntarily withdrew from the PCF Model varied by region. In the Greater Buffalo region, 86 percent of practices withdrew from PCF. Of those practices that left, 91 percent withdrew to join the Global and Professional Direct Contracting (GPDC) Model, now known as the Accountable Care Organization Realizing Equity, Access, and Community Health (ACO REACH) Model. In addition, all three payer partners in the Greater Buffalo region withdrew from the model. In Florida, 37 percent of the practices that left the model were affiliated with one parent organization that cited a "business decision" as the reason for the practices' withdrawal. In Virginia, 69 percent of the state's 68 PCF practices withdrew from the model, and, of those that left, 36 percent cited financial reasons, 30 percent cited lack of resources to participate, and 23 percent cited lack of data or timeliness of the data as reasons for withdrawal.

The remainder of this chapter will focus on the voluntary withdrawal group.

Exhibit 2.3. There was large variation in attrition rates across PCF regions



Source: Mathematica's analysis of PCF Model Practice Roster provided by the Payment, Operations, Monitoring, and Quality Contractor, January 2024.

Notes: The attrition rate was calculated as the number of practices that left the PCF Model by December 31, 2023, for any reason (voluntarily or involuntarily) divided by the total number of PCF practices that ever participated in the model. Alaska is a PCF region that does not have practices participating in the model.

PCF = Primary Care First.

C. Characteristics of the practices that chose to leave the PCF Model

The PCF Model is a voluntary model designed for primary care practices with advanced primary care capabilities. As reported in the second annual report, practices participating in the PCF Model differed from the larger universe of primary practices in the United States (Schurrer et al. 2024), so we recognize that results from this evaluation will not be fully generalizable. With high attrition, however, the concern is more about our evaluation findings having less generalizability to the larger population of practices with advanced primary care capabilities and the extent to which attrition might bias our results. We evaluated the extent to which practices that withdrew from the PCF Model differed from practices that remained in the model.

A larger proportion of practices that voluntarily withdrew from the PCF Model were smaller or independent compared to practices that remained in the model. Nearly one-quarter of practices that voluntarily withdrew since the start of the model were independent, while only 14 percent of practices that remained in the model were independent (Exhibit 2.4). Further, practices that withdrew had fewer practitioners at their practices on average (6.5 practitioners) and a smaller average number of assigned patients (578 patients), compared to practices that remained in the model (8.9 practitioners and 693 patients, respectively). Practices that withdrew from the model were more likely to be located in rural areas or areas with lower median household incomes than practices that remained in the model (17% versus 12%; $78,462 versus $88,264).

Exhibit 2.4. Practices that voluntarily withdrew from the PCF Model were more likely to be smaller, independent, or located in rural areas or areas with lower median household income

Baseline characteristics	Voluntarily withdrawn (n = 632)	Not withdrawn (n = 2,175)
Practice characteristics		
Independent (%)	24%	14%
Number of providers (mean)	6.5	8.9
Number of assigned patients (mean)	578	693
Located in a rural area (%)	17%	12%
Median household income based on practice location (mean)	$78,462	$88,264
Medicare Shared Savings Program participation (%)	56%	49%
Total Medicare expenditures per beneficiary per month (mean)	$907	$875
Acute hospitalization (short-stay acute care and critical access hospitals) rate per 1,000 beneficiaries, annualized (mean)	247	235
Patient dual eligibility		
Partial or full (%)	15%	13%
Patient complexity		
Three or more HCC conditions (%)	34%	31%

Source: Mathematica's analysis of Medicare FFS claims and enrollment data at baseline, OneKey data (2020 and 2021), supplemental data and PCF Model Practice Roster provided by the Payment, Operations, Monitoring, and Quality Contractor, January 2024.

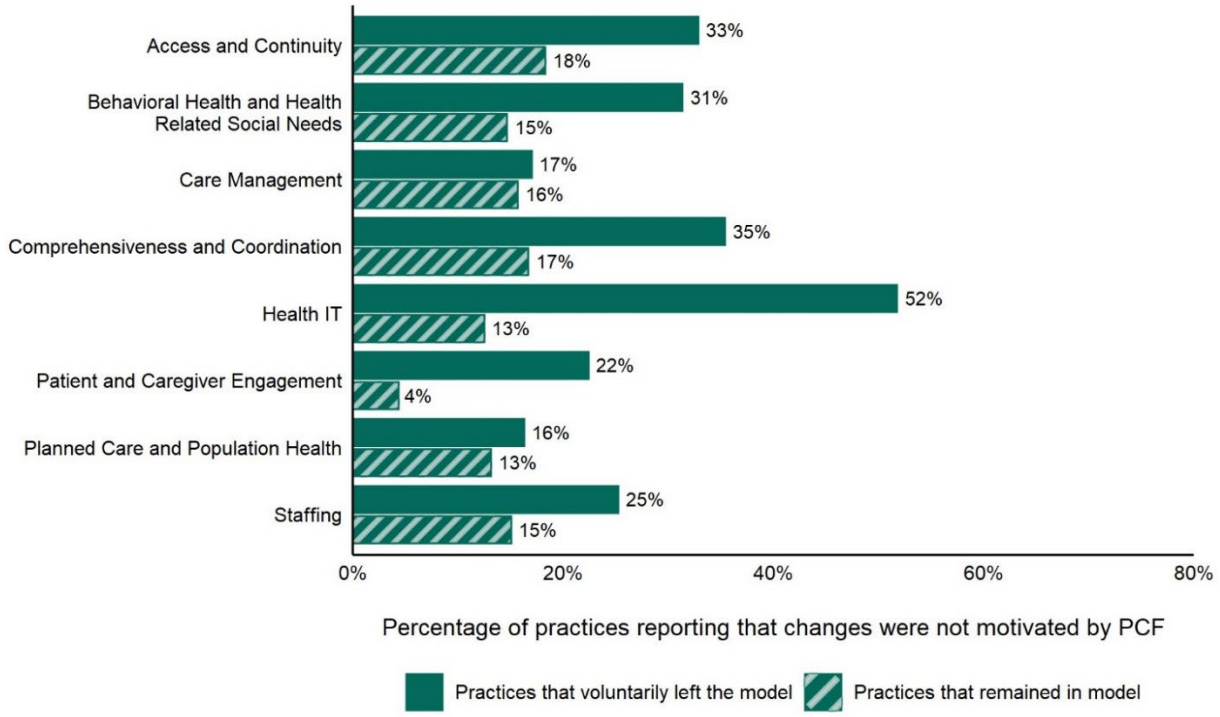
Notes: This analysis included practices from both cohorts that voluntarily left the PCF Model by December 31, 2023, compared with practices that remained in the model. Patients' characteristics were measured among assigned Medicare FFS beneficiaries and calculated as the average at the practice level. Appendix A.2.1 provides detail about patient assignment.

CPC+ = Comprehensive Primary Care Plus; FFS = fee-for-service; HCC = Hierarchical Condition Category.

Practices that voluntarily withdrew had a less favorable impression of the PCF Model, and they were less likely to be motivated by PCF to make changes in care delivery compared with practices that stayed in the model. Of the practices that responded to the PCF Practice Portal questions in 2023 and later voluntarily withdrew from the model, 80 percent reported they were not very or not at all likely to participate in PCF if they could do it all over again, compared with 24 percent of practices that remained in the model. Nearly half of those withdrawn practices reported that they found the requirements of PCF very burdensome, compared with less than 10 percent of practices that remained in the model through 2023.

Practices that voluntarily left in 2023 were less motivated by PCF goals to make changes and less likely to use PCF payments to fund these changes to their care delivery activities than practices that stayed in the model. In the 2023 PCF practice survey, respondents described the extent to which care delivery changes across eight domains (staffing, access and continuity, care management, behavioral health and health-related social needs, comprehensiveness and coordination, HIT, planned care and population health, and patient and caregiver engagement) were motivated by PCF goals and funded by PCF payments. Compared with practices that remained in the model through 2023, a larger share of practices that voluntarily left the model in 2023 reported that the changes to care delivery activities they made that year were *not at all* motivated by PCF goals (Exhibit 2.5). For example, 52 percent of practices that left the model reported that changes in HIT were *not at all* motivated by PCF goals, compared with 13 percent of practices that remained in the model. [Chapter 3 includes additional results about the extent to which practices were motivated to make changes to their care delivery activities by their PCF participation.]

Exhibit 2.5. Of practices active in 2023, a greater percentage of practices that left the model than those that remained in the model reported that the care delivery changes within a domain were *not at all* motivated by PCF goals



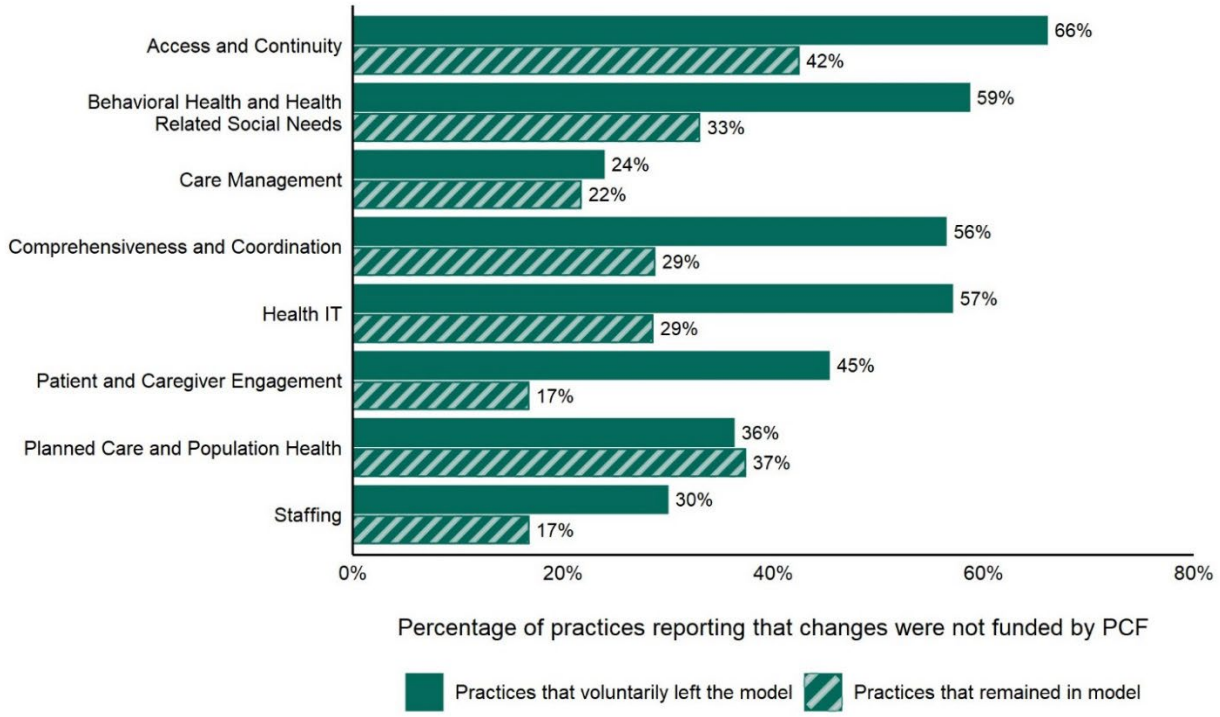
Source: Mathematica's analysis of 2023 PCF practice survey and PCF Model Practice Roster provided by the Payment, Operations, Monitoring, and Quality Contractor, January 2024.

Notes: The PCF practice survey included responses from 151 practices that voluntarily withdrew and 990 practices that remained in the model. This analysis included practices from both cohorts.

IT = information technology; PCF = Primary Care First.

Further, practices that voluntarily left the model in 2023 were also less likely to report using PCF payments to fund changes to their care delivery activities compared with practices that stayed in the model (Exhibit 2.6). For example, 66 percent of practices that left the model that year reported that changes in access and continuity were not at all funded by PCF payments, compared with 42 percent of practices that remained in the model.

Exhibit 2.6. Of practices active in 2023, a greater percentage of practices that left the model than those that remained in the model reported that the care delivery changes within a domain were *not at all* funded by PCF payments



Source: Mathematica's analysis of 2023 PCF practice survey and PCF Model Practice Roster provided by the Payment, Operations, Monitoring, and Quality Contractor, January 2024.

Notes: The PCF practice survey included responses from 151 practices that voluntarily withdrew and 990 practices that remained in the model. This analysis included practices from both cohorts.

IT = information technology; PCF = Primary Care First.

The differences in the characteristics discussed above between practices that withdrew from the model and those that remained in the model were generally consistent over time. We examined whether the characteristics of those practices that left the model changed over time (for example, change in the proportion of exiting practices that were independent or the average number of patients of the exiting practices). Generally, characteristics of practices that left the model and practices that remained in the model remained stable over time. We observed, however, temporary one-year increases in the proportion of withdrawing practices located in rural areas or practices participating in the Medicare Shared Savings Program at baseline, which were driven by decisions of parent organizations to withdraw most of their practices at once.

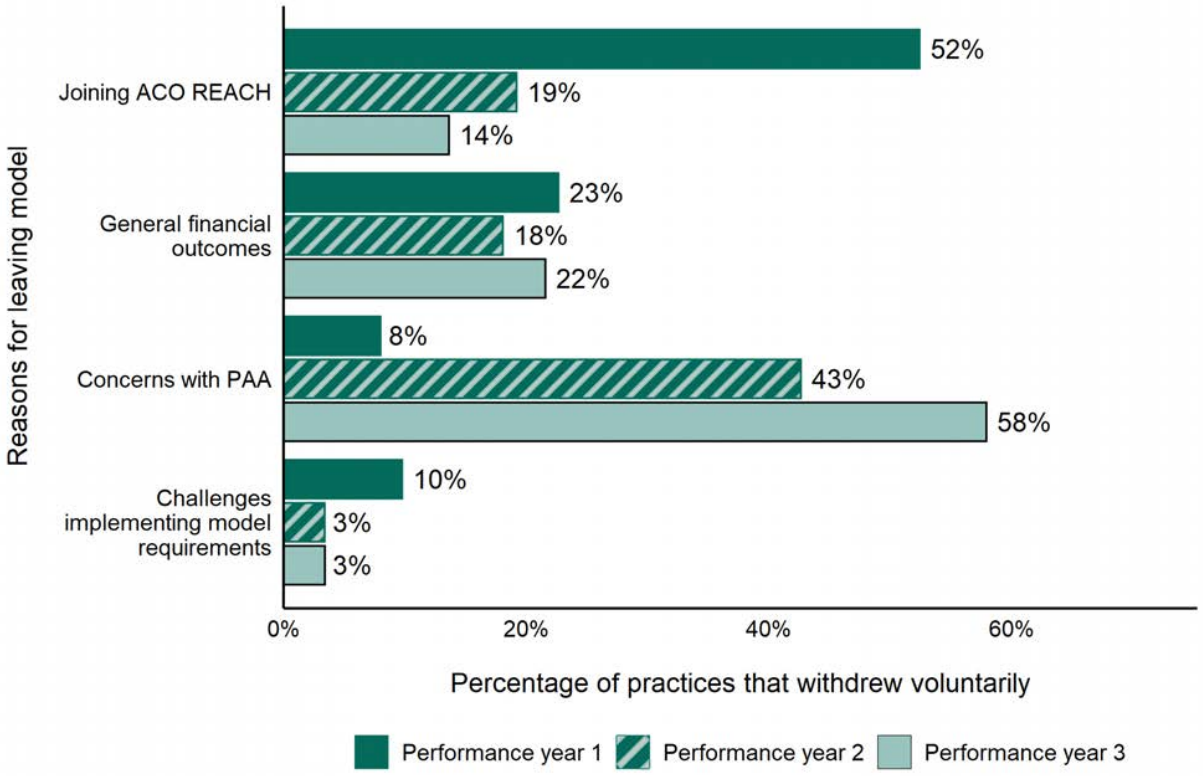
The differences we observed between practices that left and practices that remained in the PCF Model could bias our estimates of PCF's effects. If we focused our impacts analysis exclusively on practices that remained in the model (in other words, larger practices and practices affiliated with a parent organization), then our results would represent the effects of the model for these types of practices and would not represent the effects of the model for the larger set of primary care practices nationally that have advanced primary care capabilities. In Chapter 5, we present results using an intention-to-treat (ITT) design, which tracks outcomes over the model to date even if a practice withdrew. This design helps stabilize our analytic sample size and guards against bias that could occur if attrition from the model is correlated with outcomes. We also present results from a sensitivity analysis that includes practices that remain in the model so we can compare sensitivity analysis results with the ITT results and determine the extent to which attrition biases our impact estimates.

D. Reasons for voluntary withdrawal changed over time

Because PCF is a voluntary alternative payment model, practices review model requirements, assess the benefits and risks to participation, and ultimately decide whether to apply. In the second annual report, we discussed the reasons practices initially chose to participate in the PCF Model: to be at the forefront of care transformation and to improve quality of care (Schurrer et al. 2024). In voluntary models, practices can choose to end their participation in the model at any time, and the reasons practices leave the model at the start may differ from the reasons practices leave later in their participation.

In the first year of participation in the PCF Model, around half of practices voluntarily left to join GPDC, which was later known as ACO REACH (Exhibit 2.7). Cohort 1 practices interviewed in the first performance year reported that these other models were appealing because they had greater potential financial upside and because an accountable care organization (ACO) often provided supports similar to those in PCF. They joined another practice or group that was participating in GPDC or ACO REACH or they joined because they were approached by an ACO REACH contracting entity or a private equity firm that offered supports and services to support their participation in these other models (for example, help collecting and analyzing data or adding staff to address patients' mental and behavioral health needs). Practices said a combination of financial, logistical, and external factors influenced their decision to withdraw for these other opportunities. The percentage of practices that left the PCF Model for other Innovation Center models decreased in the second and third performance years (19 percent and 14 percent, respectively).

Exhibit 2.7. In the first performance year, more than half of practices left the PCF Model to join GPDC or ACO REACH; in the second and third performance years, more than half of practices left PCF because of concerns with the PAA



Source: Mathematica's analysis of PCF Model Practice Roster provided by the Payment, Operations, Monitoring, and Quality Contractor, January 2024.

Notes: This analysis included 667 practices from both cohorts that voluntarily withdrew from the PCF Model. This exhibit shows the top reasons for voluntarily withdrawing from the PCF Model. The performance year-specific percentages do not add up to 100 percent because practices reported a variety of other operational challenges and concern with PECS as reasons for voluntarily withdrawing that are not included. Performance year 3 does not include cohort 2 practices because they have only participated in the model for two performance years as of December 31, 2023.

ACO REACH = Accountable Care Organization Realizing Equity, Access, and Community Health; GPDC = Global and Professional Direct Contracting; PAA = payment accuracy adjustment; PCF = Primary Care First; PY = performance year.

The PAA took effect in the second performance year of participation for each cohort, and around half of practices cited concerns with the PAA as the reason for voluntarily exiting the model in the second and third performance years (Exhibit 2.7). Practices that voluntarily withdrew said that they earned less money in PCF than they expected when joining, which was exacerbated when the PAA went into effect. For practices that voluntarily withdrew and those that remained in the model, more than half reported that PCF payments were less than adequate considering the amount of work required. However, a larger percentage of practices that left the model reported the payments were less than adequate (67 percent versus 56 percent).

PCF payment adjustments

CMS applies a quarterly **PAA** to a practice's PBP with the goal of more accurately capturing the amount of primary care provided by the PCF practice to its attributed beneficiaries. A higher PAA indicates that a practice is receiving a lower PBP because non-PCF practitioners are providing a large share of primary care to the PCF practice's beneficiaries.

The quarterly **PBA** is applied to the PBP and FVF to reward or penalize practices based on their performance on the Quality Gateway and two measures: acute hospital utilization (practices in risk groups 1 and 2) or total per-capita cost (practices in risk groups 3 and 4).

In exit interviews, practices expressed dissatisfaction with the unpredictability of total revenues, specifically stemming from the PAA, as well as the PBA and risk group assignment. Most practices reported it was too difficult to overcome the PAA because practices cannot control where their patients go. For example, office visits with qualifying nurse practitioners who provide specialty care are billed, according to the calculation of the PAA, using specified office visit evaluation and management (E&M) procedure codes—essentially billing them as primary care rather than specialty care. About one-quarter of practices interviewed in the third performance year indicated that it was hard for them to improve the quality measures, which, in turn, would improve their PBA. Finally, about one-third of interviewed practices also mentioned that their risk group assignment did not accurately capture the complexity of their patient population or align with their expectations.

Although practices that left the model in the second and third performance years often cited concerns with the PAA, we did not observe differences in the PAA and PBA applied to PCF payments between practices that voluntarily withdrew from the model in 2023 and those that remained in PCF (Exhibit 2.8). The median PAA percentage was around 30 percent, and the median PBA percentage was 3 to 4 percent for practices that voluntarily withdrew and those that remained in the model. Additional payment results are included in Appendix B.1.

Exhibit 2.8. In 2023, there were no differences in PCF payments between practices that voluntarily withdrew from PCF and those that remained

Payment characteristic	Voluntarily withdrew in 2023	Remained in 2023
Overall		
PAA percentage (median)	29%	30%
PBA percentage (median)	3%	4%
Independent practices		
PAA percentage (median)	23%	23%
PBA percentage (median)	2%	5%
Practices with a parent organization		
PAA percentage (median)	31%	31%
PBA percentage (median)	3%	4%

Source: Mathematica's analysis of 2023 PCF payment data to PCF practices (including those that withdrew).

Notes: PBA went into effect in Q2 2022 for Cohort 1 and Q2 2023 for Cohort 2, and the PAA went into effect in Q3 2022 for Cohort 1 and Q3 2023 for Cohort 2. Although only median values are reported, both median and mean rates were explored and produced similar results. The group that voluntarily withdrew includes 295 practices (63 independent and 232 with a parent organization), and the group that remained includes 2,147 practices (297 independent and 1,850 with parent organizations). This analysis included practices from both cohorts.

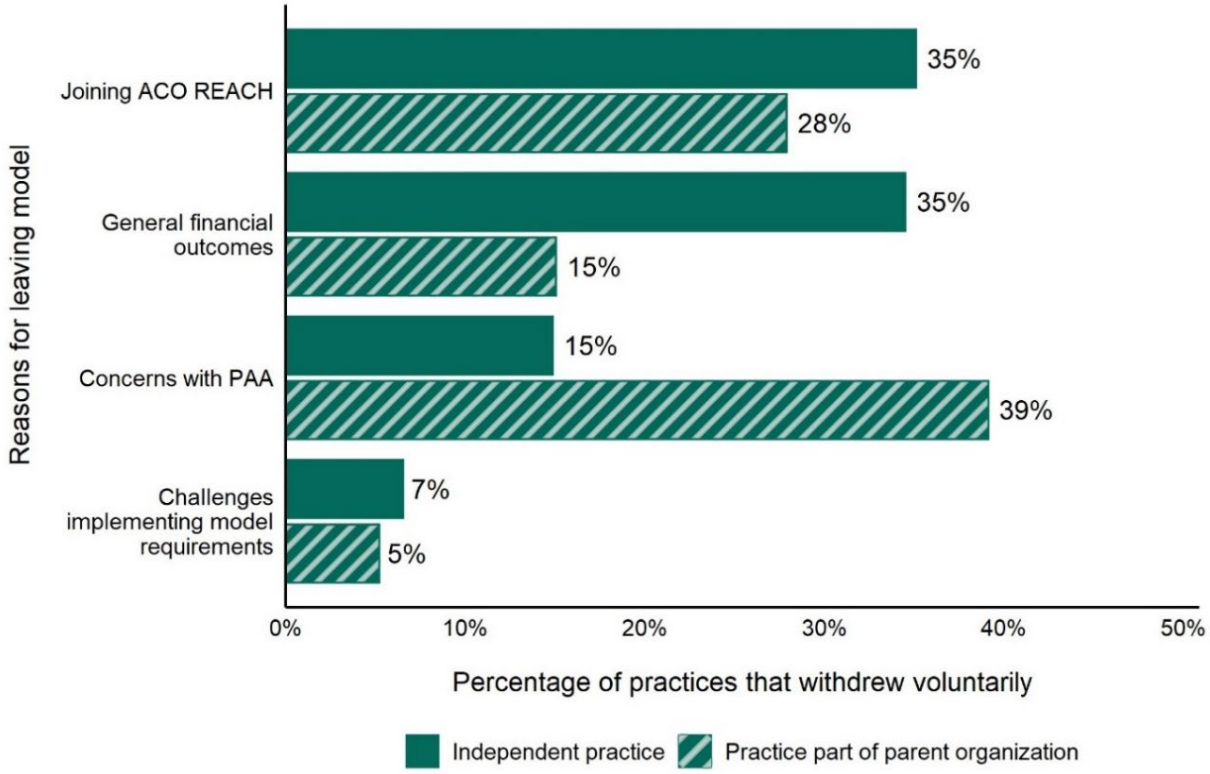
PAA = payment accuracy adjustment; PBA = performance-based adjustment; PCF = Primary Care First; Q = quarter.

While less often reported as a reason for leaving the PCF Model, model requirements were reported as burdensome by a small percentage of practices leaving the model in the first performance year. In all, 10 percent of Cohort 1 practices that voluntarily exited the model in the first performance year cited challenges implementing the PCF Model requirements as the reason for withdrawing from the model (Exhibit 2.7). Practice representatives also discussed these challenges as a reason for withdrawal in our interviews with exiting Cohort 1 practices in the first performance year. For example, practices participating in these interviews noted they were not prepared for certain expenses, such as paying for the administration of the Patient Experience of Care Survey (PECS) and contracting with a registry to submit data for the Advance Care Plan measure, both of which were original model requirements for Cohort 1 practices. In the second and third performance years, 3 percent of practices that voluntarily left the model cited challenges implementing model requirements.

E. Reasons for voluntarily withdrawing from PCF differed for independent practices and practices affiliated with a parent organization

Independent practices were more likely to voluntarily withdraw from the PCF Model, and they were also more likely to report leaving the PCF Model to join other Innovation Center models (Exhibit 2.9). ACOs bring providers together to care for a group of patients, assuming collective responsibility and sharing financial risk. ACOs may be a more attractive option to independent practices than PCF because the practices are not solely responsible for the patients and taking on downside financial risk.

Exhibit 2.9. Independent practices were more likely to voluntarily leave the PCF Model to join GPDC or ACO REACH or because of more general financial concerns with participating in the model



Source: Mathematica's analysis of PCF Model Practice Roster provided by the Payment, Operations, Monitoring, and Quality Contractor, January 2024.

Notes: This analysis included 168 independent practices and 498 practices affiliated with a parent organization from both cohorts.

ACO REACH = Accountable Care Organization Realizing Equity, Access, and Community Health; GPDC = Global and Professional Direct Contracting; PAA = payment accuracy adjustment; PCF = Primary Care First.

Independent practices and practices affiliated with a parent organization both cited financial concerns as a reason for exiting the model, but a larger proportion of practices affiliated with a parent organization reported voluntarily leaving the model because of concerns with the PAA. Practices affiliated with parent organizations were more likely to report to CMS that they left the PCF Model because of concerns with the PAA (39 percent versus 15 percent of independent practices; Exhibit 2.9). Although practices affiliated with a parent organization had higher median PAA than independent practices (31 percent versus 23 percent; Exhibit 2.8), we did not observe a difference in median PAA between practices affiliated with a parent organization that voluntarily left the model and those practices affiliated with a parent organization that remained in the model (both 31 percent).

Of the independent practices that voluntarily exited the model, 15 percent reported to CMS that the PAA was the reason for withdrawal, and 35 percent reported general financial concerns as the reason (Exhibit 2.9). Practices reported in 2023 exit interviews that the nature of small or independent practices made it more challenging to reduce the PAA, improve the acute hospital utilization measure used as the basis for PBA, manage administrative burden, and mitigate downside risk. All independent practices interviewed in 2023 indicated that PCF had too much downside risk for primary care practices. However, unadjusted median PAA percentages were similar for independent practices that withdrew and independent practices that remained in PCF (23 percent for both; Exhibit 2.8).

F. Payer participation

Since 2021, six payer partners (26 percent) withdrew from the PCF Model. We interviewed four of the six exiting payers to learn more about their reasons for withdrawing.

Payer partners that left the model reported that PCF was not a priority compared with their own initiatives. Although they saw collaboration and partnership with CMS and Innovation Center models as valuable, they preferred prioritizing their own programs and initiatives over PCF. They planned to continue to work on value-based payment methods in their own internal programs.

Technological issues were also cited as a reason for withdrawing from the model. For example, payer partners reported difficulty paying out capitated payments using their current billing systems and said it was too expensive to resolve the issue to support their participation.

Payer partners cited limited internal capacity or staffing to support the payer's participation in the model as a reason for withdrawing from the model. One payer partner commented that it required one full-time equivalent to manage data reporting requirements associated with the model.

A goal of the PCF Model was to encourage multi-payer collaboration and alignment. Yet one payer partner that also participated in the CPC+ Model said they were not as engaged in the PCF Model with its smaller number of payer partners. Another payer partner reported challenges working with other payers in the region to align measures.

In one state, two payer partners reported they decided to leave the PCF Model after practices left PCF to join ACO REACH. One payer partner commented that they joined PCF to align with their community and improve quality of care in their community. Many of the practices in their region, however, elected to participate in ACO REACH instead of PCF.

These barriers to participation and reasons for exiting were also challenges that payer partners remaining in the model reported. Some payer partners are participating but not aligning with the PCF Model. Payer partners said that increased engagement and outreach from CMS at the design phase of PCF could help identify barriers to payer participation.

3. Practices' response to the PCF Model's incentives and supports

Key takeaways

- Practices indicated that PCF was rarely their sole motivation for changing their care delivery. Instead, most practices changed their care delivery based on the goals of other value-based contracting arrangements they entered alongside PCF. Similarly, most PCF practices made investment decisions based on the incentives of PCF and other models and programs in which they were participating.
- PCF most frequently motivated practices to change their approaches to care management, planned care and population health, and behavioral health and social needs integration. Practices used PCF funds, along with other funding sources, to support these changes but also reported that PCF payments alone were not sufficient to support their desired changes.
- The number of practices that received a positive PBA decreased over time, and practices earning a negative or neutral PBA in previous quarters were rarely able to achieve a positive PBA. In 2023, about half of practices in both cohorts earned a positive PBA in quarter 2, but only about one-third earned a positive PBA in quarter 3. For Cohort 1, this decrease likely resulted from the automatic adjustments for practices failing the Quality Gateway, including the PECS measure, which practices felt they had little control over.
- Practices continued to raise concerns about the PAA unfairly penalizing the use of nurse practitioners and their other strategies for expanding access. Our analysis indicated that the data supported practices' concerns about the PAA misclassifying nurse practitioners, but the data did not support concerns that the PAA penalizes health care provider organizations for expanding PCF beneficiaries' access to care at non-PCF practices within their organizations.
- CMS encouraged payers to align with the PCF Model by providing payment and other supports to practices so they could provide care changes to more of their patient panel. As reported in prior years, PCF payer partners' reach was limited because of the small number of payers at the national and regional levels. The lack of more robust payer partner participation likely reduced the scale and scope of changes PCF practices could implement across their patient panel.

A. Focus of this chapter

This chapter examines whether and how practices modified their approaches to primary care delivery because of the incentives and supports in PCF, as well as how those modifications might tie to the model's goals of reducing Medicare expenditures and hospitalizations, improving quality, and improving patients' experience of care. We also explore how PCF payer partners align their payment approaches to support primary care delivery changes to more of practices' patient panels. CMS hypothesized that PCF could result in detectable cost savings to Medicare by performance year 4. Therefore, after three years of model implementation for Cohort 1, and two years for Cohort 2, we

expected practices to be fully implementing planned changes to primary care delivery to improve their performance in PCF.

Both cohorts of PCF practices experienced further adjustments to their PCF payments because of the application of the PAA; the adjustment was first applied in July 2022 for Cohort 1 practices and in July 2023 for Cohort 2. (The PCF payment model is described in more detail in Chapter 1.) Further, the Quality Gateway was applied for the first time for Cohort 1 practices in quarter 2 of 2023. In prior annual reports, we reported widespread concern among practices about the PAA. We also expect PCF payer partners to have launched their aligned payment approach and additional supports for PCF practices by this point in the model, which theoretically should have helped practices expand the scale and scope of changes they can provide across their entire patient panel.

We first describe how PCF goals motivated practices to change their care delivery and other primary care activities, and how practices used PCF funds to support these changes. We explain how practices perceived PCF relative to other value-based contracting arrangements and how PCF factored into practices' financial decision making. We then show how practices were impacted by the PBA and PAA in 2023, including how the application of the Quality Gateway affected PBA amounts. We relay practices' perceptions of the adequacy and fairness of PCF Model payment components. Finally, we describe practices' perceptions of CMS data tools and learning supports and include an update on payer partners participating in the model, including describing the minimal changes to payer partners' approaches in 2023.

This chapter also includes a study on the PAA (called In Focus: Payment accuracy adjustment). We first explore practices' concerns related to identifying the specialty of nurse practitioners using administrative data by assessing the sensitivity of the PAA to the inclusion of nurse practitioners. We then explore the concerns of practices affiliated with a larger parent organization by assessing whether organizations lose money when they provide primary care services to their PCF beneficiaries at sites outside of the attributed PCF practice but within the organization.

Data sources used in this chapter

This chapter synthesizes findings across the following quantitative and qualitative data sources:

Practice perceptions

- Payment-focused practice interviews, Cohort 2 (n = 16; see Appendix A.1.5)
- Longitudinal practice interviews, Cohort 1 (n = 18; see Appendix A.1.6)
- Practice exit interviews, Cohort 1 (n = 10; see Appendix A.1.3)
- PCF 2023 Practice Portal data, Cohorts 1 and 2 (n = 2,483; see Appendix A.1.1)
- PCF 2023 Practice Survey data, Cohorts 1 and 2 (n = 1,155, 91 percent response rate; see Appendix A.1.2)

Payments to practices

- PCF practice-level payment data (n = 2,479)

Data tools and learning supports

- Claim and claim line feed usage data (n = 2,479)

Payer partners

- Payer worksheet data (n = 17; see Appendix A.1.2)
- Payer interview data (n = 10; see Appendix A.1.8)

How we got here

Throughout this chapter, we draw on data from the PCF Practice Portal, the PCF Practice Survey, interviews with practices and payers, and analysis of PCF payments to develop our understanding of practice experiences in PCF. Understanding how practices are implementing and perceiving these PCF incentives and supports provides a fuller picture of PCF's role in driving primary care transformation and helps to contextualize our estimates of PCF's impact on Medicare beneficiaries' outcomes (see Chapter 5).

Our data collection in 2023 sought to build on our findings from previous reports, which include:

- Two-thirds of Cohort 1 practices earned a positive PBA in 2022, but this adjustment did not offset the downward effect of the PAA on practices' PBPs, which was much more significant.
- Practices characterized the methodology used to calculate the PAA as unfair and in conflict with their goals to provide patients greater access to health care. Practices affiliated with a parent organization often described the goal of increasing access to care within the organization, regardless of where patients receive primary care services. The PAA design, in contrast, incentivizes care delivery at a beneficiary's attributed practice.
- Analyses show that PCF payments were more generous on average than FFS payments, but most practices felt payments were inadequate to implement their planned care delivery changes.

B. To what extent did PCF motivate practices to make care delivery changes?

The PCF Model emphasizes five comprehensive primary care functions to guide practice transformation: access and continuity; care management; comprehensiveness and coordination (including behavioral health and social needs integration); patient and caregiver engagement; and planned care and population health (see Chapter 1 for more detail). As part of their participation in PCF, practices agreed to meet a limited set of care delivery requirements within these five functions, but they generally had flexibility to pursue the strategies and activities they believed were most likely to help them achieve the model outcomes.

On the PCF Practice Survey, we asked practices whether they had made changes to 17 individual care delivery activities across nine domains of primary care since joining PCF (see Exhibit 3.1; more detail is available in Appendix A.1.2). Most of the domains overlapped with comprehensive primary care functions, but we included additional domains related to other activities that were directly related to PCF Model requirements, such as maintaining health IT systems, or supportive of the primary drivers to achieving PCF outcomes identified in the PCF theory of change and

Relevant PCF Model context

Practices were expected to have advanced primary care capabilities before participating in PCF, so we would not expect every PCF practice to want or need to make significant changes to care delivery during or because of PCF. For example, practices coming from CPC+ are likely to have already implemented a care management program and hired key staff, so they may not need to make additional changes related to care delivery or staffing.

PCF Practices may also be making changes motivated by their participation in other value-based contract arrangements and therefore would not indicate that PCF motivated them to make changes.

driver diagram (Center for Medicare & Medicaid Innovation 2021). If a practice reported making a specific change, they were asked whether the change was motivated by PCF goals or supported by PCF payments. In this section, we describe practices' perceptions of whether PCF influenced their decisions to make care delivery changes within each primary care domain, and the degree to which PCF funds supported the changes. Assessing the degree to which PCF motivated care delivery changes provides context for interpreting the role PCF plays in affecting impacts on the outcomes that we analyze in Chapter 5.

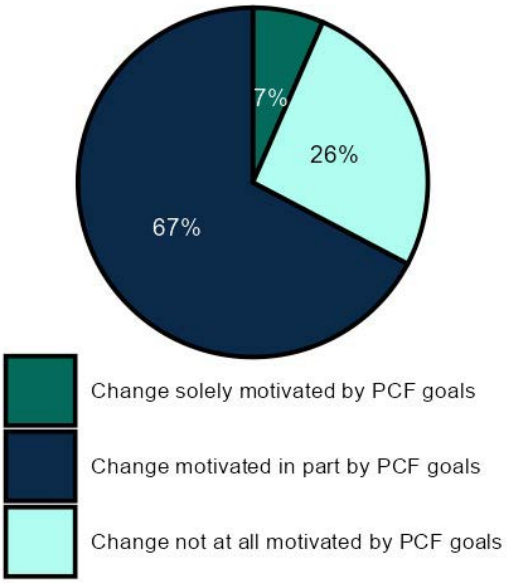
Exhibit 3.1. Care delivery changes practices were asked about in the PCF Practice Survey

Domain	Care delivery changes
PCF Practice Survey items related to primary care functions	
Access and continuity	• Expanded patient access to primary care practitioners via billable care (for example, extending office hours or offering home visits) • Expanded patient access to primary care practitioners via non-billable care (for example, communication via a patient portal or email) • Increased likelihood that patients see their usual primary care practitioner and not another primary care practitioner for face-to-face visits
Care management	• Improved or expanded long-term, proactive, relationship-based care management, provided by a care manager to patients who would most benefit from additional support (sometimes called longitudinal care management) • Improved or expanded short-term care management, often for patients discharged from the hospital or emergency department (sometimes called episodic or transitional care management) • Enhanced outreach to, or care for, high-risk patients or patients with specific conditions or complex care needs, outside of longitudinal or episodic care management
Comprehensiveness and coordination	Behavioral health and health-related social needs • Integrated (or improved integration of) behavioral health into primary care services • Increased screening for patients' health-related social needs • Enhanced capabilities for connecting patients to community resources that can meet their health-related social needs
	Other comprehensiveness and coordination • Refined or enhanced the provision of comprehensive medication management for high-risk patients; this includes action plans, individualized therapy goals, a planned follow-up strategy, and a full medication review • Improved specialist coordination (including collaborative care agreements or e-consults) • Expanded the types of conditions treated or medical services provided at the practice site to reduce referrals to specialty care (for example, conditions like poorly controlled diabetes, or services like point-of-care ultrasound)
Patient and caregiver engagement	• Implemented or improved any process for patients and caregivers to provide feedback to inform practice improvement (such as surveys or a Patient and Family Advisory Council)
Planned care and population health	• Increased use of data to improve care delivery or identify care gaps (such as data from electronic health records or from the CMS or other payers) • Increased the frequency of or started conducting regular structured team meetings to improve team-based care or promote practice change
PCF Practice Survey items related to secondary drivers and PCF Model requirements	
Staffing	• Increased the number of primary care practitioners on staff
Health IT	• Enhanced health IT capabilities

Source: Mathematica's analysis of PCF Practice Survey data (2023). Total N = 1,155 (both cohorts).
IT = information technology; PCF = Primary Care First.

PCF practices typically reported that care delivery changes they have made since joining PCF were only partially motivated by PCF goals. On average, two-thirds of the care delivery changes PCF practices reported making since joining PCF were motivated in part by PCF, according to responses to the PCF Practice Survey (Exhibit 3.2). Yet practices rarely reported that the changes they made were motivated solely or mostly by PCF goals, and occasionally reported that their changes were not at all motivated by PCF goals. In interviews, most practices said that although they were making changes for PCF, they likely would have made similar changes to help them meet the requirements of other value-based contracting arrangements. These findings suggest that PCF motivation can be characterized as having a broad reach but limited direct influence; although most practices reported that they were at least somewhat motivated by PCF, PCF was rarely the sole factor in practices' decisions to make care delivery changes.

Exhibit 3.2. Most changes were motivated in part by PCF



Together with PCF, the goals and incentives of other value-based contracting arrangements[4] also motivated practice's decisions to change care delivery. Nearly all (92 percent) of PCF practices reported participating in at least one other value-based contracting arrangement such as ACOs, commercial value-based care programs with shared savings or risk, or other CMS models like Bundled Payments for Care Improvement Advanced. Among practices participating in other value-based contracting arrangements, 91 percent reported that they were making care delivery changes to support PCF and other programs at the same time. In interviews, half of practices noted they made payer-agnostic resource allocation decisions for all patients rather than focusing solely on Medicare beneficiaries attributed to PCF. For example, practices' descriptions of how they delivered longitudinal care management or conducted social needs screenings were similar, whether or not they were motivated to

> "When we got into value-based care and shared savings and these different programs, we started treating every patient the same. It didn't matter what insurance. Or even our self-pay patients, they get the same care as our Medicare and shared savings and PCF patients. We're looking at the quality measures at every appointment."
>
> — PCF practice office manager

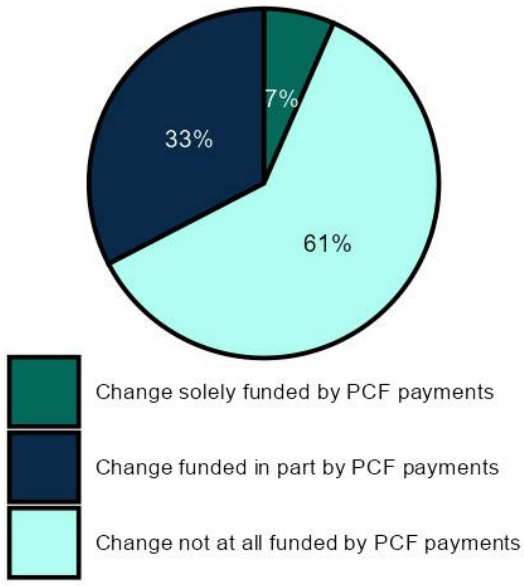
[4] On the PCF Practice Survey, PCF practices responded to the question: "Does this practice site participate in other value-based programs (for example, through a public or commercial insurer or as part of an ACO, including the Medicare Shared Savings Program)?"

do so by PCF goals. In other words, these practices noted that they would have made these changes even if they were not participating in PCF.

Consistent with our findings from 2022, more than three-quarters of interviewed practices reported that the goals and incentives of the other value-based contract arrangements they are participating in were broadly aligned with PCF, even if specific payment approaches or measure specifications differ. For example, in both interviews and the portal, about half of practices reported participating in a value-based contract with some kind of shared savings arrangement, but fewer practices reported participating in programs or models with shared risk or capitation. From the practice perspective, the alignment in goals and incentives across value-based contract arrangements is beneficial because it allows clinicians and administrators to spend less time on reconciliation of requirements and metrics across initiatives and more time on care delivery that meets patients' needs.

Although most PCF practices said some of their care delivery changes were motivated in part by PCF, in most cases, practices reported that these changes were not funded by PCF payments (Exhibit 3.3). On average, only around one-third of the care delivery changes PCF practices reported making since joining PCF were funded in part by PCF payments (Exhibit 3.3). Practices very rarely reported the changes were funded solely by PCF payments, and most practices reported that their care delivery changes were not at all funded by PCF payments. Our survey did not distinguish between larger- and smaller-scale changes, so there is likely variation in the level of funding required to support each type of change, and we would therefore not necessarily expect all care delivery changes to be supported by PCF payments.

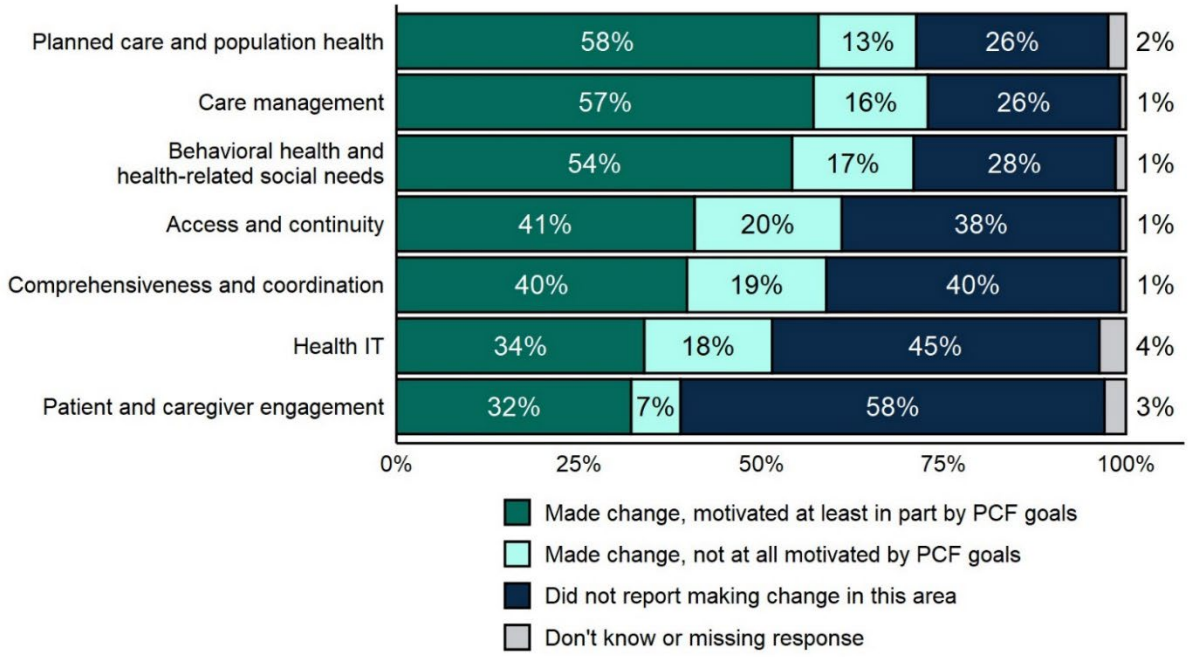
Exhibit 3.3. Most changes were not funded by PCF



In terms of specific care delivery function changes, more than half of PCF practices were motivated by PCF goals to make changes to care management (Exhibit 3.4). Since 2021, practices have consistently reported that longitudinal and episodic care management are their primary strategies for reducing acute hospitalizations, underscoring additional motivation for making these changes. Within care management, practices specifically reported being at least in part motivated by PCF goals to improve or expand episodic and longitudinal care management (46 and 45 percent, respectively), and to enhance outreach to patients with complex care needs (43 percent).

More than half of PCF practices were motivated by PCF goals to make changes to planned care and population health, and behavioral health and health-related social needs integration. In previous years, interviewed practices consistently reported making changes related to comprehensiveness and coordination, including to integrating behavioral health, addressing health-related social needs, and coordinating care with medical specialists, and practices anticipated these changes could help reduce acute hospitalizations and total cost of care. In the PCF Practice Survey, practices reported being motivated by PCF goals to enhance their capabilities to meet patients' health-related social needs by connecting them to community resources (42 percent), to increase screening for patients' health-related social needs (40 percent), and to improve behavioral health integration into primary care (30 percent; see Appendix B.2). Within planned care and population health, 53 percent of practices specifically reported being motivated at least in part by PCF goals to increase their use of data to improve care delivery or identify care gaps.

Exhibit 3.4. Practices most commonly reported being motivated by PCF goals to make care delivery changes related to planned care and population health, care management, and behavioral health and health-related social needs



Source: Mathematica's analysis of PCF Practice Survey data (2023). Total N = 1,155 (both cohorts).

Note: The exhibit shows a combined count of practices who responded yes to "Changes motivated solely or mostly by PCF goals" or "Changes motivated in part by PCF goals." If a practice reported that PCF goals solely or in part motivated change to any care delivery activity in a domain, they are counted in the "made change motivated by PCF goals" bar for that domain. Some rows might not sum to 100 because of rounding.

IT = information technology; PCF = Primary Care First.

C. To what extent were care delivery changes supported by PCF payments?

The main components of the PCF payment model include a total primary care payment consisting of a PBP and an FVF for certain primary care services, as well as a PBA tied to outcome measures and a PAA (Exhibit 3.5). Practices receive an FVF for face-to-face or telehealth primary care visits with attributed beneficiaries for select E&M services and various services related to care planning and management (Appendix B.3). The PBP is a prospective monthly payment that practices receive quarterly for each beneficiary attributed to the practice. The PBP was adjusted by the practice's quarterly PAA beginning in July 2022 for Cohort 1 practices and July 2023 for Cohort 2 practices.

The PBA is an adjustment to the total primary care payment based on performance and improvement among attributed Medicare FFS beneficiaries on acute hospital utilization (for practices in risk groups 1 and 2) or total per-capita cost (for practices in risk groups 3 and 4), and Quality Gateway measures, which include all qualifying patients regardless of payer. The PBA took effect in April 2022 for Cohort 1 practices and April 2023 for Cohort 2 practices.

Exhibit 3.5. The PCF payment model replaces the Medicare fee schedule with a population-based approach for some primary care services

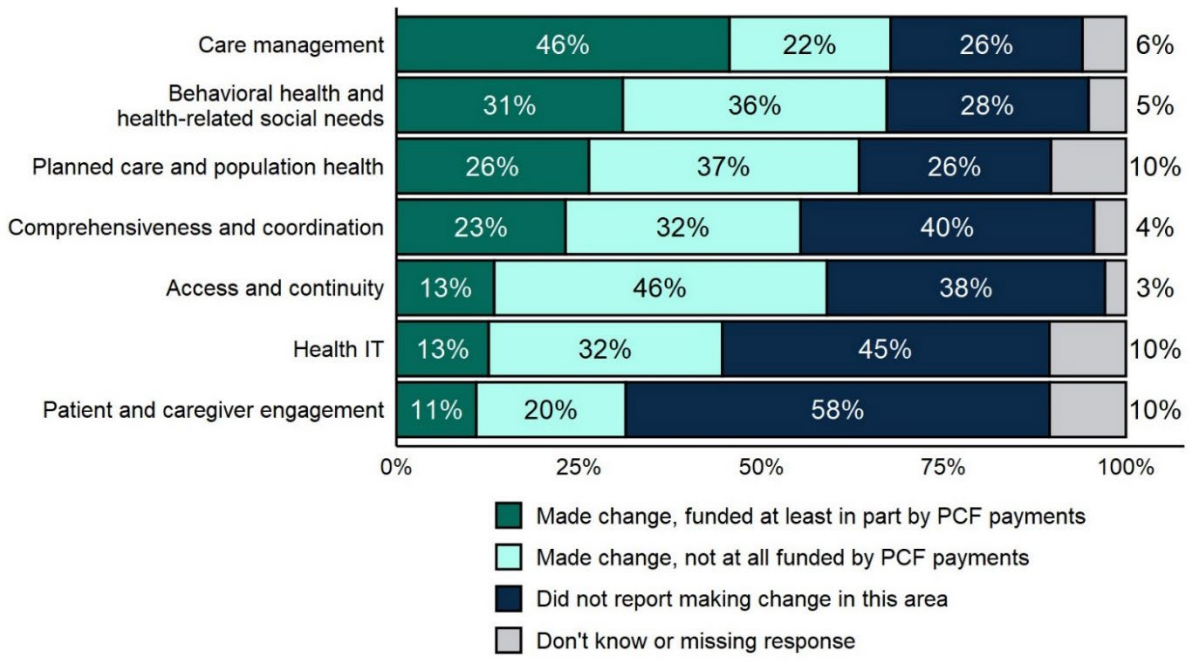
Components of the PCF total primary care payments to practices
Population-based payment (PBP)
• A prospective monthly payment (paid quarterly) for each beneficiary attributed to the practice • Amount varies by risk group, from $28 per beneficiary per month for risk group 1 to $175 for risk group 4 • Adjusted by geographic location, PBA, PAA, Merit-based Incentive Payment System performance, Medicare sequestration, patients seeking primary care outside the practice, and retrospective debits for beneficiaries who become ineligible during the quarter
Payment accuracy adjustment (PAA)
• A quarterly adjustment to the PBP to improve its accuracy starting in quarter 3 of the second performance year • Based on the number of certain primary care services that attributed beneficiaries received outside the practice as a percentage of all qualifying services • Based on a rolling one-year period of service dates, which is lagged to allow for claims processing time
Flat visit fee (FVF)
• A flat payment for certain face-to-face or telehealth primary care visits with attributed beneficiaries • The national FVF base rate of $40.82 is adjusted by geographic location, Merit-based Incentive Payment System performance, Medicare sequestration, beneficiary cost-sharing (based on the original fee-for-service allowed amount), and the PBA
Performance-based adjustment (PBA)
• A quarterly adjustment to the PBP and FVF to reward or penalize practices based on performance • Based on performance on acute hospital utilization (practices in risk groups 1 and 2) or total per-capita cost (practices in risk groups 3 and 4) relative to the national benchmark, peer region group benchmark, and their own historical performance • To be eligible for a positive PBA, practices must meet the minimum performance threshold on a set of Quality Gateway measures

PCF = Primary Care First.

Practices most frequently reported using PCF funds to support changes to care management (Exhibit 3.6). In line with practices' consistently identifying care management as a primary strategy for reducing acute hospitalizations, nearly half of practices reported that changes to their care management activities were funded at least in part by PCF payments. For example, a little over one-third of practices (37 percent) used PCF funds, either solely or in part, to support improvements to episodic or longitudinal care management (see Appendix B.2).

Nearly all PCF practices came into the model with existing care management programs, and PCF practices appeared to continue prioritizing using PCF funds to support care management improvements over time. In interviews, practices largely described using PCF funds to sustain existing care delivery investments that they started before joining PCF. A couple of practices mentioned using PCF funds to add staff to improve patient care, such as adding a case manager or staffing the population health department (see Chapter 4 for more information about staffing changes).

Exhibit 3.6. Overall, most practices did not report that PCF payments funded their care delivery changes, but nearly half of practices did say PCF funds supported their changes to care management



Source: Mathematica's analysis of PCF Practice Survey data (2023). Total N = 1,155 (both cohorts).

Note: The exhibit shows a combined count of practices who responded yes to "Changes supported solely or mostly by PCF payments" or "Changes supported in part by PCF payments." If a practice reported that PCF payments solely or in part supported change to any care delivery activity in a domain, they are counted in the "made change funded by PCF payments" bar for that domain. Some rows might not sum to 100 because of rounding.

IT = information technology; PCF = Primary Care First.

More than half of PCF practices reported that the model payments themselves were insufficient to support care delivery changes. Only about one-third of PCF practices indicated that PCF payments were adequate, considering the amount of work PCF required. In interviews, some practices expressed a desire to make investments to provide other services at the primary care practice (such as diabetic eye screenings) or add additional staff (such as a social determinants of health navigator or a case manager) but said they were unable to do so because PCF payments alone were insufficient to support these changes.

> "We absolutely need to grow the infrastructure of our practice support team. Just recently [we] had to deny approval of a new position for a navigator to help with some of the [social determinants of health] functions. And, unfortunately, we've having to pay RNs to do clerical functions in supporting our patients with their [social determinants of health] needs, where—had we continued even at the lowest incentive—it would've allowed us to grow those resources."
>
> — Population health manager

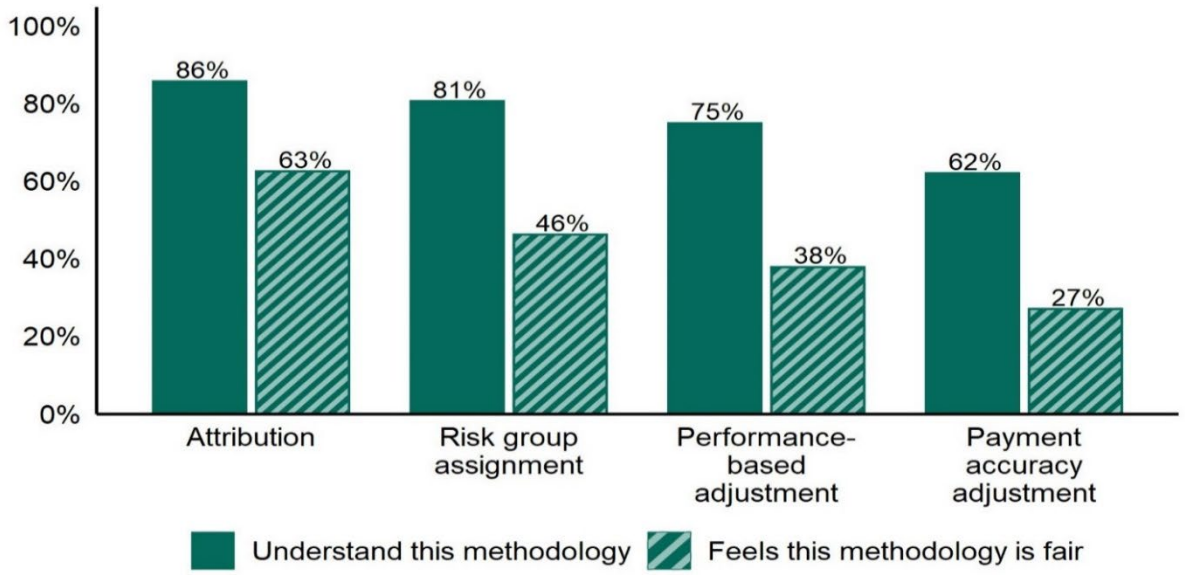
Practices in risk groups 3 and 4 were more likely to report that PCF payments were adequate than practices in risk groups 1 and 2. When designing the PCF Model, CMS anticipated that practices in higher risk groups will on average receive larger payments than they otherwise would under FFS to compensate for the additional resources needed to serve patients with complex needs and multiple chronic conditions. Practices in lower risk groups would likely receive payments similar to what they would receive under FFS. However, in both the first and second annual reports, we reported that average PCF payments for certain primary care services were higher than payments would have been under FFS across all risk groups (Conwell et. al, 2022; Schurrer et. al, 2024). Compared to FFS, estimated PCF payments in 2022 before applying the PBA were 29 percent higher for risk group 1, 57 percent higher for risk group 2, and more than twice as high for risk groups 3 and 4. Accordingly, in 2023 portal data, 43 percent of risk group 3 and 4 practices reported that payments were adequate, compared with 31 percent of risk group 1 and 2 practices.

Practices in risk groups 3 and 4 also reported being more motivated by PCF to make changes to their care delivery activities and more often reported using PCF funds to support changes in some areas of primary care than practices in risk groups 1 and 2. Specifically for access and continuity and planned care and population health, about three quarters of risk group 3 and 4 practices reported that PCF motivated their care delivery changes compared with 40 percent and 58 percent of risk group 1 and 2 practices, respectively. Similarly, about 40 percent of risk group 3 and 4 practices reported using PCF funds to support changes to access and continuity and planned care and population health, compared with 13 percent and 26 percent of risk group 1 and 2 practices, respectively.

D. Practices' perceptions of the PCF Model payment components and methodology

Most practices reported that they understood the components of the PCF payment methodology, but few perceived the components as fair. In portal data, the percentage of practices' reporting comprehension of payment model methodology ranged from a high of around 90 percent for attribution to a low of about 60 percent for the PAA (Exhibit 3.7). Perceived fairness was lower for each component—about two-thirds believed attribution was fair, and less than half perceived other model components as fair.

Exhibit 3.7. Practices' perceptions of the PCF payment model components



Source: Mathematica's analysis of care delivery changes from PCF Practice Portal data collected in 2023 at the end of practices' second year (Cohort 2) and third year (Cohort 1) of participation in PCF. Total n = 2,483.

Note: These percentages include practices that either strongly agreed or agreed with each statement.

PCF = Primary Care First.

Only about one-quarter of practices reported that the PAA was fair. This aligns with findings from the second annual report, where many interviewed practices perceived the PAA as a penalty rather than a recoupment of Medicare overpayments for primary care services that had been reimbursed twice: both covered under the PBP and paid at the full FFS rate to non-PCF providers that furnished the services. In 2022, practices also perceived the PAA as unfair because nurse practitioners working in specialty care may bill E&M primary care service codes and be categorized with a specialty code that is eligible for the PAA. As a result of practice feedback regarding how the PAA methodology treats mid-level providers, CMS changed the PAA calculation in 2022 to remove Physician Assistant and certain Nurse Practitioner National Plan & Provider Enumeration System taxonomies from contributing to the

PAA.[5] However, practice perceptions of the PAA remained consistent despite these changes. In 2023 interviews, practices similarly believed high PAA rates were because of patients being seen by nurse practitioners working in specialty care.

In the PCF Practice Survey, only one-third of practices reported that the PBA was fair. In interviews, practices pinpointed the PECS, which is one of the Quality Gateway measures, as contributing to a neutral or negative PBA. Specifically, respondents reported it was difficult to show improvements on the PECS for various reasons, including survey fatigue and language barriers, which made it challenging to get patients to respond. In the second performance year, which these practices were in at the time of these interviews, failing the Quality Gateway led to a practice receiving a neutral adjustment. To help address this concern, CMS changed the PECS measure benchmark, so it is now adjusted based on historical PCF performance instead of a static benchmark.

> "[The PECS is] very subjective. You can have patients who are upset about something that happened, say, in specialty, and they will give you a negative rating just because this has been their first opportunity to vent their spleen… it's very nebulous, and it's hard to impact. Do we want to spend time trying to come up with campaigns to try to change people's mindset about their experience, or do we want to get in there and take better care of the patient medically?"
>
> — Director of quality

Although more than half of practices reported in the portal that they did not think their risk group assignment was fair, most interviewed practices acknowledged that their risk group assignment accurately reflected the acuity of their patient panel or the average HCC scores of their attributed beneficiaries. In PCF, practice risk group assignments are based on the average HCC scores of their attributed beneficiaries—a *population*-based risk score. This contrasts with past models, such as CPC+, in which payments were adjusted based on *individual* patient risk scores. Because a PCF practice's risk group assignment affects its PBP, practices noted that even when they care for a small proportion of very sick patients, those patients are unlikely to change their practices' overall risk group assignment to receive higher payments.

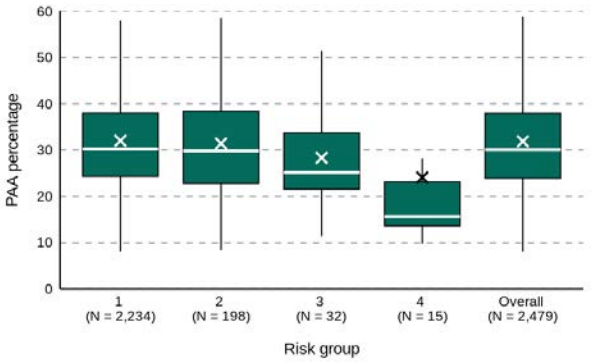
In interviews, practices had mixed perceptions of PCF's methodology of using population-based risk scores as opposed to individual patient risk scores. One-quarter of interviewed practices favored payments based on population-based risk scores, such as in PCF, because it mitigates payment fluctuations based on patients' health status, which can change quickly, and allows practitioners to spend more time with patients. These practices shared that PBPs are more predictable. About one-third of interviewed practices perceived payments based on individual patient risk scores, such as in CPC+, as having more flexibility for nuances and complexity of individual patients than population-based risk scores. These practices perceived payments based on patient risk scores as better allowing them to focus on a subset of a patient panel rather than having to average out the services they provide.

[5] Physician Assistants are excluded from the PAA (both the General [363A00000X] and Medical [363AM0700X] National Plan & Provider Enumeration System (NPPES) taxonomies. Nurse practitioners registered under the Acute Care [363LA2100X] and Women's Health [363LW0102X] NPPES taxonomies were excluded from the PAA.

E. Variation in PCF payments over time

Across all PCF practices and consistent with prior years, the PAA reduced the PBP by at least 30 percent on average. The mean PAA percentage in 2023 for all practices was 32 percent, and most practices received a PAA between 24 and 38 percent (Exhibit 3.8).[6] In 2022, Cohort 1 practices received a PAA for the first time starting in quarter 3, and the mean PAA percentage was 34 percent; most practices received a PAA between 25 and 42 percent. Practices in risk groups 1 and 2 had larger adjustments relative to practices in risk groups 3 and 4. Some of the variation in PAA reduction in risk groups 3 and 4 might be a function of their small sample sizes and the fact these practices tend to serve sicker patients who may visit out-of-office specialists more frequently (for example, practices focused on providing end-of-life care), though practices in risk groups 3 and 4 serve a different patient population than practices in risk groups 1 and 2.

Exhibit 3.8. PAA reduced total PCF payments for all practices by a mean of 32 percent



Source: Mathematica's analysis of 2023 PCF payment data to Cohort 1 and Cohort 2 practices.

Notes: The boxes show the 25th percentile, median, and 75th percentile of PAA rates for PCF practices (Cohorts 1 and 2) in 2023, and the X shows the average PAA for each risk group in 2023. We restricted to practices that were active as of the end of 2023 (N = 2,479).

PAA = payment accuracy adjustment; PCF = Primary Care First.

In addition, PAA amounts were relatively stable over time, and practice staff felt they had little control over the PAA. Overall, practices' PAAs were relatively stable across 2023, with 80 percent of practices experiencing either minor reductions (up to about 2 percentage points per quarter) or modest increases (up to about 3 percentage points per quarter). On average, practices saw their PAA in 2023 increase by about one percentage point per quarter, measured across quarters in which they received the PAA (Exhibit 3.9).

Consistent with this finding and with what was reported in the prior year (for Cohort 1), interviewed practices struggled to estimate the PAA because of challenges with data tools and confusion about the methodology. In addition, they perceived having very little control over the PAA. About one-third of interviewed practices reported that they do not believe they can control the PAA for a variety of reasons, including the inability to affect whether patients see nurse practitioners—who are subject to the PAA and can bill using office visit E&M codes despite providing specialty care—when they access specialty care, and challenges understanding available data to identify who contributes to leakage by accessing out-of-practice care. Moreover, some strategies that may be intended to increase access to care may unintentionally increase the PAA, such as patients receiving care from a non-PCF practice site that is part of the same organization (for example, walk-in clinic or after-hours care), which are

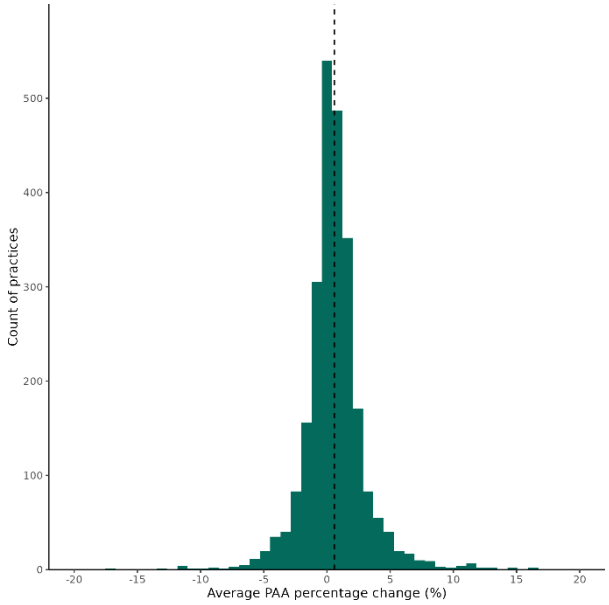
[6] The PAA was first applied for Cohort 2 practices in Q3 of 2023. The average PAA reflects only the quarters in which the PAA was applied.

categorized as out of practice if the services are not performed by practitioners on the PCF practice roster.

Few practices reported implementing strategies to improve the PAA, though some reported educating patients to call the practice before accessing acute care and offering same-day appointments, believing that these strategies might reduce out-of-practice care. Ultimately, because practices experienced challenges identifying how to improve and predict the PAA, this contributed to the perception that they are unable to predict PCF payments in future quarters because the PAA is applied to the PBP and reduces the total payment amount even if the practice meets the Quality Gateway.

The PAA was designed to incentivize a sustained practitioner-patient relationship and prevent CMS from paying twice for the same service, once through the PBP to the PCF practice and once through FFS payment at another primary care practice. This is not, however, how interviewed practices perceived the PAA. Some practices affiliated with larger parent organizations felt PCF's inability to account for patients receiving treatment from clinicians outside of a patient's attributed practice, but within the same organization or system, was a limitation of the model's design (see the In Focus: Payment accuracy adjustment study below for an investigation of these concerns). These practices shared that PCF's focus on a single practice site within an organization does not align with the organizational desire to provide greater access to care and that the PAA should allow more flexibility when services are provided within the same organization, rather than focusing on services from a list of specific practitioners. Because of this, practices perceived the PAA as a penalty, despite findings that model payments (with the PAA applied) are higher than fee-for-service payments for the same services, as reported in the second annual report.

Exhibit 3.9. The PAA was relatively stable for practices in 2023



Source: Mathematica's analysis of 2023 PCF payment data to Cohort 1 and Cohort 2 practices.

Notes: The histogram shows the average PAA rate change for PCF practices in 2023 (for Cohort 1 practices, this is the average of the percentage change from Q1 2023 to Q2 2023, Q2 to Q3 2023, and Q3 to Q4 2023; for Cohort 2 practices, this is the percentage change from Q3 2023 to Q4 2023). We restricted to practices that were active as of the end of 2023 (N = 2,479). The dotted line represents the mean PAA rate change across all practices.

PAA = payment accuracy adjustment; Q = quarter.

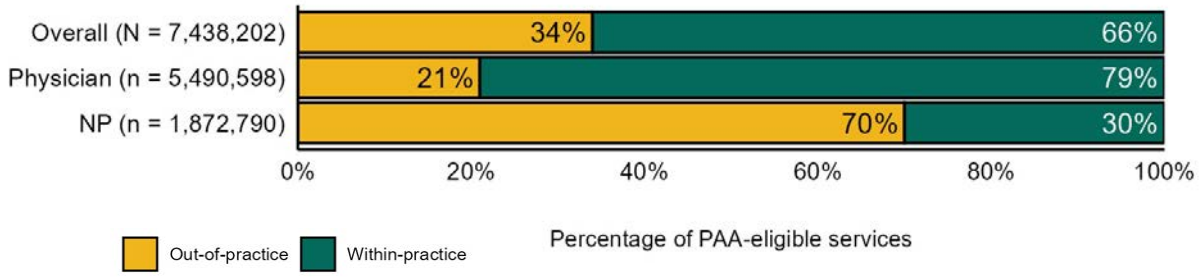
IN FOCUS

Payment accuracy adjustment

In interviews, participating practices noted two primary reasons for perceiving the PAA as unfair. First, because of challenges identifying the specialty of nurse practitioners using administrative data, specialty visits with nurse practitioners may count as primary care services when calculating the PAA. Second, primary care services provided outside the PCF practice but within other affiliated parent organization practices count against PCF practices in the PAA. We examined the influence of these two issues on PAA rates and reimbursement by assessing (1) sensitivity of the PAA to including nurse practitioners and (2) whether organizations lose money when they provide primary care services to their PCF beneficiaries at sites outside the attributed PCF practice. We analyzed PAA-eligible services in 2022 because these were used to calculate the PAAs applied in the third quarter of 2023, the first quarter that PAAs were applied for both cohorts. For more detail on the PAA analysis methodology, refer to Appendix A.2.2.

Nurse practitioners were substantially more likely than physicians to provide out-of-practice care, supporting concerns about primary care services delivered by misclassified specialty nurse pracitioners counting as out-of-practice primary care services in the PAA. Among all PAA-eligible primary care services delivered in 2022, 70 percent of services delivered by nurse practitioners were out of practice, compared with just 21 percent of services delivered by physicians (Exhibit 3.10). This trend was consistent across all nurse practitioner specialty designations eligible for the PAA (Appendix B.4.1). The current PAA methodology uses the National Plan and Provider Enumeration System to identify specialty, but that system's specialty designations do not reliably identify the type of care nurse practitioners deliver. One study found that just under half of nurse practitioners billing E&M or preventive services for at least 50 Medicare beneficiaries in 2019 were in fact specialty clinicians, based on other services billed (O'Reilly-Jacob et al. 2023). Office E&M visits conducted by nurse practitioners with any of the specialty designations included in the PAA are assumed to be primary care visits, which may not be the case. In the absence of administrative data that reliably differentiates between primary care

Exhibit 3.10. Out-of-practice versus within-practice PAA-eligible services by provider type

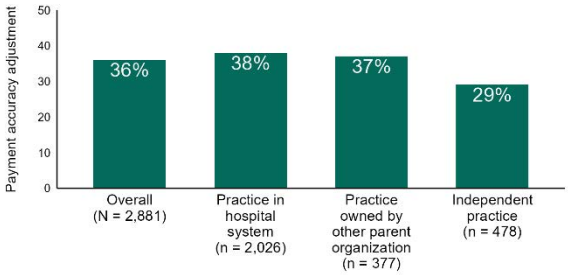


Source: Mathematica's analysis of 2022 Medicare fee-for-service claims data (N = 2,881 practices).
Note: Clinical nurse specialist and other provider types not shown. NP = nurse practitioner; PAA = payment accuracy adjustment.

and specialty care nurse practitioners, it is not possible to know the proportion of out-of-practice primary care services nurse practitioners provided. If PCF beneficiaries received out-of-practice primary care from nurse practitioners at the same rate they received it from physicians (that is, if only 21 percent of services provided by nurse practitioners were truly out-of-practice, in line with the proportion of out-of-practice services provided by physicians), the mean PAA would decrease by 9 percentage points, from 36 percent to 27 percent (Appendix B.4.2).

Data did not support concerns that the PAA penalizes health care provider organizations for expanding PCF beneficiaries' access to care at non-PCF practices. On average, the PAA was indeed higher among practices affiliated with a parent organization than among independent practices (Exhibit 3.11). Among practices affiliated with hospital systems, on average, almost 40 percent of out-of-practice services for attributed beneficiaries were conducted within the broader organization, defined by the TIN (Appendix B.4.2).

Exhibit 3.11. Payment accuracy adjustment by practice affiliation



Source: Mathematica's analysis of 2022 Medicare fee-for-service claims data (N = 2,881 practices).

For each PCF-affiliated organization, we compared current reimbursement for PCF-attributed beneficiaries (that is, the organization receives an FVF and PAA-adjusted PBP for primary care services at the PCF practice and Medicare FFS reimbursement for primary care services at non-PCF practices within the organization) with a hypothetical scenario in which PCF practices retained all within-organization primary care for attributed beneficiaries (that is, the organizations receive an FVF and lower PAA, resulting in a higher PBP). On average, organizations were reimbursed $1.10 PBPM more for out-of-practice primary care visits within the organization compared with primary care visits provided by the attributed practice (Exhibit 3.12, Appendix B.4.3), despite model payments being higher on average than fee-for-service for the same set of services (as described in the second annual report).

Exhibit 3.12. Average organizational reimbursement, per beneficiary per month

Current reimbursement, including PAA	$44.32
Primary care retained by PCF practices (hypothetical scenario with lower PAA)	$43.22
Mean difference	$1.10

Source: Mathematica's analysis of 2022 Medicare FFS claims, OneKey, and practice application data.
Note: N = 2,276 non-independent practices corresponding to 429 organizations.
FFS = fee for service; PAA = payment accuracy adjustment; PCF = Primary Care First.

Still, even if the parent organization does not lose money by offering PCF beneficiaries care at its other non-PCF practice sites, the PCF practices themselves might lose revenue through the higher PAA rate if the parent organization does not share FFS revenue received for the non-PCF practice primary care visits.

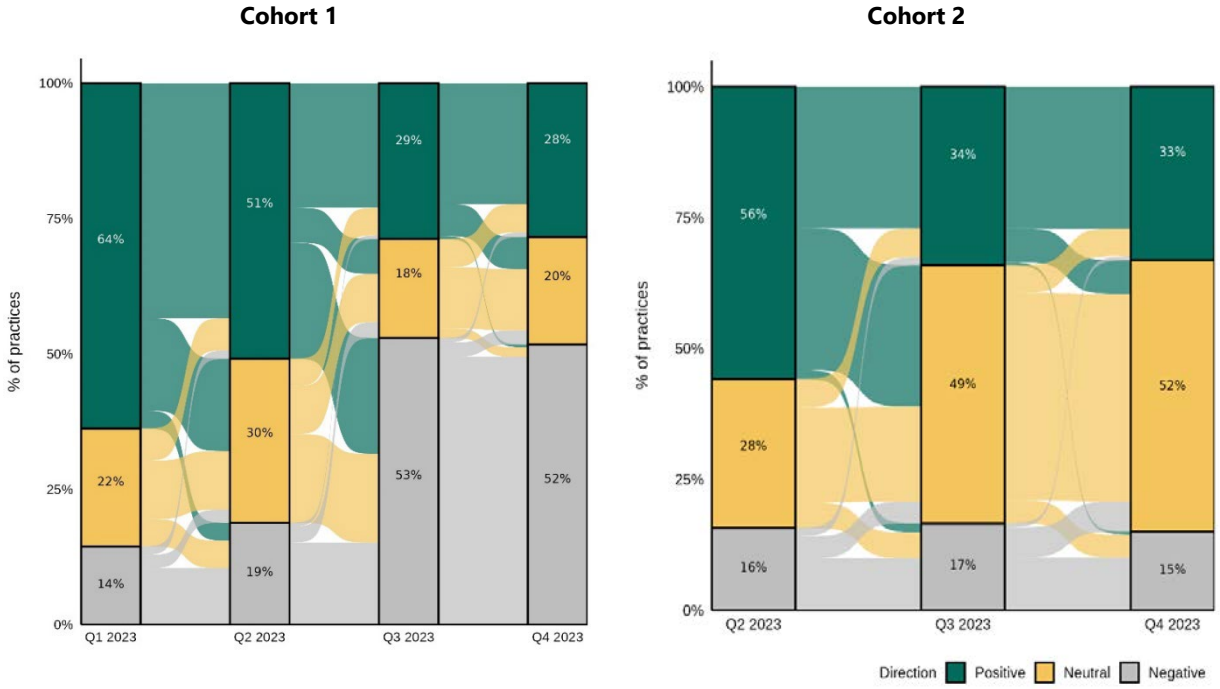
Over time, fewer practices earned positive PBAs because of the design of the incentive. As described in Chapter 1, the PBA adjusted the model's primary care payments (both PBP and FVF) for practices' performance in the previous year on a series of quality and health care service use measures. Practices received the PBA quarterly, starting in quarter 2 of performance year 2 (2022 for Cohort 1 and 2023 for Cohort 2), based on their measured performance during a rolling 12-month period beforehand. In other words, the first PBA, paid in quarter 2 of performance year 2, reflected practices' performance during the 12 months corresponding to January to December of performance year 1.

By design, the threshold for receiving a positive PBA became higher between performance year 2, when the PBA started, and performance year 3. The main difference between PBAs in performance years 2 and 3 was how the PBA affected practices that failed the Quality Gateway, which is a series of quality measures and includes performance on the PECS. Starting in the third quarter of performance year 2, practices failing the Quality Gateway received a maximum PBA of 0 percent (neutral PBA). However, starting in the third quarter of performance year 3, practices failing the Quality Gateway received an automatic PBA of negative 10 percent. Additionally, CMS assumes that all practices passed the Quality Gateway when assessing the PBA for earlier quarters, because Quality Gateway information is not available at the beginning of each year.

The effect of the automatic adjustments and assumption that practices pass the Quality Gateway can be observed among Cohort 1 practices, which were in performance year 2 in 2022 and performance year 3 in 2023. As mentioned in the second annual report, about 60 percent of Cohort 1 practices earned a positive PBA from CMS in the second half of 2022. This proportion fell over time, and, by the second half of 2023, just under 30 percent of Cohort 1 practices received a positive PBA. Additionally, practices that fail the Quality Gateway contribute to the increase in negative or neutral PBAs in later quarters relative to earlier quarters in each performance year. In 2023, the percentage of Cohort 1 practices receiving a negative PBA rose from 19 percent in quarter 2 to 53 percent in quarter 3, in part because of how the PBA is assessed (Exhibit 3.13).

Cohort 2 practices were in performance year 2 in 2023, and Cohort 2 practices that did not pass the Quality Gateway automatically received a neutral PBA starting in quarter 3. Between quarters 2 and 3 of 2023, the percentage of Cohort 2 practices receiving neutral PBAs increased from 28 to nearly 50 percent (Exhibit 3.13).

Exhibit 3.13. Most PCF practices saw their PBA amounts decrease significantly in 2023



Source: Mathematica's analysis of 2023 PCF payment data to Cohort 1 and Cohort 2 practices.

Notes: We restricted to practices that were active as of the end of 2023 (N = 2,479). The PBA went into effect in Q2 2022 for Cohort 1 and Q2 2023 for Cohort 2. The diagram shows how the proportion of positive, negative, and neutral PBAs changed from one quarter of 2023 to the next. The three stacked bars (one for each quarter) show the proportion of practices earning a positive, negative, and neutral PBA in each quarter. In between the bars, flows show how each category feeds into the subsequent quarter. For example, starting with practices with a negative PBA in quarter 2 (the gray piece of the leftmost bar), the flow depicts the proportion that (1) remained negative, (2) changed to neutral, and (3) changed to positive in quarter 3.

PBA = performance-based adjustment; PCF = Primary Care First; Q = quarter.

In interviews, practices felt unable to improve their PBA performance. One-quarter of practices said they were not making efforts to improve their PBA because they had limited understanding of the PBA methodology or did not believe they could control the factors contributing to their performance adjustment. For example, senior administrators at one practice mentioned challenges parsing the acute hospital utilization data to identify strategies for improvement. Those that tried to improve their PBA focused on raising awareness among staff about their quality metrics performance. Others tried to focus on specific components of the PBA such as (1) avoiding potentially preventable admissions by having patients call the practice before accessing acute care or (2) improving the practices' performance

> "So, I'm looking at our PBA comparison and the first benchmark is [acute hospital utilization] and [the practice] passed it but that one is always going to be a groaner. We have a million committees and work groups working on acute hospital utilization, readmissions…and it is really hard to affect from a primary care office."
>
> — Practice transformation coordinator

on the Quality Gateway by reminding patients of the PECS and that they would help the practice by completing it.

PCF payer partners made minimal changes to their PCF approach in 2023, and the lack of more robust payer partner participation likely reduces the scale and scope of changes PCF practices can implement across their patient panel

- The number of payer partners in PCF has continued to be modest, especially in comparison to CPC+. Though 23 participated in the model at some point, six have withdrawn as of 2023, and one more payer paused their participation because of few participating PCF practices in their region.
- Because PCF payer partners' reach is limited at the national and regional levels, we expect practices will have fewer resources and support to implement PCF-related changes for a larger proportion of their patients.
- By the third year of model implementation, we hypothesized that payer partners would have solidified their payment approaches and non-payment supports for PCF. But, similar to 2022, payer partners made no substantial changes to their approaches in 2023, and, overall, made minimal changes specific to PCF over the course of the model.
- Payer partners were largely implementing payment models that predate PCF with tweaks over time, including changes to measure sets or improving data feedback.
- In interviews, payers continued to express a desire for CMS to play a role in offering regional convening and practice facilitator supports.
- More than three-fourths of practices also reported that they did not observe any changes to payers' approaches because of partnering in PCF. Some practices noted that PCF payer partnership did not confer any benefits or challenges because nothing about these payers' contracts has changed.

F. Response to PCF learning supports and data tools

Under the PCF Model, practices are hypothesized to make continuous improvements to patient care, leading to reduced acute hospital utilization, higher quality of care, and reduced overall expenditures. To support these improvements, CMS provides PCF practices with prospective payments; data tools, including claims data and claims line feed (CCLF) data for the attributed patient population; a data feedback tool (DFT);[7] and a range of learning supports, including the PCF Connect website, webinars, newsletters, help desk support, and an annual meeting for practices, payers, and other PCF stakeholders.

More practices accessed claims data in 2023 compared with 2022, but practices' regular use of claims data stayed relatively consistent. In 2023, 69 percent of practices accessed the CCLF at least once, up 12 percentage points since 2022, when 57 percent of practices accessed the CCLF at least once. Like in previous years, large practices and those affiliated with a parent organization that includes a hospital more regularly accessed CCLF data (Exhibit 3.14). In Exhibit 3.14, we separate Cohort 2 practices into CPC+ participants and non-participants because former CPC+ practices may have experiences with CMS data tools more broadly.

[7] DFT usage statistics were unavailable for calendar year 2023.

In 2023, practices with especially high PAAs more regularly accessed CCLF data than practices with lower PAAs. More than half of practices in the highest quartile of PAA rates accessed CCLF data each month, compared with only 33 percent of practices in the lowest PAA quartile. This indicates that the PAA might be driving more practices to access CCLF data, though, as described above, interviewed practices said these data were not helpful in identifying patients accessing out-of-practice care. Because Cohort 2 practices experienced the PAA for the first time in 2023, this might account for some of the overall increase in accessing of CCLF data compared with prior years.

Exhibit 3.14. Practices' regular use of CCLF data stayed relatively consistent in 2023 compared with 2022

Characteristic	Accessed CCLF data every month in 2023 (n = 951)	Accessed CCLF data every month in 2022 (n = 1,003)
Total	38%	35%
Cohort and CPC+ status		
Cohort 1	53%	53%
Cohort 2, CPC+ participant	26%	25%
Cohort 2, CPC+ non-participant	46%	41%
Risk group		
Risk groups 1 and 2	38%	35%
Risk groups 3 and 4	36%	36%
Practice size		
Small (1 or 2 practitioners)	37%	30%
Medium (3 to 9 practitioners)	39%	33%
Large (10 or more practitioners)	54%	49%
Practice affiliation[a]		
Independent	16%	17%
Owned by a health system with a hospital	44%	42%
Owned by some other health care delivery organization	32%	28%
PAA percentage applied to PBP		
Practices with lowest PAA (8% to 24%)	33%	n/a
Practices with second lowest PAA (24% to 30%)	32%	n/a
Practices with second highest PAA (30% to 38%)	36%	n/a
Practices with highest PAA (38% to 98%)	53%	n/a

Source: Mathematica's analysis of data from the 4i datahub audit report for calendar year 2023, the practice roster (2023), and IQVIA (2021) as well as PCF payment data.

Note: PAA is calculated by taking the average of each practices' quarterly PAA (in quarters in which the PAA was applied). n/a indicates that CCLF access was not calculated for a certain characteristic.

[a] Excludes two practices for which we are missing data on affiliation in the IQVIA database.

CCLF = claims and claim line feed; CPC+ = Comprehensive Primary Care Plus, PAA = payment accuracy adjustment; PBP = population-based payment.

Practices reported challenges using the data tools from CMS, consistent with findings from prior years. In longitudinal interviews, about one-third of practices reported using PCF data tools such as the CCLF to determine PAA or attribution and the DFT to understand utilization trends or performance. Some practices noted concerns, however, about the usefulness of the tools. For example, about one-quarter of practices asked about data tools said the CMS data supports (CCLF and DFT) were difficult to use to predict their financial performance in the model because of the complexity of the data and high level of effort required to analyze the data to understand how to make improvements within their practice. Practices also reported difficulty using the DFT to actively manage their patient populations because data are lagged by a full calendar quarter from the end of a rolling one-year measurement period. Similarly, in payment-related interviews, most practices mentioned the need for additional supports from PCF, including more support from CMS to help them understand the data and make improvements, and more information on how to use the DFT and CCLF. Although some practices have advanced analytic capabilities, these practices still struggled to leverage CMS data sources to improve their financial performance. Organizations with multiple practices must also access each practice file individually.

> "I think we've struggled a lot with the CCLF files…We've created this entire program on how to read them, and then we have to upload them for 17 practices. And so we haven't really been able to even access the data that we really need to look at…I can't imagine how an independent primary care group would ever be able to analyze that, because we have to reach out to our data analytics team and have that prioritized with our entire organization, which isn't always easy to do either."
>
> — Program improvement manager

The unpredictability and perceived unfairness of certain payment components underscored the importance of data tools in helping practices improve. The perceived inadequacy of CMS' data supports deepened the sentiment that PCF payments are unpredictable, especially the PAA, because many practices did not feel they had the tools to predict their financial performance in the model, further limiting practices' ability to comprehend the PAA and PBA or identify necessary changes.

4. Care delivery and the trajectories of change among PCF practices

Key takeaways

- Nearly all participating practices remained actively engaged in improving care delivery after their first year in the PCF Model, modifying or sustaining their first-year strategies and even adding new strategies.
- Practices focused on refining their existing care management strategies while also implementing new strategies to improve comprehensiveness of and access to care.
- After their first year in the PCF Model, practices implemented care delivery changes across three categories: workflows, staffing, and data and technology. These changes expanded care, improved care delivery, or achieved both.
- Three factors—strengthening existing infrastructure, learning from experience with other initiatives, and creating community partnerships—helped practices remain engaged in practice transformation after their first year of participation.

A. Introduction

In this chapter, we focus on the care delivery changes practices have made over time to achieve the PCF Model's goals. However, as noted in Chapter 3, some of these changes were likely influenced by factors beyond the PCF Model. We aim to characterize the trajectories in care delivery change, but we cannot disentangle which changes came about from practices specifically responding to the PCF Model. To accomplish this, in 2023, we examined how a group of previously interviewed practices approach practice transformation over time (what we call the trajectory of change). Our goal is to determine the extent to which practices have remained engaged in care delivery transformation (that is, Cohort 1 practices were looking for new ways to achieve the model's goals) after three years of participation. We also describe the specific activities practices implemented to improve care delivery after the first year of participation in the model and the factors that have affected implementation strategies. Finally, we assessed whether there were differences in trajectories of change by practice characteristics.

Using a longitudinal study design, we reinterviewed Cohort 1 practices that we originally interviewed in 2021 and that continued to participate in the model in 2023 (see Appendix A.1.6). We asked the practices to describe their approaches to care delivery in 2021 compared with what they were doing at the time of our second round of interviews in 2023–2024. We supplemented these interview findings with data from the PCF Practice Portal (portal) for nearly all PCF practices from both cohorts at two points in time, representing three years of participation for Cohort 1 and two years of participation for Cohort 2. The combination of these two data sources—along with relevant items from the PCF Practice Survey (fielded in 2023)—provides a nuanced story about practices' implementation strategies over time and their trajectories of change, which was especially important because PCF by design is a flexible

model with care delivery requirements that represent minimum standards of care that practices are expected to deliver.

Data sources used in this chapter

This chapter synthesizes findings across several data sources:

- **Practice interviews.** Conducted interviews with 18 Cohort 1 practices interviewed in 2021 that continued to participate in the model in 2023 (out of 28 practices that originally were interviewed; see Appendix A.1.6).
- **PCF Practice Portal**. Self-reported data from 2,472 out of 2,488 active PCF practices from both cohorts that continued to participate in the model from their first year of participation (2021 for Cohort 1, 2022 for Cohort 2) to 2023 (see Appendix A.1.1).
- **PCF Practice Survey**. Data from a 2023 survey of 1,155 PCF practices (see Appendix A.1.2).

In this chapter, we use certain terms (noted in bold) to denote the three levels of care delivery and characterize the trajectories of change, none of which are mutually exclusive. First, at the highest level, practices could have added or stopped **primary care functions** based on the five functions CMS identified in the PCF driver diagram discussed in Chapter 1. Second, practices could have modified, sustained, added, or dropped individual **strategies** associated with each of the primary care functions. For example, longitudinal and episodic care management are strategies within the care management function.[8] Finally, at the most granular level, we used the term **activities** to describe the specific actions that practices took to implement a strategy. For example, hiring a care manager, increasing the frequency of follow-up visits, or using new data to identify hospital discharges are all activities to improve the episodic care management strategy within the function of care management. Exhibit 4.1 shows the relationships across primary care functions, strategies, and activities.

The interview and portal data provided insight into whether practices were continuing to make care delivery changes. We also relied on interview data to determine whether practices were adding new strategies or dropping old ones during the first three years of the model. In contrast, we cannot determine from the portal data whether practices have added or dropped strategies.[9]

We present the findings in this chapter in the following way. First, in section B, we briefly summarize findings from practice interviews reported in the previous annual reports in a text box, and then we provide evidence to show that most practices remained actively engaged in care transformation by continuing or modifying existing strategies or adding new ones in the second and third year of participation. In section C, we describe three broad categories of activities spanning these strategies that practices implemented after their first year of participation, designed to either expand or improve

[8] The full list of strategies follows: Access, episodic care management, longitudinal care management, risk stratification, health-related social needs, behavioral health integration, referral coordination, patient and caregiver engagement, planned care and population health, and continuous quality improvement. These are based on the PCF Care Delivery Interventions Guide (Center for Medicare & Medicaid Innovation 2020).

[9] Items in the PCF Practice Portal ask about changes to specific activities. The reported data reflect one of three things: whether practices are continuing to make a change to strategies or activities they had previously changed; whether practices made a change to strategies or activities they had not previously changed; or whether practices stopped changing strategies or activities they had previously changed.

the delivery of care. In section D, we conclude by highlighting three factors that have helped practices to remain engaged in PCF over the past three years of the model, all of which took time to put into place.

Exhibit 4.1. PCF practices remained engaged in the model through activities that span strategies aligned with the primary care functions

Primary care function	Strategies	Activities (illustrative examples)
Access		Offered alternatives to office-based care Provide timely access to care during office hours
Care management	Longitudinal care management	Improved or expanded care management processes to help patients manage medical conditions between visits
	Episodic care management	Improved or developed new processes to systematically follow up with patients after hospital discharge or emergency department visit
	Risk stratification	Improved or developed new processes to identify high-risk patients
Comprehensiveness and coordination	Referral coordination	Improved coordination with other providers (for example, home health agencies, pharmacists, specialists)
	Behavioral health integration	Expanded the availability of behavioral health supports provided at the practice site
	Health-related social needs	Increased screening for patients' social needs Improved coordination with community resources to meet patients' health-related social needs
Patient and caregiver engagement and education		Improved advance care planning processes Educated patients and caregivers about alternatives to the emergency department
Planned care and population health	Continuous quality improvement	Developed data-based improvement strategies to guide practice change
	Population health	Addressed care gaps

B. Evidence of continued practice engagement in performance year 2 and performance year 3 of the model

We based our assessment of how engaged Cohort 1 practices are in care delivery transformation on what we describe as their trajectory of change, that is the degree to which (and the specific ways in which) they continued to change their care delivery strategies and activities between performance years 1 and 3 (2021 and 2023). Our interviews with practices led us to identify four types of change trajectories among practices, none of which were mutually exclusive. Specifically, practices described how they did one or more of the following:

1. Continued making changes to strategies or activities that existed in performance year 1 (reported by all practices)
2. Began adding new strategies or activities after performance year 1 (reported by more than 60 percent of practices)
3. Maintained performance year 1 strategies or activities without making further changes to them (reported by half of practices)
4. Discontinued strategies or activities that were implemented or planned in performance year 1 (reported by a couple of practices)

How we got here

The PCF evaluation team conducted its first round of data collection in late 2021 with a diverse sample of Cohort 1 practices. The following are key findings from the 2021 interviews:

- Most practices in risk groups 1 and 2 adopted a multipronged approach built on existing care management strategies to reduce hospitalizations. They had increased access to primary care services or had already integrated behavioral health into primary care services before joining the PCF Model. Several others reported implementing changes or adding new access or behavioral health strategies after joining the model.
- Risk group 3 and 4 practices were already providing high-touch, individualized, and comprehensive primary care services to their patients before joining PCF.
- Key factors associated with successful implementation of the model in 2021 included modified staffing, availability of community-based behavioral health practitioners and social services, health IT tools and interoperability, and affiliation with a larger health care organization. Practices described these factors as facilitators when they had access to them and barriers when they did not.

In addition, we used data from the PCF Practice Portal (which includes practices from both cohorts) to further assess the changes that practices have been making over time. As we describe below, we focused on the areas for which practices have continued to make changes and the areas for which practices have made no further changes since performance year 1.

PCF practices generally showed ongoing engagement in care delivery transformation as they continued—and often modified—their first-year strategies and activities and as they implemented new ones to achieve model outcomes. Most practices followed two or more of the four trajectories of change, underscoring the complex pathways that practices use as they consider their options on how best to deliver care. We describe these four trajectories in this section. Notably, the trajectories grew out of practices' desire to meet the PCF outcomes, but as we discussed in Chapter 3,

practices' involvement in other value-based contracting arrangements and their desire to improve patient care independent of the model also contributed to the changes they made in care delivery during this period. We observed only a few differences based on practice characteristics, as described later in this chapter.

1. Continued making changes to existing strategies or activities

Practices most commonly modified and expanded many of the strategies and activities implemented in their first year of model participation. All interviewed practices described continuing to modify or expand at least one (and often several) high-level strategies they had implemented in year one. Many practices had started PCF by building on existing care management strategies, which they continued to strive to enhance along with other strategies. Specifically, practices frequently discussed continuing to modify strategies under the comprehensiveness and coordination function—including addressing health-related social needs—and the planned care and population health function, with a particular focus on continuous quality improvement. Interviewed practices described how the complexity of the strategies they implemented in the first year contributed to the need for ongoing modifications in the second and third years. For an example of a practice that continued to make changes to implementation strategies, see the text box called Deep dive: A trajectory of change focused on modifying existing strategies at the end of this chapter.

On a more granular level, nearly all PCF practices (97 percent) reported in the portal in 2023 that they continued to change at least one of the care delivery activities that they were changing in their first year of PCF. In fact, about three-quarters of practices reported through the portal that they made changes to most of the activities they were working to improve in their first year of participation. Practices most commonly reported continuing to change activities in the areas of patient and caregiver engagement, access, continuous quality improvement, care management, and health-related social needs (see Exhibit 4.2). Although we cannot determine from the portal data the extent to which practices were making changes, it is important to note that practices in 2023 typically reported that they made just *"some change"* to these activities as opposed to "*a great deal of change*" to those activities (see Appendix B.5).

Exhibit 4.2. Most PCF practices reported they were continuing to change care delivery activities across multiple strategies in 2023 that they reported changing in their first year of PCF

Strategy	Activity	Percentage of practices continuing to make changes to each activity
Patient and caregiver engagement and education	Improved advance care planning processes	75
Access	Educated patients and caregivers about alternatives to the emergency department	62
Continuous quality Improvement	Increased use of available data to improve care delivery	66
Longitudinal care management	Improved or expanded care management processes to help patients manage medical conditions between visits	55

Strategy	Activity	Percentage of practices continuing to make changes to each activity
Episodic care management	Improved or developed new processes to systematically follow up with patients after hospital discharge or emergency department visit	53
Health-related social needs	Increased screening for patients' social needs	54
	Improved coordination with community resources to meet patients' social needs	53

Source: Mathematica's analysis of care delivery changes from PCF Practice Portal data collected at the end of practices' first year of participation in PCF (2021 for Cohort 1, 2022 for Cohort 2) and at the end of 2023 (practices' second year for Cohort 2 and third year for Cohort 1).

Note: N = 2,472. These percentages include activities that practices reported making some changes to and those that they reported making a great deal of change to. This exhibit includes seven strategies because we do not have portal data on risk stratification in either year nor data on behavioral health integration in the first round of data collection. The planned care and population health strategy is limited to continuous quality improvement.

PCF = Primary Care First.

2. Began adding new strategies or activities after performance year 1

Practices are not just relying on the strategies they implemented in the first year of PCF—they are also pursuing new strategies. More than half of practices interviewed reported adding at least one new strategy (and often more than one) after their first year of participation. Over one-third of interviewed practices added strategies focused on improving comprehensiveness of care, such as addressing health-related social needs, integrating behavioral health, and improving coordination of referrals. About one-quarter of practices reported starting new changes or strategies focused on improving access to care, such as adding nurses to support Annual Wellness Visits and staff the phone triage system. Through the phone triage system, nurses answer patients' calls and determine whether they need to go to the hospital and increase the number of available appointments, including telehealth appointments. For an example of a practice that continued to make changes to its implementation strategies, see the text box called Deep dive: A trajectory of change focused on adding strategies at the end of this chapter.

Practices were engaged in wide-ranging efforts to improve care delivery

Through the PCF Practice Portal, most practices (80 percent) reported that they started changing at least one care delivery activity in 2023 that they had not reported changing in their first year of PCF; common examples included increasing patients' access to practitioners via billable and non-billable care, expanding the types of medical services provided at the practice site to reduce referrals to specialty care, and improving coordination with specialists. (These new changes could reflect changes to activities that were already in place before PCF began or brand-new activities created to meet PCF's goals.) Only one out of 10 of the new changes involved "*a great deal of change.*" Most practices reported making just *"some change"* in these new areas.

3. Maintained performance year 1 strategies or activities without making further changes

Practices left some existing strategies unchanged because further changes were unnecessary or because they lacked the resources or faced other barriers to make needed changes. About half of the practices we interviewed said they had stopped making changes to at least one strategy or activity they implemented during their first year of participation. Practices often reported in interviews that these strategies were working well and did not need further changes. For example, practices that developed education campaigns in performance year 1 on when it is appropriate to go to the ED kept this strategy in performance year 3 but did not find it necessary to continually modify their materials. Similarly, other practices reported that their staff continued to adhere to rigid timelines for follow-up and scheduling after hospital discharge.

An even higher proportion of practices reported in the PCF Practice Portal that they had stopped making changes to at least one strategy or activity they implemented during their first year of participation (73 percent).[10] Practices most commonly reported that they had stopped making changes related to advising practice improvements through patient and family advisory councils (25 percent). Similar to interviews, some practices reported that no further changes were needed to their activities or strategies. This most frequently occurred with increasing patients' access to practitioners via non-billable care (an activity that other practices, conversely, reported they were making new changes to), updating care plans for seriously ill patients, and expanding practices' ability to be notified of patient hospital discharges or ED visits. Practices also reported in the portal that, although changes might be needed, they lacked the resources or faced other barriers to making further changes. This most frequently occurred with increasing contact with patients potentially at risk for hospitalizations or ED visits and improving coordination with community resources to meet patients' social needs (see Appendix B.5).

4. Discontinued strategies after performance year 1

Finally, only two interviewed practices said they completely discontinued a strategy they had planned or implemented in performance year 1—largely because of financial pressures. Both practices said they discontinued behavioral health integration, and one also stopped coordinating home podiatry services. The first practice reported that systemwide budget cuts and concerns over providing podiatry services in patients' homes led the practice to stop offering these services. The second practice reported that their system had used PCF funds to provide other practices with a behavioral health specialist, but, at the time of our interview, their own practice did not know when or if they would have access to these services. We do not have information from the portal data on whether practices completely discontinued previously implemented strategies. For an example of a practice that stopped implementation strategies, see the text box called Deep dive: A trajectory of change focused on stopping strategies at the end of this chapter.

[10] We asked interviewed practices about the specific activities they had described when we first spoke to them in 2021. In contrast, the PCF Practice Portal asks practices if they have made changes to a list of 21 activities, which is likely a larger list of activities than discussed in interviews. This difference in how the data were collected likely explains why a greater proportion of practices reported through the portal they had stopped making changes compared to the proportion of interviewed practices that reported stopping activities.

Differences in trajectories of change by practice characteristics

Practices appeared to follow similar trajectories of change: small practices, independent practices, and practices that participated in CPC+, for example, had similar trajectories of change as medium and large practices, practices with a parent organization, and practices that did not participate in CPC+, respectively. We observed only a few differences based on practice characteristics. In the portal, a greater share of practices in risk groups 1 and 2 reported making changes to new activities in 2023 compared with their peers in risk groups 3 and 4. For an example of how a risk group 3 practice evolved its care delivery approach over time, see the case study called Deep dive: Putting patients' wishes and needs at the center of care at the end of this chapter.

Among interviewed practices, the three that made the most additions and changes after performance year 1 were all medium or large practices in risk group 1 with a parent organization (six other organizations in our sample had these same characteristics; see Appendix A.1.6). As an example, all three of these practices added a new strategy to screen patients for health-related social needs and connect them with social services—including hiring patient navigators or licensed social workers who connect patients with resources—which being part of a system helped to facilitate.

From the PCF Practice Portal, we observed some differences based on practice characteristics when it came to changing specific activities in 2023 compared with those practices' changes in the first year of participation. A greater proportion of Cohort 1 practices, risk group 3 and 4 practices, and practices that did not participate in CPC+ reported changing processes that support care management compared with Cohort 2 practices, risk group 1 and 2 practices, and practices that participated in CPC+. In addition, a higher proportion of practices in risk groups 3 and 4 (compared with those in risk groups 1 and 2) and practices affiliated with parent organizations that do not include a hospital (compared with practices that are part of a hospital system) reported expanding the types of medical services provided at the practice site (for example, mole removal for biopsy to reduce referrals to dermatologists) and improving coordination with specialists. Other modifications made more often by risk group 3 and 4 practices than by risk group 1 and 2 practices reflected their focus on providing high-risk patients care in non-traditional settings, such as scheduling longer appointments for more complex patients who need extra time, developing and updating care plans for their high-risk patients, and increasing access to palliative care.

C. Specific activities implemented to expand and improve the delivery of care

In the previous section, we described the broad trajectories of change practices reported making at the primary care function and strategy levels over the first three years of model participation. In this section, we look across the primary care functions and strategies to identify specific activities practices implemented to improve care delivery. Different factors spurred the decision to implement these activities. For example, after realizing that its patients were having a hard time seeing specialists in a timely manner, one practice began using care coordinators to call specialists and get appointments sooner. In some cases, practices cited an increase in behavioral health needs, in part because of the COVID-19 pandemic, as an influencing factor. In other cases, parent organizations mandated the change. For example, a practice expanded the number of appointment slots available for post-hospitalization follow-up visits to meet the new system-wide standard. Other changes reflected

practices' critical review of current processes and how they affected patients and staff. For example, one practice expanded the role of registered nurses beyond triage to include more direct patient care, leading to increased overall staffing capacity for Annual Wellness Visits and boosting the practice's reports of job satisfaction and retention among nurses. Finally, external factors prompted practices to modify strategies. For example, one practice transitioned to reviewing hospital admission alerts in patient charts after regional hospitals began offering a direct data feed. Another practice started using new patient education materials when it began participating in an ACO.

Most of the activities that practices adopted during the second and third years of participation fell within three broad categories: (1) workflows, (2) staffing, and (3) data and technology. The activities that practices implemented were generally meant to broaden the scope of a given strategy by expanding it to new populations, adding services, or increasing access. In some cases, the activities helped improve effectiveness by reducing staff burden or streamlining and standardizing processes. We discuss each of these activities in greater detail below (see also Exhibit 4.3).

Exhibit 4.3. Examples of activities practices implemented by type and objective

Type of activity	Changes to expand scope	Changes to improve effectiveness
1. Improving practice workflows	• Increased access to care through longer clinic hours and more appointment slots, especially for urgent care • Incorporated HRSN and behavioral health screenings and referrals for services into patient workflows	• Adopted approaches to promote more standardized care (for example, documented requirements for post-hospitalization visit) • Shifted responsibilities from practitioners to other staff members to free up practitioners' time
2. Building staffing capacity	• Hired care managers to support episodic care management and longitudinal care management strategies • To a lesser degree, hired new behavioral health staff and other practitioners, including pharmacists for medication management	• Trained staff on topics that range from clinical protocols to incorporating data into patient care
3. Leveraging data and technology	• Began remote patient monitoring • Added new data feeds to identify more patients with recent hospitalizations	• Consolidated data into dashboard to more easily identify patients' needs

HRSN = health-related social needs.

Workflow improvements were the most common change reported in interviews, representing about half of all activities that practices modified, stopped, or added. We define workflow improvements broadly in this report, encompassing activities that range from changes to clinical practice patterns to new service offerings.

Many workflow changes involved expanding the scope or reach of existing strategies. For example, practices promoted greater access to care through longer clinic hours and more appointment slots for urgent care, episodic care management follow-up visits, or telehealth. Likewise, in the PCF Practice Portal, 57 percent of practices reported they increased patients' access to practitioners via billable care (for example, through extended office hours). Practices also changed workflows to better identify and address patients' needs in a timely manner. For example, some practices reported in interviews that they

began checking in with patients with chronic conditions more frequently. Others began screening for health-related social needs and depression or increased the frequency of these screenings. Practices also commonly expanded eligibility criteria for patient interventions, such as adding chronic conditions (for example, pre-diabetes) for longitudinal care management eligibility. Finally, practices built and expanded partnerships to improve comprehensiveness of care, including with specialists (such as podiatry), pharmacists, and transportation programs.

> "I would say that [longitudinal care management is] going to help [reduce hospitalizations]. The biggest reason, from my perspective, is because the patient has more touches."
>
> — Lead practitioner

In contrast to activities that expanded strategies, other activities were improvements to processes to provide care more efficiently and effectively, such as by reallocating staff, streamlining or standardizing workflows, and improving communication tools. For example:

- Several practices shifted responsibilities from clinicians to other staff members to free up clinicians' time. For example, at one practice, lead medical assistants began setting up telehealth visits and involving clinicians only when patients were successfully connected.
- Practices adopted approaches to standardize workflows, helping reduce the risk of patients falling through the cracks and ensuring all patients received the same quality of care; one practice accomplished this by assigning a single person to schedule all follow-up episodic care management visits. Another practice better documented episodic care management processes (such as medication reconciliation and patient education) after realizing that practitioners, especially new ones, were not covering essential components during post-hospitalization visits.
- Better referral processes also became a focus to ensure patients could access timely care, especially with specialists. One practice built a direct referral line between care managers and specialists to facilitate referrals in urgent cases. Similarly, another practice developed a messaging system to communicate more easily with specialists.
- Finally, several practices aimed to improve staff coordination through new communication tools, such as interdisciplinary care team meetings and daily messages to the practice team about patients on the day's schedule.

Practices reported hiring and training staff to build internal capacity to provide and coordinate care. The PCF Practice Survey data point to the role that PCF played in hiring staff. Four out of five PCF practices reported in the survey that they used PCF funds to hire or retain different types of staff, either entirely through PCF funds or together with other funding streams. For example, in the PCF Practice Survey, more than half (58 percent) of PCF practices reported using PCF funds to hire or retain care managers or care coordinators. Practices also typically used PCF funds to hire or retain multiple staff positions. Around half of

> "It is maybe one of the more creative positions to have someone who is an expert in transitions of care. She can follow up with that person, or then hand them off back to me."
>
> — Lead practitioner

practices (53 percent) reported using PCF funds, either entirely or in conjunction with other funding streams, to support three or more staff positions.

In interviews, practices most commonly reported hiring staff to support longitudinal care management and episodic care management activities. (More information on longitudinal care management is available in the "In Focus: Care Management" text box below). In interviews, practices reflected on the positive outcomes longitudinal care management and episodic care management generated and how hiring additional care managers to conduct chronic care management or follow up with patients after a hospitalization enabled the practice to serve more people and provide more comprehensive care. For example, one practice created a new "transitionist" position; this person leveraged extensive knowledge about clinical issues and care transitions to better manage episodic care. Practices also added new support staff to triage patients, make and follow up on referrals with specialists, conduct outreach to patients about preventive care and Annual Wellness Visits, and connect patients to social services.

Three interviewed practices that were already doing behavioral health integration in the first year of PCF added more behavioral health specialists, including psychologists, licensed clinical social workers, and psychiatrists. (More information on behavioral health integration is available in the "In Focus: Behavioral Healthcare Management" text box below). In a handful of cases, practices hired clinicians, mainly pharmacists, to conduct medication reconciliation.

Practices also reported in interviews that they bolstered existing strategies by training staff on a range of topics, including electronic health record (EHR) data entry, protocols for scheduling Annual Wellness Visits, quality metric definitions, and clinical guidelines. For example, as part of a larger effort to improve episodic care management, one practice trained staff on how to interpret hospital discharge reports. Another practice began sharing quality measures with staff so they better understood the importance of complete and accurate EHR data in tracking and demonstrating progress.

Practices leveraged data and technology to improve care coordination, measure performance, and improve patients' experience. In the PCF Practice Portal, two-thirds of practices said they were continuing to enhance their health IT capabilities (such as improving EHR functionality) and increasing their use of available data to improve care delivery. In interviews, practices reported that new data sources and IT features typically helped staff better coordinate care and save time on current activities rather than expand existing strategies. Specific examples reported in interviews include the following:

- **Data aggregation.** In some cases, new health IT features aggregated existing information in one location, such as in a dashboard or spreadsheet, to make it easier for staff to identify people in need of intervention, commonly through longitudinal care management or episodic care management. Previously, staff had to access data through multiple systems, which was time-consuming and susceptible to error. Similarly, several practices modified risk algorithms or embedded flags or summaries of patient medical conditions within patient records to better identify patients at risk for hospitalization.

> "Our transition of care dashboard was initially not interactive. Now it includes information where we can see if the first outreach has been made, was it timely, second outreach, when's the deadline."
>
> — System lead

- **Patient engagement.** Some practices began using technology as a way of giving patients more control over their care. New EHR features allowed patients to better access their medical records, schedule appointments, or message clinicians and support staff. One practice built a communication sheet for patients to give specialists to ensure information about their conditions was comprehensively shared.
- **Care management.** Other new tools helped practices document patient outreach, such as a successful contact or appointment scheduled, to facilitate care management and hold staff accountable for meeting milestones related to patient follow-up.
- **Performance measurement.** Practices also used data to calculate measures to monitor and improve performance. For example, a parent organization developed a PCF scorecard with quality metrics (such as Annual Wellness Visit completion rates, hospitalization rates, and others) for each practice. The parent organization then shared these scorecards to help engage practice leaders in performance improvement by creating competition across practices.

Less commonly, practices made technology changes to expand the scope or reach of a given activity. For example, two practices adopted remote patient monitoring, allowing patients to monitor their blood pressure and other vital signs and transmit the findings to the care team. Some practices added new data sources to serve more patients through PCF activities. Examples include state health information exchange data, hospital discharge information through shared EHRs, and information on transfers from more settings, such as nursing homes.

IN FOCUS

Care management

PCF requires practices to provide risk-stratified care management for all empaneled patients and to follow up after a hospitalization or ED visit. In 2023, we explored practices' efforts related to longitudinal care management and episodic care management through the PCF Practice Portal and the PCF Practice Survey.

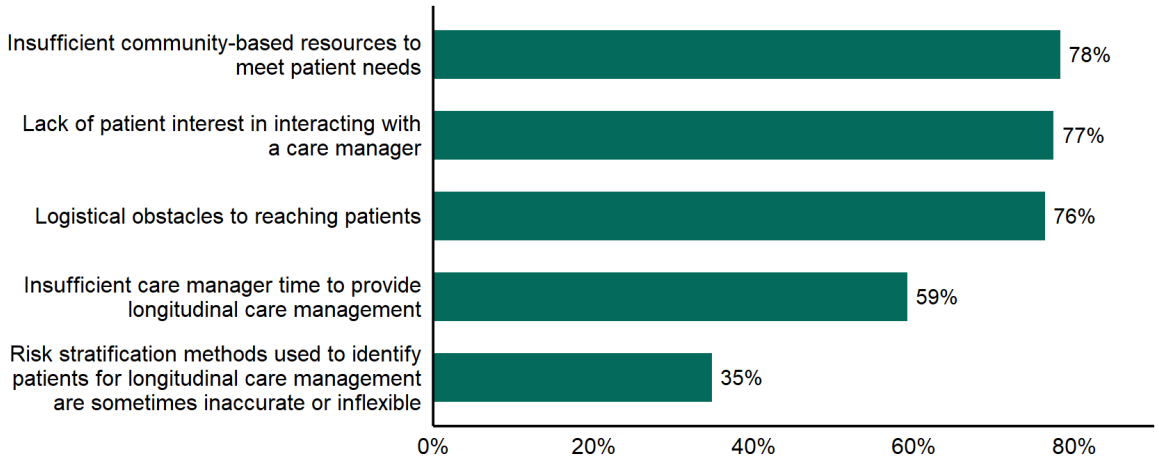
Key strategy. In 2023, most PCF practices continued to report that care management was their main strategy for reducing acute hospitalizations or total cost of care (86 percent).

Influence of PCF. PCF funds played an important role in funding care management: nearly two-thirds of practices making changes to longitudinal care management and episodic care management reported that these changes were funded in part or solely by PCF payments (62 and 63 percent, respectively). In contrast, practices tended to report that most of the other care delivery changes they made were not at all funded by PCF Model payments (see Chapter 3).

Care managers. In all, 42 percent of PCF practices reported their care managers were primarily located at their practice site. About one-quarter of practices reported that their care managers work from a centralized location to support multiple practices, and another quarter said their care managers work from home. Practices also said that sufficient care manager time was the greatest help to trying to reduce acute hospitalizations or expenditures (52 percent).

Challenges. When asked about barriers to providing longitudinal care management specifically, PCF practices tended to cite multiple external factors, such as insufficient community-based resources to meet patients' health-related social needs and difficulty getting in touch with patients or keeping them engaged in the care management process.

Exhibit 4.4. Most PCF practices reported external challenges to providing longitudinal care management



IN FOCUS

Behavioral healthcare management

PCF requires practices to integrate behavioral healthcare into primary care services. In 2023, we explored how practices are integrating behavioral health into their primary care services through the PCF Practice Portal and the PCF Practice Survey.

Care delivery changes. Nearly three-quarters of PCF practices reported making care delivery changes related to behavioral health at their practice since joining PCF. Specifically, practices reported (1) improving integration of behavioral health into their workflow, (2) improving coordination with external behavioral health practitioners, (3) increasing their offering of care management for behavioral health, or (4) adding behavioral health staff.

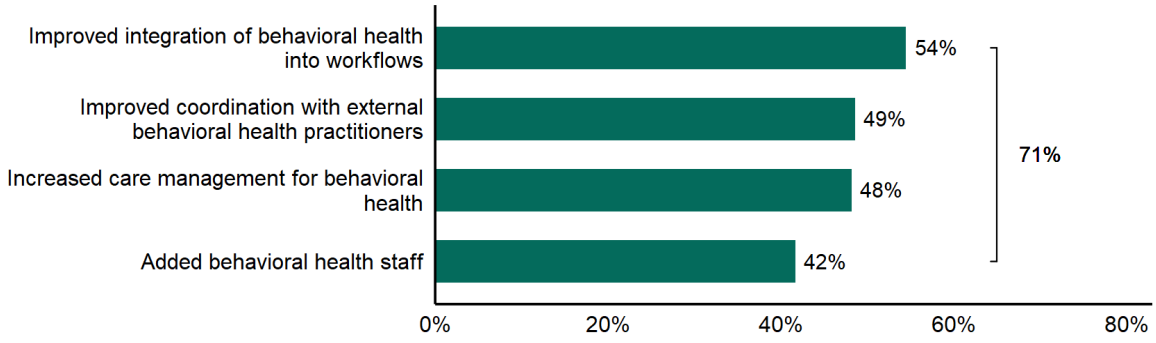
Integration approaches. Most PCF practices reported engaging in high-quality referral and coordination with behavioral health specialty care (72 percent), and around half were assessing and tracking patient-reported outcomes for behavioral health conditions under active management, such as depression or anxiety (54 percent).

Behavioral health screening. Most PCF practices reported screening most or all of their patients at least once a year for the following behavioral health conditions: depression (84 percent of practices), alcohol use disorder (65 percent), anxiety (64 percent), and opioid use disorder (56 percent).

Staffing. Around half of PCF practices reported that they did not have any behavioral health specialists working full time or part time on site at their practice. Practices that did have on-site behavioral health specialists were most likely to have a clinical social worker doing this work (41 percent). A small number of practices had a clinical psychologist (9 percent) or a psychiatrist (5 percent).

Challenges. Having insufficient behavioral health care resources, such as not having enough specialists to meet patients' behavioral health needs, was the top barrier practices said they faced in trying to reduce acute hospitalizations or total costs in PCF (40 percent of practices), followed by patients' unmet health-related social needs and insufficient community-based resources to address those needs (34 percent).

Exhibit 4.5. Most PCF practices reported making changes to behavioral healthcare at their practice site since joining PCF



Source: 2023 PCF Practice Portal data. N = 2,483.

D. Factors that helped practices stay engaged in the model over time

Informed by our prior data collection efforts, we discussed with the interviewed practices what factors they considered to be facilitators and what they considered to be challenges in their efforts to implement care delivery changes in the PCF Model (Schurrer et al. 2024). Our analysis of practices' discussion of these factors in 2023 revealed three overarching factors that facilitated practices' ability to remain engaged in practice transformation over time, all of which took time to put into place: (1) strengthening the practice infrastructure, (2) learning from experience with other initiatives, and (3) creating community partnerships. We conclude this chapter with a summary of additional factors that served as barriers or facilitators and affected practices' abilities to achieve model outcomes.

First, several practices identified aspects of their practice resources, most notably EHR functionality and staff capacity, as being important drivers of ongoing changes in care delivery. These practices noted that the enhanced functionality of their EHRs helped them make changes related to screening patients and tracking their health-related social needs, identifying patients during transitions of care, communicating with the care team and patients, reporting quality metrics, and identifying gaps in care. Practices noted that hiring and retaining staff who care about their work and supporting them in working to the top of their license (that is, maximizing the kinds of activities they are allowed to provide given their license and training) also facilitated changes in care delivery.

> "[The social worker] just has a greater knowledge base to be able to get the patient or family exactly what they need. Whereas we can try to filter through resources and look stuff up online, help as much as we can…she'll just know something off the bat that would be helpful for them and can get the ball rolling way faster than we would be able to."
>
> — Care manager

Second, practices said they used lessons learned from their experience with other initiatives, including participation in value-based contracting arrangements and affiliation with hospital-based systems, to inform continued expansions and improvements in care. Several practices noted that the goals of the PCF Model aligned with the goals of other value-based contracting arrangements they were participating in, which informed how they expanded care teams to support population health and care management activities. Practices also noted that being a part of a hospital-based system provided opportunities to learn from the experiences of other affiliated practices.

> "I think stepping into the ACO program that we did last year, they've really helped to come up with some of those resources as well, and just trying to keep our patients healthy, keep them out of the hospital. They've been a big help with getting some of those resources to us, for us to use for our patients."
>
> — Care manager

Third, several practices said establishing relationships with community resources to facilitate changes in care delivery, particularly related to addressing patients' health-related social needs, helped them expand the range of services they could offer their patients. Establishing relationships with community resources reportedly helped practices connect patients with services to address their health-related social needs. These services included palliative care or other end-of-life services, housing assistance, food banks and Meals on Wheels, and home health services. Practices commonly reported that social work staff who had existing connections or worked to establish new connections with community resources helped them establish such relationships.

Factors that helped or hindered PCF practices achieve model outcomes

Although the interviews focused on practices' experiences with implementing activities to improve care delivery, the PCF Practice Portal provides insight into practices' experiences in meeting the model outcomes. In 2023, 80 percent of all PCF practices reported in the portal that it has been somewhat or very challenging to achieve the PCF Model's primary goals of reducing acute hospitalizations (risk groups 1 and 2) or total costs of care (risk groups 3 and 4). In the PCF Practice Survey, practices identified specific factors that have helped—or hindered—their efforts to achieve these model outcomes.

The top two **facilitators** to achieving model outcomes were:

- Having sufficient care manager time to provide episodic care management or longitudinal care management services (72 percent), and
- Offering same-day appointments (44 percent).

The top two **barriers** to achieving model outcomes were:

- Insufficient behavioral health resources or specialists (40 percent), and
- Unmet health-related social needs and insufficient community-based resources to address those needs (34 percent).

E. Case studies

Deep dive: A trajectory of change focused on modifying existing strategies

One PCF practice modified multiple existing strategies, including expanding its eligibility criteria for longitudinal care management to include patients with social needs and to reduce hospitalizations.

Nestled in a New England coastal community, this PCF practice's risk group 1 population is predominantly White, and a large proportion are dually eligible for Medicare and Medicaid. This primary care practice is affiliated with a hospital and part of a parent organization that includes other practices participating in PCF. The parent organization often pilots new care delivery strategies—such as setting up a registry in the EHR Epic to track care management patients—before rolling them out to other affiliated practices. We highlight this practice as an example of one that continued making changes to existing strategies as described in section B.1 of this chapter.

Longitudinal care management is a key tool in the practice's toolbox for preventing hospitalizations. In 2021, the practice said it relied solely on comorbid health conditions to identify patients for its longitudinal care management program. While identifying patients with high utilization of the ED or inpatient department, the practice found it was missing patients with significant health-related social needs in the longitudinal care management program. In 2023, the practice expanded its eligibility criteria to include direct referrals from primary care practitioners and developed a new risk score algorithm that included social needs—data the practice already was collecting—because practice staff expected that supporting the unmet social needs of patients would help prevent hospitalizations. Staff were optimistic about the effects of these changes, with the system lead reporting, "We're able to really identify them pretty well if they're medically complex or if they have high utilization. But it's that health-related social needs stuff that slips through... so, I would say that we [are now doing] a better job at identifying patients outside of that strict risk score number." To handle the increased workload, the practice expanded its longitudinal care management team by adding care managers and another licensed clinical social worker.

In addition, the practice made a few other modifications to existing strategies to reduce hospital admissions and prevent readmissions. For example, the practice shortened the period for hospital discharge follow-up calls and instituted a follow-up visit within seven days with both the primary care practitioner and a pharmacist. The practice also expanded its transportation program (for example, giving out bus passes and Uber credits) to reduce the number of patients who were calling an ambulance and going to the ED because they lacked transportation to medical visits.

Deep dive: A trajectory of change focused on adding strategies

One PCF practice added multiple new strategies to reduce hospitalizations, including hiring patient navigators to help patients address their health-related social needs.

This family medicine practice in risk group 1 primarily serves a geriatric population. In 2021, respondents from this urban Midwestern practice reported that up to one-quarter of the patient panel likely experience socioeconomic barriers to care, placing a burden on the longitudinal care management staff who manage patients' chronic health conditions and health-related social needs. We highlight this practice as an example of one that added new strategies as described in section B.2 of this chapter.

In 2022, the practice launched a patient navigation program focused on connecting patients to community resources, such as food, housing, and transportation. In doing so, the practice was able to narrow the scope of work of the care managers to focus on medical needs and use patient navigators to meet the growing demand for help addressing patients' health-related social needs. In 2023, the practice expanded the role of the patient navigators by asking them to teach patients when and how to seek primary care before conditions deteriorate and require acute care intervention. As one care manager noted, "We hate that term 'non-compliant patient,' but some of those patients … they can't even think about taking care of themselves, taking care of their chronic diseases, or even coming to their primary care visit because they owe money on a utility, and they're so overwhelmed or embarrassed, that they can't come. So that patient navigator role has really been key to rounding our team out and helping take away some of those barriers that allow the patient to focus on themselves and getting to better self-management."

This practice also added new strategies to address behavioral health needs, increase access, and provide continuous quality improvement. For example, the practice began addressing the behavioral health needs of its patients by using system-level social workers to provide short-term counselling for mental health and substance use disorders. In 2022, the practice also hired registered nurses to increase the delivery of Annual Wellness Visits as a way of meeting its system-established benchmarks as well as becoming more responsive to issues that, if unaddressed, could result in hospitalization. Finally, in 2023, the practice's lead physician began convening interdisciplinary group meetings to discuss ways to improve care delivery, such as through e-consults, Annual Wellness Visits, advanced care planning, and billing codes.

Deep dive: A trajectory of change that focused on stopping strategies

Financial barriers led one PCF practice to stop plans to integrate behavioral health services and to discontinue home podiatry services.

When this risk group 4 practice joined PCF in 2021, the practice leadership hoped that the increased funding would provide more financial support than traditional FFS for the high cost of caring for the practice's homebound patients. After joining PCF, the practice used the model's supports to enhance its ability to provide comprehensive home-based primary care. This practice stands out, however, because it was one of only two interviewed practices that was not able to implement a new planned service and because it stopped offering an additional service due to insufficient funding. We highlight this practice as an example of one that discontinued strategies after performance year 1 as described in section B.4 of this chapter.

In 2021, the practice anticipated hiring a therapist to provide at-home behavioral health supports for patients and caregivers. This added position was approved at the system-level, but then COVID-19 hit before the practice was able to recruit. While the practice had hoped that PCF funding would be sufficient to cover the cost of hiring the new therapist, the system ultimately decided to cut all unfilled positions, which made hiring behavioral health staff impossible in 2021. According to one physician at the practice, "We trimmed positions here at [parent organization], so there was honestly no play for us to ask for a behavioral health person." Despite these challenges, practice leaders shared that staff have maintained enthusiasm for providing these services and they would consider revisiting plans to hire a therapist in the future if they could afford it.

The second strategy the practice cut was at-home podiatry services. The practice offered these services in the first year of model participation via referrals to third-party vendors, but private podiatrists deemed in-home visits as financially unsustainable for their business because they could not make enough home visits in a single day to cover the fixed costs of the program. The practice stopped making referrals for in-home services. Instead, the podiatrist shifted focus by providing care at assisted living and nursing facilities where they could see multiple patients on the same day. This change created a gap for the practice's homebound patients who otherwise could not access podiatry services, which are critical in managing chronic conditions such as diabetes. In response, a nurse practitioner at the practice obtained a podiatry certificate to offer limited at-home services. The practice eventually decided to discontinue even this scaled-back program, however, because the per-visit rate they were charging was still unaffordable for many of the low-income patients.

Deep dive: Putting patients' wishes and needs at the center of care

A risk group 3 practice's philosophy centers on shared decision making and patients' goals.

Here we describe an example of a large risk group 3 practice that has a home-based primary care program serving high-risk patients who are homebound, frail, and elderly. About 90 percent of its patient population has dementia; half the patients are in adult residential care or foster homes, and the rest are in private homes with family or hired caregivers. This practice is in a state that is experiencing an extreme shortage of nursing home beds. To address the needs of its high-risk patient population, the practice is using PCF funds to expand its care team with a focus on incorporating patients' goals into care plans. According to the medical director, "It's really been [PCF] that has allowed us to get additional positions, build our team, get the support of the organization to expand our program into something different than just medical visits on the road."

Participation in the PCF Model has led this practice to establish a new philosophy that its staff believe reduces overall cost of care while simultaneously aligning with the wishes of patients and their families. Open and honest conversations between practitioners and patients leads to identifying patients' preferences and goals from the beginning; they continue to have these conversations frequently since patients' goals of care change over time. By verbally identifying their goals, patients are then empowered to make medical decisions that reflect their wishes and priorities even if it does not align with what practitioners recommend. Overall, this practice's philosophy and the resulting relationship between practitioners and patients is instrumental in guiding patients' behaviors and decision making.

> "Even when we're onboarding new nurse practitioners, [we're] always bringing it back to the goals of care and clarifying goals of care. Leading discussions in goals of care really helps us, early on, have patients that are also in this philosophy of really understanding their chronic disease burden, understanding what is important to them and what a good death looks like to them. From the beginning, if that is always part of the conversation when we're trying to make medical decisions, then a lot less people choose to go to the hospital"
>
> — Lead physician

PCF funds led to hiring additional clinical staff, including nursing staff and social workers, increasing the number of patients seen, incorporating patients' goals into care plans, and providing additional support to families and caregivers during home visits. The practice recognizes that these activities positively affected how practitioners treat patients; patients' goals of care are the foundation of their new practice philosophy because they are tailored and specific for every individual. Goals of care permeate all care decisions, including care planning (such as what screenings, tests, and treatments are still necessary), coordination and referrals to specialists, and transitional care management (home visits for the first post-discharge contact for high-risk patients). These care delivery activities have been improved since 2021 and now reflect patients' goals of care. The teams share patient goals in care planning meetings, and goals are documented and updated in the EHR.

5. Estimated impacts of PCF on Medicare beneficiaries' outcomes during the first three years of the model

Key takeaways

- PCF did not reduce acute hospitalization rates among Medicare FFS beneficiaries and, counter to the model's goals, *increased* total Medicare Part A and B expenditures (including model payments) PBPM by about 1 percent by the end of 2023 (the first three performance years for Cohort 1 and first two performance years for Cohort 2).
- The weak association between each practice's impacts on acute hospitalizations and its PBAs implies a potential misalignment between model performance metrics and hypothesized mechanisms for reducing hospitalizations.
- The findings for Medicare expenditures and acute hospitalizations are consistent with (1) CMS' expectation that PCF would not yield detectable savings until performance year 4 and (2) findings that PCF participation led to little or no improvement in leading indicators, which are measures we selected as likely early signals of improvement if the model is to lower acute hospitalizations and Medicare spending.
- These results do not necessarily imply that PCF practices' care delivery changes have no effects on outcomes but rather that their changes do not lead to substantively different effects than activities undertaken by non-PCF practices in the comparison group.
- In addition, PCF did not meaningfully affect a range of secondary outcomes related to Medicare expenditures, service use, and quality of care that we hypothesized could be affected through the same care delivery changes expected to influence primary outcomes.
- We find little evidence that PCF's impacts differed by practice and beneficiary characteristics. In general, results for the subgroups of practices and beneficiaries we examined resembled estimated impacts for the overall study population.

A. Focus of this chapter

In this chapter, we report on PCF's impact on Medicare beneficiaries' outcomes based on data through the end of 2023. Impact estimates for performance years 1 and 2 reflect effects for the first and second year of a practice's participation in the PCF Model (2021–2022 for Cohort 1 practices and 2022–2023 for Cohort 2 practices). Impact estimates for performance year 3 reflect the 2023 experience for Cohort 1 practices only. We also report average cumulative impacts on the first two performance years, for which we have data from both cohorts.

We first report impacts for our two primary outcomes, acute hospitalizations and Medicare Part A and B expenditures, to assess whether PCF successfully reduced them. These two measures comprise our primary outcomes because CMS expected the PCF Model, if successful, could reduce Medicare expenditures largely by reducing the number of acute hospitalizations. A reduction in acute

hospitalizations would also reflect improvement in quality of care by avoiding health crises and the disruption they cause to patients' lives.

After reporting impacts for the primary outcomes, we next report impacts for (1) a set of leading indicators, which are measures we expect to see improve early in the model if PCF is to lower acute hospitalizations and Medicare Part A and B expenditures, and (2) a range of secondary outcomes that we hypothesized—if PCF were successful—could be affected by PCF through the same care delivery changes expected to influence primary outcomes. Lastly, for a select set of outcomes, we examine whether there are differences in model impacts by practice or beneficiary characteristics (subgroups).

We limit all impact analyses to Medicare FFS beneficiaries. Although PCF is a multipayer model, CMS calculates PCF payments for only Medicare FFS beneficiaries and expects PCF should have its greatest effects for patients among the Medicare FFS population.

1. Expectations for PCF impacts midway through the model

We expected we might not see improvements in the primary outcomes by performance year 3 for several reasons. First, CMS hypothesized that PCF, if successful, likely would not result in detectable cost savings to Medicare by performance year 4. Second, findings described in earlier chapters of this report suggest PCF led to limited changes that might improve outcomes by performance year 3 relative to a comparison group of practices similar to the PCF practices but not participating in the model. For example, many of the care delivery changes that PCF practices reported were motivated only in part by the PCF Model and were often modifications to existing activities that began before PCF (see Chapters 3 and 4). PCF practices also often faced challenges meeting the model's requirements and cited difficulty working with CMS data supports intended to help identify opportunities to improve care and ultimately reduce hospitalizations (see Chapter 3). Finally, CMS designed PCF for practices with experience with primary care transformation or value-based care, including through CPC+, which could leave little room for PCF to further improve outcomes. Previous research shows that CPC+ reduced acute hospitalizations (O'Malley et al. 2023). Consistent with this evidence, we found PCF practices that participated in CPC+ had lower baseline rates of acute hospitalizations (227 per 1,000 beneficiaries in 2020) than PCF practices that did not participate (239 per 1,000 beneficiaries in 2020) (Schurrer et al. 2024).

2. Summary of estimation methodology

We estimated the impacts of PCF on a range of outcomes for Medicare FFS beneficiaries served by PCF practices, comparing outcomes among these beneficiaries (our intervention group) with outcomes among Medicare FFS beneficiaries served by a set of matched comparison practices. We measured all outcomes using Medicare claims, which reflect health care services that clinicians provided to Medicare FFS beneficiaries and billed to the Medicare program. Our intervention group included all practices that started PCF, regardless of whether they later left the model. Keeping all practices that started PCF in the intervention group helps guard against bias that could be introduced if practice attrition is correlated with outcomes, which could occur if practices with worse performance were more likely to leave the model because of downward payment adjustments. (We compare impact estimates for Medicare Part A and B expenditures between all practices that started PCF and those that remain in PCF each performance year below. (See "In Focus: Impacts among practices that remain in PCF.") Matched

comparison practices did not participate in PCF but were located in PCF regions and had similar characteristics to the PCF practices before the model began.

We estimated impacts using linear difference-in-differences regression models and a hybrid frequentist–Bayesian technique (Lipman et al. 2022). The difference-in-differences method (a frequentist statistical approach) estimates impacts based on the difference in outcomes between PCF practices and their matched comparison practices, net of any difference in outcomes that existed between the groups in the two years before PCF began (2019–2020 for Cohort 1 and 2020–2021 for Cohort 2). We use $p = 0.1$ as our threshold for statistical significance. A core assumption of difference-in-differences methods is that any outcome difference between the PCF and comparison groups would stay the same if not for the model (an assumption known as the *parallel trends assumption*). For each outcome, we tested for differences in outcome trends between PCF and comparison practices before PCF began. We report impact findings for outcomes that passed our test in Chapter 5. (Results for outcomes that failed our test appear in Appendix B.6.) Additional details on the difference-in-differences method and our outcome selection are available in Appendix A.2.4 and Appendix A.2.5, respectively.

Matched comparison practices

Matched comparison practices (N = 7,144) did not participate in PCF but were located in PCF regions, were geographically close to their matched PCF practice(s), and had similar characteristics to the PCF practices before the model began. For more detail on the comparison group, including methods to select the group and characteristics of the matched comparison practices, see Appendix A.2.3.

The hybrid frequentist–Bayesian approach is based on the difference-in-differences results, but it also uses evidence from related literature (such as results from evaluations of similar models like CPC+) and capitalizes on patterns in the data (such as relationships between subgroups) to estimate the *probability* PCF led to favorable impacts (different from a *p*-value). This approach enables us to make statements such as "There is a 15 percent probability that PCF reduced acute hospitalizations, relative to the comparison group, by at least 1 percent in performance year 1." More details are available in Appendix A.2.6.

Details for defining outcomes and analytic population for Medicare FFS beneficiaries

Outcomes and data sources. We constructed primary and secondary outcome measures using Medicare FFS claims data from January 2019 to December 2023. We provide detailed outcome definitions and describe the process for constructing all outcome measures in Appendix A.2.5.

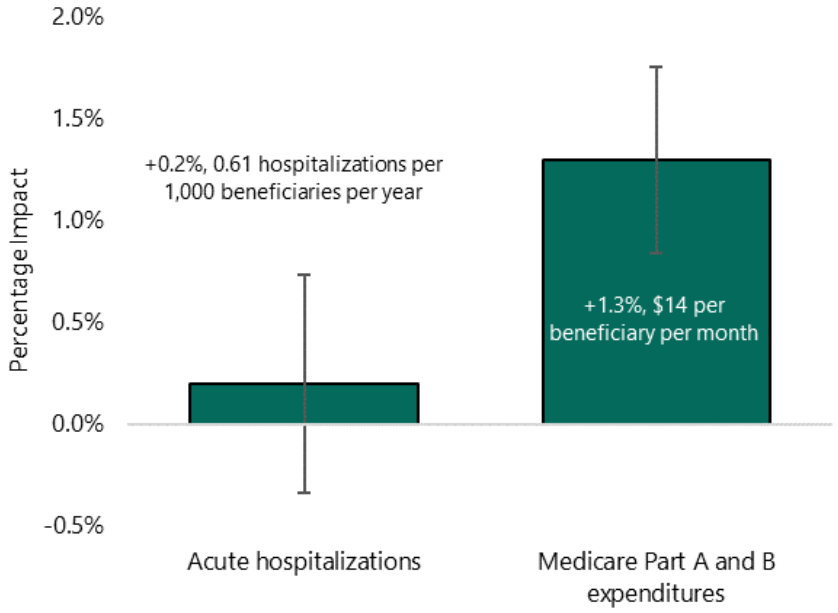
Details on regression control variables and their data sources appear in Appendix A.2.4.

Analytic population. We used Medicare FFS claims and enrollment data to attribute Medicare FFS beneficiaries to PCF and comparison practices that provided primary care in PCF regions. After a beneficiary was first attributed to a specific PCF or comparison practice during the model period, they remained assigned to that practice throughout the evaluation, even if the PCF practice later left the model. Details on how we constructed the analytic population are in Appendix A.2.1.

B. Effects of PCF on acute hospitalizations and Medicare Part A and B expenditures

PCF did not reduce acute hospitalizations and increased total Medicare Part A and B expenditures (including model payments) by about 1 percent. Exhibit 5.1 shows the average estimated impacts across performance years 1 and 2. The estimate for acute hospitalizations was not statistically different from zero, while we estimated PCF increased Medicare Part A and B expenditures by $14 PBPM (1.3 percent).

Exhibit 5.1. PCF did not reduce acute hospitalizations and increased Medicare Part A and B expenditures across performance years 1 and 2.



Source: Mathematica's analysis of Medicare claims data from January 2019 to December 2023.

Notes: Black bars represent 90 percent confidence intervals. We calculated percentage impacts by dividing the impact estimate by the estimated counterfactual, where the counterfactual is represented by the PCF mean outcome minus the impact estimate for the same performance year (that is, the mean outcome we calculate PCF practices would have experienced without the PCF Model).

PCF = Primary Care First.

We also estimated impacts for each performance year individually, including for performance year 3, which reflects experience only for Cohort 1 (Exhibit 5.2). No frequentist estimates for acute hospitalizations were statistically different from zero (all *p*-values > 0.1), and the probability that PCF decreased acute hospitalizations relative to comparison practices by at least 1 percent ranged from 12 to 22 percent across performance years. The increase in Medicare Part A and B expenditures was statistically significant each performance year (all *p*-values < 0.1) and ranged from $10 to $17 PBPM. For performance years 1 and 2, for which we estimated impacts for both cohorts, we find approximately equal probabilities that PCF either increased or reduced acute hospitalizations relative to the comparison group (51 and 49 percent, respectively) as well as a 72 percent probability that Medicare Part A and B expenditures increased relative to the comparison group by at least 1 percent (Exhibit 5.3).

Exhibit 5.2. PCF did not significantly reduce acute hospitalizations in any performance year and it increased Medicare Part A and B expenditures in all years

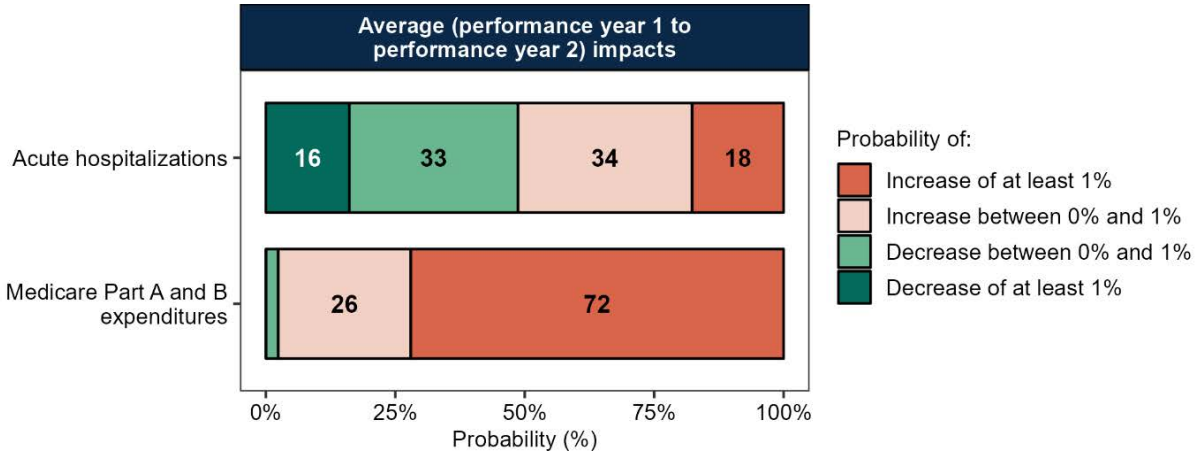
Performance year	PCF outcome mean	Impact estimate (SE)	Percentage impact	*p*-value	Probability the outcome decreased for PCF practices, relative to comparisons, by at least 1%
Acute hospitalizations (per 1,000 beneficiaries per year)					
PY 1	239	<1 (1)	<0.1%	0.90	15%
PY 2	249	1 (1)	0.4%	0.34	22%
Average (PY 1 to PY 2)	244	<1 (<1)	0.2%	0.54	16%
PY 3 (Cohort 1 only)	263	4 (2)	1.4%	0.12	12%
Medicare Part A and B expenditures ($ PBPM)					
PY 1	$1,040	$17 ($3)	1.7%	<0.01	<1%
PY 2	$1,118	$10 ($4)	0.9%	<0.01	<1%
Average (PY 1 to PY 2)	$1,079	$14 ($3)	1.3%	<0.01	<1%
PY 3 (Cohort 1 only)	$1,213	$14 ($7)	1.2%	0.05	<1%

Source: Mathematica's analysis of Medicare claims data from January 2019 to December 2023.

Notes: We calculated percentage impacts by dividing the impact estimate by the estimated counterfactual, where the counterfactual is represented by the PCF mean outcome minus the impact estimate for the same performance year (that is, the mean outcome we calculate PCF practices would have experienced without the PCF Model). The percentage impacts we report may differ from those calculated from the PCF means and impact estimates in this exhibit because of rounding. Estimates for performance year 3 reflect 2023 experience for Cohort 1 practices only. The probabilities of decreases in outcomes come from the hybrid frequentist–Bayesian analysis and reflect model impacts (that is, decreases relative to the comparison group) as a percentage of the counterfactual.

PBPM = per beneficiary per month; PCF = Primary Care First; SE = standard error; PY = performance year.

Exhibit 5.3. There is a low probability that PCF decreased hospitalizations by at least 1 percent and a high probability that PCF increased expenditures by at least 1 percent.



Source: Mathematica's analysis of Medicare claims data from January 2019 to December 2023.

Note: For readability, we did not label very small bar segments. When including the unlabeled segments, the total probability in each bar sums to 100 percent.

Results for primary outcomes were robust to a range of tests that evaluated the robustness of our main frequentist and hybrid frequentist–Bayesian results in response to key variations in our estimation approach, such as alternative sample compositions, the impact of outliers, and different levels of clustering (tests are described in Appendix A.2.7 and results are available in Appendix Exhibits B.6.1 to B.6.4). In addition, we did not find evidence that differences in participation between PCF and comparison practices in other CMS initiatives, such as the Medicare Shared Savings Program, influenced our primary outcome results. Participation rates were low for PCF and comparison practices across the initiatives we analyzed, except for the Medicare Shared Savings Program and ACO REACH. Across all initiatives, we observed minimal differences in participation rates between PCF and comparison practices before and during the PCF performance years (see Appendix Exhibit B.6.6). Furthermore, our impact estimates for Medicare Part A and B expenditures remained nearly identical regardless of whether we included payments (shared savings and losses) from the Medicare Shared Savings Program (see Appendix Exhibit B.6.7).

The decline in expenditure growth between performance years 1 and 2 likely reflects model payments becoming less generous over this period. PCF led to increased Medicare Part A and B expenditures in all years, though the increase lessened from $17 to $10 PBPM between performance years 1 and 2 (Exhibit 5.2). Hybrid frequentist–Bayesian results indicate an 85 percent probability of increases in expenditures greater than 1 percent in performance year 1 but only a 51 percent probability of a similarly large increase in expenditures in performance year 2 (see Appendix Exhibit B.7.3). The decline in expenditure growth over this period is likely driven by model payments becoming less generous. For example, payments first became subject to the PAA and PBA during the second performance year for both cohorts (see Chapter 3). Over 60 percent of practices earned a positive PBA in at least one quarter of 2023, but this adjustment did not offset the downward effect of the PAA, which reduced the PBP by about 30 percent on average. Overall, estimates for Medicare Part A and B expenditures remain consistent with previous findings that PCF payments are still higher than regular FFS without PCF for a given set of primary care services provided, even after the PCF payments becoming less generous (Schurrer et al. 2024).

Results for Medicare expenditures remain consistent with CMS' hypothesized timing of PCF's impact on Medicare cost savings. CMS hypothesized that PCF could result in detectable cost savings to Medicare by performance year 4, and evidence from evaluations of similar models, such as CPC+, suggest primary care practice transformation is a complex process and can take time to improve outcomes (O'Malley et al. 2023). As a result, we did not necessarily expect to detect improvements in either of the primary outcomes after three performance years for Cohort 1 and two performance years for Cohort 2. Future annual reports will continue to examine impacts on acute hospitalizations and Medicare Part A and B expenditures.

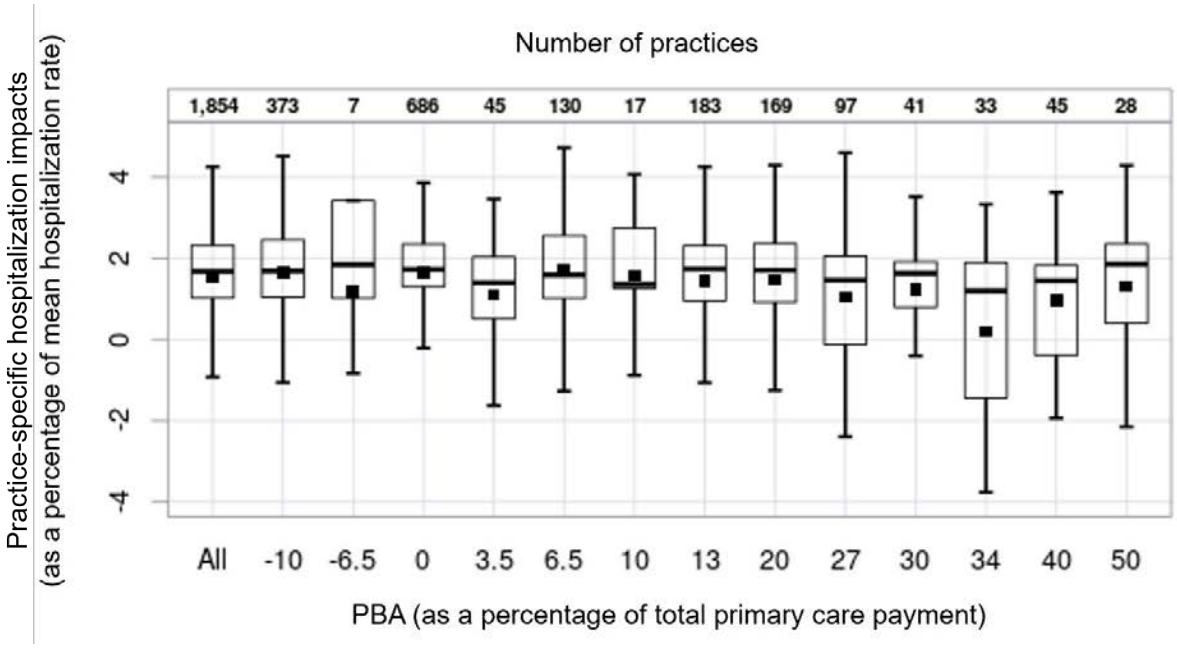
There was evidence of potential misalignment between the PCF Model's performance incentive structure and hypothesized mechanisms for the model to improve primary outcomes. CMS expected that reductions in Medicare FFS expenditures among participating practices would be driven primarily through reductions in hospitalizations and created the PBA as an incentive, but there was a weak association between each practice's estimated impact on acute hospitalizations in 2023 and its PBA for the corresponding time period. Exhibit 5.4 shows the relationship between a practice's PBA category in the second quarter of 2024 and the estimated impact on acute hospitalization rates over the same calendar quarters used to assess PBA performance (the four quarters of 2023; see text box). We chose to analyze PBAs in the second quarter of 2024 to exclude the effects of the automatic negative and neutral Quality Gateway adjustments on the PBA that were applied in the third quarter of the year. By doing so, we focus on the relationship between the PBA methodology that assesses performance compared to benchmarks and the evaluation's estimates of practice performance relative to similar looking practices. As Exhibit 5.4 shows, the median impact on the acute hospitalization rate, as shown by the horizontal bar in the boxes, was similar for practices with a negative or neutral PBA. The median across the positive PBA categories was similar or slightly lower (indicating lower hospitalizations) than that of the practices receiving a negative or neutral PBA, indicating a weak relationship. A small statistically significant relationship between impacts on hospitalizations supports these findings. (See Appendix B.8 for supplemental results, including results broken down by cohort.)

Estimating the relationship between impacts and PBAs

We used the novel aggregate Bayesian Causal Forest machine-learning method to estimate an upper and a lower bound for PCF's impact on acute hospitalization rates for each participating practice in risk groups 1 and 2 for calendar year 2023. We then analyzed the relationship between these practice-specific impacts and the PBA percentages for quarter 2 of calendar year 2024. PBAs for risk groups 1 and 2 are based on practices' acute hospital utilization,11 and quarter 2 PBAs are based on performance in calendar year 2023. For more details on the PBA analysis, refer to Appendix A.2.8.

[11] Acute Hospital Utilization is a Healthcare Effectiveness Data and Information Set (HEDIS®) measure developed and maintained by the National Committee for Quality Assurance (NCQA) and differs from the acute hospitalization rates we used in the evaluation. Acute Hospital Utilization, the measure used for the PBA calculation, is a risk-adjusted measure defined as a ratio of the observed number of inpatient stays (including observation stays) to the expected number of inpatient stays (Center for Medicare & Medicaid Innovation 2024). The acute hospitalization rate used in the evaluation is the number of regression-adjusted inpatient stays per 1,000 beneficiaries per year. Full copyright, disclaimer, and use provisions related to the NCQA measures are available at https://www.cms.gov/priorities/innovation/about/notices-disclaimers.

Exhibit 5.4. Impacts on acute hospitalizations were not a strong predictor of PBA performance



Source: Mathematica's analysis of Medicare claims and PCF payment data.

Notes: The box plots show, for each PBA percentage that PCF practices received in quarter 2 of 2024, the distribution of practice-specific impacts on the acute hospitalization rate per 1,000 beneficiaries per year weighted by the number of assigned beneficiaries. The bottom and top edges of each box denote the 25th and 75th percentiles, respectively. The thicker horizontal line denotes the median, and the square represents the mean. The whiskers denote the 25th percentile minus 1.5 times the interquartile range and the 75th percentile plus 1.5 times the interquartile range, respectively.

PBA = performance-based adjustment; PCF = Primary Care First.

Although the care delivery changes PCF practices reported may be beneficial, our findings indicate that changes PCF practices implemented because of the model have not improved outcomes relative to the comparison group. Practice care delivery changes were often modifications to existing activities and were only partly influenced by PCF incentives or initiated before PCF began (see Chapters 3 and 4). The impact estimates reported in this chapter do not necessarily imply that PCF practices' care delivery changes have no effects on outcomes, but they do indicate these changes have not led to substantively different effects compared to activities non-PCF practices may have undertaken in the comparison group. In addition, though 60 percent of practices earned a positive PBA in at least one quarter of 2023 (see Chapter 3), a positive PBA does not necessarily mean these practices are performing better than comparison practices at reducing acute hospitalizations. This can arise because the PBA rewards practices in risk groups 1 and 2 based on (1) performance against the national and regional hospitalization benchmarks CMS sets and (2) improvement relative to past performance on acute hospitalizations, rather than on improvement relative to outcomes that reflect what PCF practices themselves would have likely achieved without the PCF Model (such as those in our comparison group).

IN FOCUS

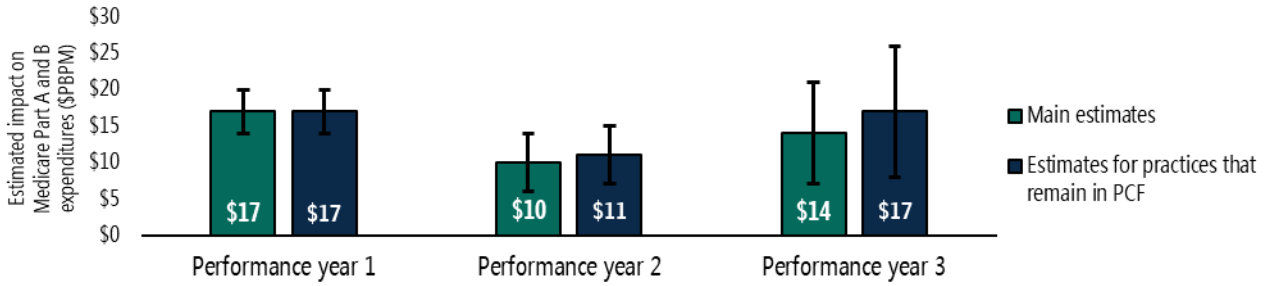
Impacts among practices that remain in PCF

By the end of 2023, fewer than three-quarters of the practices that joined PCF still participated due to the attrition described in Chapter 2. Our main analytic approach includes practices that left the model to guard against potential bias that may be introduced by only estimating impacts among practices that chose to continue their participation. This approach, however, may dilute PCF's effects and could be one explanation for the lack of favorable impact estimates for the primary outcomes. In this supplemental analysis, we compared our main results for the primary outcome of Medicare Part A and B expenditures with impacts estimated only among practices that remained in PCF each performance year.

Estimates do not provide evidence that attrition from PCF drives the lack of favorable findings for Medicare Part A and B expenditures. In fact, we estimate PCF increased Medicare Part A and B expenditures by $1 PBPM more for practices that stayed in the model in performance year 2 compared with our main estimates ($11 versus $10 PBPM) and by $3 PBPM more for practices that stayed in the model in performance year 3 ($17 versus $14 PBPM) (Exhibit 5.5). The larger estimates we find for practices that remain in PCF is likely driven by those practices receiving higher reimbursement for a given set of primary care services compared with practices that leave PCF, which are reimbursed through regular FFS.

To approximate impacts among practices that remained in the model each year, we divided the main impact estimates in each performance year by the fraction of PCF practices that participated in the model at any time during that year. This adjustment accounts for the dilution of impacts from practices that withdrew from PCF (under the assumption that only practices still participating in PCF experience an impact of PCF). We took this approach instead of simply excluding practices that left the model from our analysis because excluding practices could introduce bias if the withdrawn practices left the model because of their poor performance or low payments. In that scenario, impacts estimated by excluding the withdrawn practices would reflect a combination of the impact of PCF participation on Medicare expenditures *and* the impact of PCF payments on PCF participation.

Exhibit 5.5. PCF increased Medicare Part A and B expenditures more for practices that stayed in PCF in performance years 2 and 3 than for the main analytic population of all practices that ever participated in PCF



Source: Mathematica's analysis of Medicare claims data from January 2019 to December 2023.
Note: Error bars represent impact estimate standard errors;
PBPM = per beneficiary per month; PCF = Primary Care First.

C. Effects of PCF on leading indicators

There is limited evidence that PCF has led to substantially different performance in the leading indicators than we observe in the comparison group. We summarize results for leading indicators—measures, including select quality outcomes, that we would expect to see improve early in the model if PCF lowers acute hospitalizations and Medicare spending—in Exhibit 5.6. For brevity, we show cumulative estimates for performance years 1 and 2. Detailed year-by-year results appear in Appendix Exhibit B.7.4.

Of the 11 leading indicators we examined, we found favorable results for three measures and one unfavorable result for billable primary care services within seven days of a hospital discharge. The favorable results include a 1.1 percent increase in ambulatory primary care visits by attributed beneficiaries,[12] a 51.7 percent increase in practice revenue for primary care visits by attributed beneficiaries (including model payments),[13] and a 2 percent increase in the proportion of beneficiaries receiving an Annual Wellness Visit. The increase in Annual Wellness Visits likely reflects PCF incentives for performing these visits because CMS attributes beneficiaries based in part on Annual Wellness Visits when calculating the model's PBPs. This Annual Wellness Visit result also aligns with interview findings in which some practices reported hiring additional staff to increase outreach and capacity for conducting Annual Wellness Visits (see Chapter 4).

We found PCF had an unfavorable impact for one leading indicator. PCF resulted in a 0.6 percent reduction in billable primary care services within seven days of a hospital discharge (it is possible that PCF influenced non-billable services for follow-up care, but we are not able to measure this in claims). We found no evidence that PCF had a statistically significant impact on the other seven leading indicators we assessed over performance years 1 and 2 (Exhibit 5.6).

Exhibit 5.6. There is limited evidence that PCF improved leading indicators

Leading indicator	PCF outcome mean	Average impact estimate (SE) for performance years 1 and 2	Percentage impact	*p*-value
Measures we expect PCF to increase				
Ambulatory primary care visits by attributed beneficiaries (per 1,000 beneficiaries per year)	2,819	31 (16)	1.1%	0.06
Practice revenue for primary care visits by attributed beneficiaries ($ PBPM)	$39	$13 (<$1)	51.7%	<0.01

[12] We approximate this measure using ambulatory primary care services that beneficiaries received at practices in their assigned treatment group (that is, services received by beneficiaries assigned to a PCF practice at all PCF practices and services received by beneficiaries assigned to a matched comparison practice at all comparison practices).

[13] We approximate this measure using the fraction of revenue for a PCF or comparison practice obtained through primary care services for beneficiaries in their assigned treatment group (that is, revenue to a PCF practice from primary care services for beneficiaries assigned to any PCF practice and revenue to a matched comparison practice from primary care services for beneficiaries assigned to any comparison practice).

Leading indicator	PCF outcome mean	Average impact estimate (SE) for performance years 1 and 2	Percentage impact	*p*-value
Proportion of beneficiaries who received an Annual Wellness Visit	0.54	0.011 (0.004)	2.0%	<0.01
Proportion of inpatient discharges, ED visits, or observation stays with follow-up billable service within seven days	0.51	-0.003 (0.001)	-0.6%	0.01
Telehealth use (per 1,000 beneficiaries per year)	776	-8 (11)	-1.0%	0.49
Proportion of eligible beneficiaries who adhere to medications prescribed for multiple chronic conditions	0.69	0.001 (0.001)	0.2%	0.26
Days in hospice (per year) for beneficiaries receiving hospice care	73	<1 (<1)	0.8%	0.57
Behavioral health visits to behavioral health specialists in an ambulatory setting (per 1,000 beneficiaries per year)	609	2 (5)	0.3%	0.69
Measures we expect PCF to decrease				
Observation stays (per 1,000 beneficiaries per year)	88	<1 (<1)	0.2%	0.77
Proportion of elderly beneficiaries experiencing high-risk medication use	0.13	<-0.001 [a] (<0.001)	<-0.1% [b]	0.96
Number of primary-care-adjacent low-value services (per 1,000 beneficiaries per year)	126	1 (1)	1.1%	0.22

Source: Analysis of Medicare claims data from January 2019 to December 2023.

Notes: We calculated percentage impacts by dividing the impact estimate by the estimated counterfactual, where the counterfactual is represented by the PCF mean outcome minus the impact estimate for the same performance year (that is, the mean outcome we calculate PCF practices would have experienced without the PCF Model). The percentage impacts we report may differ from those calculated from the PCF means and impact estimates in this exhibit because of rounding. We also estimated model impacts for urgent care center visits, ambulatory primary care visits, and proportion of eligible beneficiaries who received a transitional care management-billable service. Results for these measures are not shown in the exhibit (but do appear in Appendix Exhibit B.7.4) because these leading indicators did not pass tests of regression model assumptions (specifically, parallel trends tests), needed to interpret estimates as impacts of PCF.

[a] The impact estimate is between 0 and -1.

[b] The percentage impact is between 0 and -0.1 percent.

ED = emergency department; PBPM = per beneficiary per month; PCF = Primary Care First; SE = standard error.

PCF's limited impact on leading indicators helps explain why we did not see reductions in acute hospitalizations and Medicare Part A and B expenditures during the first three performance years. Leading indicators are measures we expect to have improved for PCF practices relative to the comparison group if PCF is to improve the primary outcomes. Similar to the primary outcome results, the findings for leading indicators do not necessarily imply that PCF practices' care delivery changes have no influence on leading indicators but rather that practice care delivery changes have not resulted in improvements relative to similar practices not participating in the model. We will continue to monitor the leading indicators for the remainder of the evaluation to assess whether delivery changes

PCF practices make partway through the model are likely to result in substantially different performance in primary outcomes relative to the comparison group.

D. Effects of PCF on secondary outcomes

We found little evidence of impacts across a range of secondary outcomes we examined related to expenditures, service use, and quality of care. Exhibit 5.7 summarizes cumulative impact estimates over performance years 1 and 2 for these outcomes. None of the estimates were statistically significant, and the probability that a secondary outcome decreased (that is, improved) by at least 1 percent relative to the comparison group was low (27 percent or less). The results by performance year are similar to those shown in Exhibit 5.6; the detailed results appear in Appendix B.7 (Exhibits B.7.5, B.7.6, and B.7.17). In addition, among the six secondary outcomes examined, we estimated that only one (outpatient ED visits) had a greater than 50 percent probability of decreasing by any amount over the first two performance years (Exhibit 5.8).

Exhibit 5.7. We find little evidence that PCF led to changes in secondary outcomes for Medicare FFS beneficiaries over the first two performance years

Secondary outcome	PCF outcome mean	Average impact estimate (SE) for performance years 1 and 2	Percentage impact	*p*-value	Probability the outcome decreased for PCF practices, relative to comparisons, by at least 1%
Inpatient expenditures ($PBPM)	$336	<-$1 [a] ($2)	-0.3%	0.64	21%
Post-acute care expenditures ($ per post-acute care episode)	$33,230	$34 ($147)	0.1%	0.82	17%
Outpatient ED visits (per 1,000 beneficiaries per year)	396	<-1 [a] (2)	<-0.1% [b]	0.95	24%
Primary-care-substitutable ED visits (per 1,000 beneficiaries per year)	132	<1 |(1)	0.2%	0.68	27%
Proportion of inpatient discharges with unplanned 30-day acute care	0.24	0.002 (0.001)	0.8%	0.17	7%
Proportion of inpatient discharges with unplanned 30-day readmission	0.15	0.001 (0.001)	0.8%	0.29	16%

Source: Mathematica's analysis of Medicare claims data from January 2019 to December 2023.

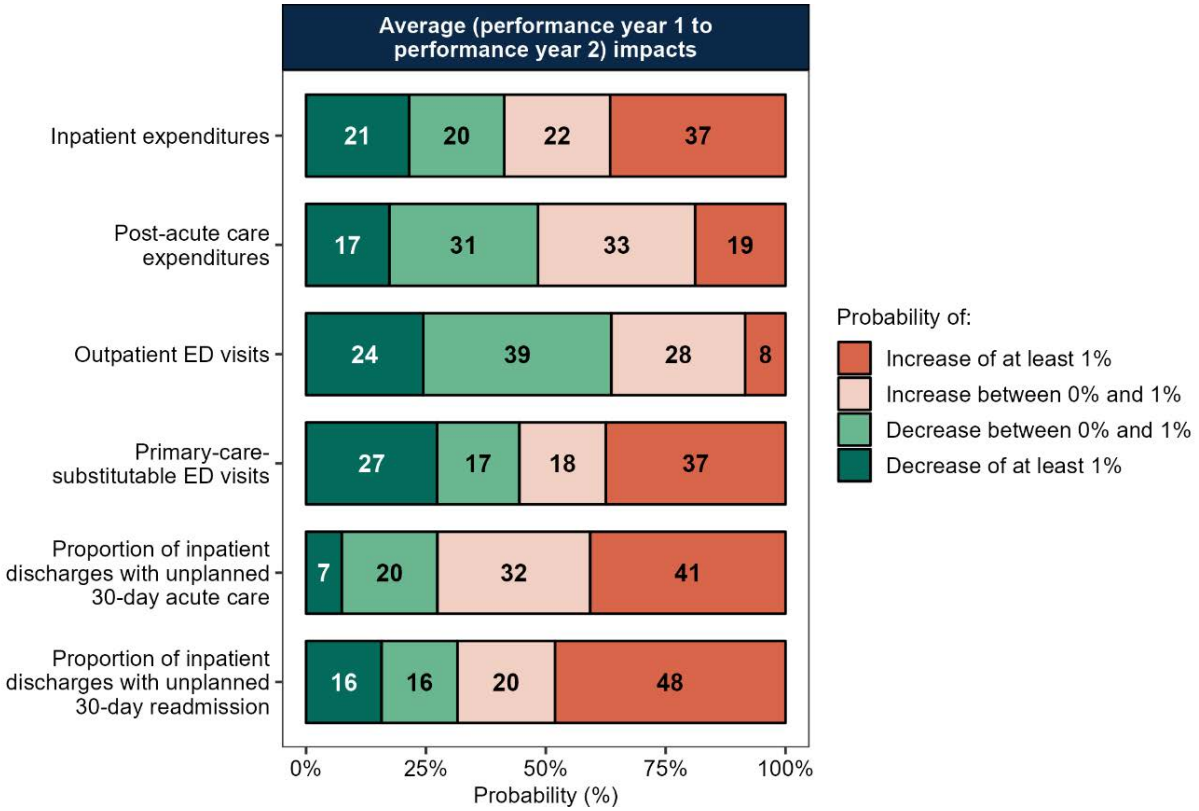
Notes: We calculated percentage impacts by dividing the impact estimate by the estimated counterfactual, where the counterfactual is represented by the PCF mean outcome minus the impact estimate for the same performance year (that is, the mean outcome we calculate PCF practices would have experienced without the PCF Model). The percentage impacts we report may differ from those calculated from the PCF means and impact estimates in this exhibit because of rounding. The probabilities of decreases in outcomes come from the hybrid frequentist–Bayesian analysis and reflect model impacts (that is, decreases relative to the comparison group) as a percentage of the counterfactual. We also estimated model impacts for medical admissions. Results for this outcome are not shown in the exhibit (but do appear in Appendix Exhibits B.7.5 and B.7.17) because it did not pass the tests of regression model assumptions (specifically, parallel trends tests) needed to interpret estimates as impacts of PCF.

[a] The impact estimate is between 0 and -1.

[b] The percentage impact is between 0 and -0.1 percent.

ED = emergency department; FFS = fee for service; PBPM = per beneficiary per month; PCF = Primary Care First; SE = standard error.

Exhibit 5.8. There is a low probability that PCF improved secondary outcomes by at least 1 percent relative to the comparison group over the first two performance years



Source: Mathematica's analysis of Medicare claims data from January 2019 to December 2023.
PCF = Primary Care First.

Overall, findings for secondary outcomes align with key takeaways presented earlier in the chapter that PCF has not led to meaningful improvements in primary outcomes or changes for leading indicators relative to the comparison group. We will continue to assess these outcomes in future reports, as it is possible improvements may appear in later performance years.

E. Differences in effects by subgroups

We tested for variation in PCF's impacts by four practice characteristics, measured at the start of the model, that could affect either practices' readiness for change or practices' response to the PCF payment incentives. The practice characteristics we examined included the following:

1. **Former CPC+ participation:** Former CPC+ participants in PCF may have greater readiness to make changes than other PCF practices but also potentially less room to improve their outcomes.
2. **Participation in the Medicare Shared Savings Program:** Participants in this program bring experience in value-based care to PCF, potentially resulting in more immediate impacts of PCF on outcomes, but also potentially leaving less room to improve their outcomes.

3. **Affiliation with a hospital-based health system:** PCF participation is often implemented at the larger organizational level, which can help promote change activities through access to additional resources but reduce local practice control over care changes. In addition, for hospital-based systems in particular, there could be weaker incentives to reduce acute hospitalization rates because doing so reduces system revenue, potentially leading to larger impacts of PCF for practices not affiliated with a hospital-based health system.
4. **Whether the practice is a multispecialty practice or primary care only:** Practices that provide only primary care may have more incentive to respond to PCF than multispecialty practices because PCF revenue likely accounts for a larger share of total revenue at primary care-only practices, potentially leading to larger impacts.

We further tested for variation in impacts by two beneficiary characteristics measured at the start of the model. These characteristics included the following:

1. **Behavioral health condition status** to assess whether requirements for PCF practices to integrate behavioral health in care changes have improved outcomes for beneficiaries with these conditions.
2. **Dual eligibility status for Medicare and Medicaid** to assess whether PCF reduces health disparities.

For each practice and beneficiary characteristic examined, we estimated impacts for Medicare Part A and B expenditures and a limited set of measures (acute hospitalizations, primary-care-substitutable ED visits, and visits to a behavioral health specialist in an ambulatory setting) that we hypothesized could differ by the given characteristic. Appendix A.2.4 provides further details on the subgroups we analyzed.

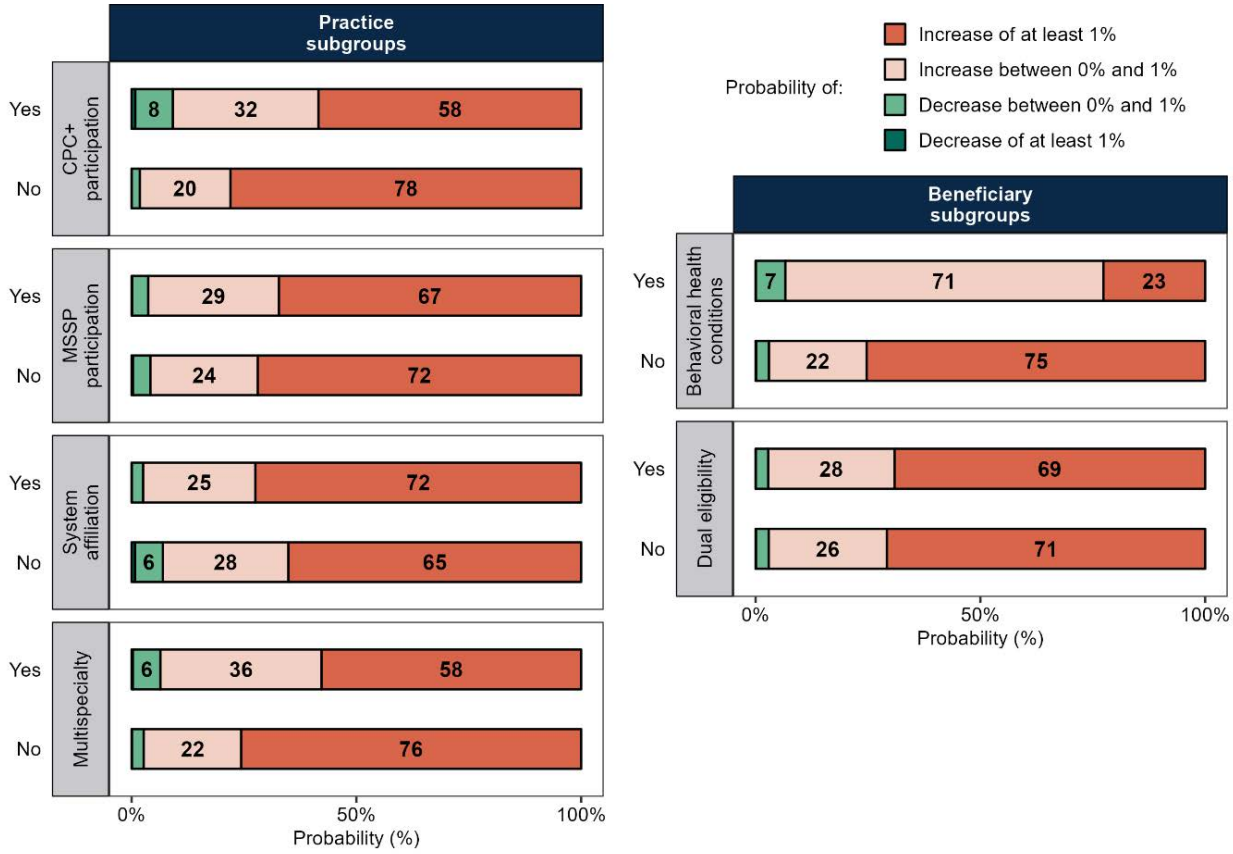
We found little evidence that PCF impacts for Medicare Part A and B expenditures differed by practice and beneficiary characteristics. Because the subgroup results for Medicare Part A and B expenditures are consistent across performance years, we show cumulative results over the first two performance years in Exhibit 5.9, focusing on the hybrid frequentist–Bayesian probabilities. Results for each subgroup indicate a more than 90 percent probability that Medicare Part A and B expenditures increased during the first two performance years. Moreover, the probability that impact estimates differed by at least 1 percent between one subgroup category and its counterpart (for example, former CPC+ participants versus non-participants) was 30 percent or less. See Appendix Exhibits B.7.7 and B.7.8 as well as Appendix Exhibits B.7.18 and B.7.19 for year-by-year results.

For outcomes other than Medicare Part A and B expenditures, one or more subgroups did not meet the assumptions required for interpreting regression estimates (both frequentist and hybrid frequentist–Bayesian estimates) as true PCF impacts.[14] In cases in which the regression assumptions were met, such as when comparing PCF's impacts on acute hospitalizations for practices with and without hospital-based system affiliation, the results were similar to our estimates for the full study population (that is, we did not find evidence that PCF reduced acute hospitalizations). Full subgroup results for these

[14] Specifically, we found evidence of PCF–comparison differences in baseline trends for one or more subgroups. The key difference-in-differences assumption requires that differences in outcomes between PCF and comparison practices would have remained stable over time if not for the intervention.

outcomes are available in Appendix Exhibits B.7.9 to B.7.15 as well as in Appendix Exhibits B.7.20 to B.7.23.

Exhibit 5.9. Among all subgroups, there was a high probability that PCF increased Medicare Part A and B expenditures over the first two performance years.



Source: Mathematica's analysis of Medicare claims data from January 2019 to December 2023.

Notes: For readability, we did not label very small bar segments. Including the unlabeled segments, the total probability in each bar sums to 100 percent.

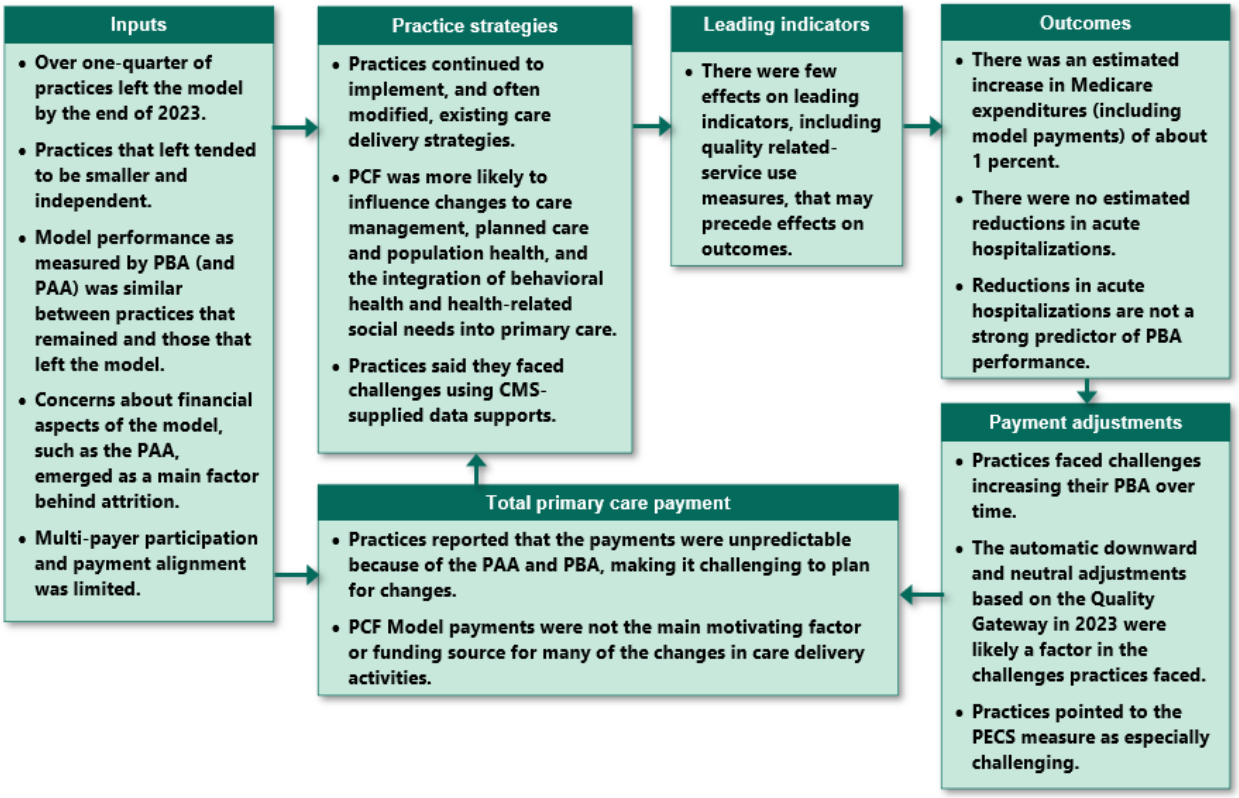
CMS = Centers for Medicare & Medicaid Services; CPC+ = Comprehensive Primary Care Plus; MSSP = Medicare Shared Savings Program; PCF = Primary Care First.

6. Conclusion

CMS designed the PCF Model to test whether moving Medicare's primary care payment structure away from FFS to a combination of FVFs and predicable PBPs, with the potential for positive and negative performance adjustments, can lead to reductions in acute hospital utilization and lower total cost of care while preserving or improving quality. Under PCF, CMS provides practices the flexibility to deliver care in a manner best suited for their patient population and holds practices accountable for their performance on quality and utilization or expenditure measures.

This report evaluates the participants' experiences and model outcomes over the first three years for the first cohort of participants and the first two years for the second cohort. Specifically, the report covers how model participation and outcomes interacted with the characteristics of participating practices and practices' responses to the payment structure, incentives, and supports. Exhibit 6.1 shows a summary of the key findings in the PCF logic model's framework.

Exhibit 6.1. Summary of key findings through 2023



CMS = Centers for Medicare & Medicaid Services; PAA = payment accuracy adjustment; PBA = performance-based adjustment; PCF = Primary Care First; PECS = Patient Experience of Care Survey.

PCF practices remained engaged as they continued to implement, and often modified, care delivery strategies that existed at the start of their participation. But most practices said that PCF participation was one factor among many that influenced their approach to changing care delivery. Relative to other areas of care delivery, more PCF practices were motivated by PCF goals to change their care management, planned care and population health, and behavioral health and health-related social needs integration. Practices tended to focus on enhancing their existing care management strategies and adding new strategies related to comprehensiveness of and access to care. Most of the specific activities that practices adopted during their second and third years of participation fell within three broad categories: (1) workflows, (2) staffing, and (3) data and technology. As we described earlier in the report, PCF participants are practices that reported the capability to deliver advanced primary care as part of the model requirements, and more than two-thirds of practices that joined as part of Cohort 2 participated in CPC+ (Conwell et al. 2022). Because of these factors, it is perhaps unsurprising that they chose to support existing activities instead of starting new ones. However, this strategy limits the potential for PCF to affect outcomes. If the PCF Model is not a major motivational or financial factor for practice change, then we cannot conclude that PCF is driving changes in patient outcomes.

To date, there has been limited payer participation and engagement

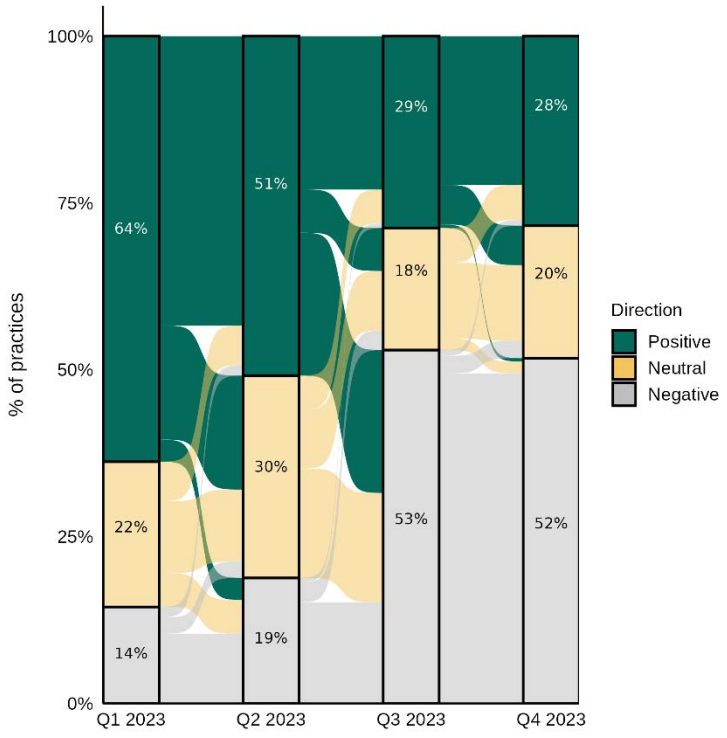
CMS encouraged payers to align with the PCF Model to provide payment and other supports for practices so they could provide care delivery changes to more of their patient panel. To date, six of the 23 participating payer partners have withdrawn from the PCF Model, and two of the 23 are participating but have no active contracts with practices (and are therefore not providing PCF-related supports).

Payer representatives described challenges using existing billing systems to make PCF capitated payments, high practice attrition in their regions, and challenges with multi-payer collaboration and alignment as the factors that led them to prioritize their internal initiatives over PCF.

For example, payers need to update their data systems to calculate capitation, which is a large investment for payers that are not providing capitated payments outside of PCF. Further, some payer representatives noted that the low rates of practice participation results in low return on investment, making the incentives for investing in data systems or designing new payment models or supports unconvincing.

Practices generally had a hard time moving into a positive PBA category, partly because of the automatic adjustments for failing the Quality Gateway that went into effect in 2023, and, in interviews, practices pointed to their performance on the PECS as a reason for their difficulties. The Sankey figure (Exhibit 6.2) shows how the proportion of positive, negative, and neutral PBAs changed quarterly in 2023 for Cohort 1. More than half of Cohort 1 practices earned a positive PBA in the first two quarters of 2023, but few practices were able to move from a negative PBA (gray) to a positive one (green). Starting in quarter 3 2023, Cohort 1 practices that failed the Quality Gateway received an automatic negative 10 percent PBA—resulting in larger shifts from positive PBAs (in green) to neutral (yellow) and negative (gray). In response to practice feedback, CMS changed the PECS benchmark starting in performance year 2023 from one based on the 30th percentile among participating practices to a static 77 percent.

Exhibit 6.2. The automatic downward PBA adjustment in Q3 reduced the number of Cohort 1 practices that received a positive PBA



Source: Mathematica's analysis of 2023 PCF payment data to Cohort 1 practices.

Notes: This Sankey diagram shows how the proportion of positive, negative, and neutral PBAs changed from one quarter of 2023 to the next. The three stacked bars show the proportion of practices earning a positive, negative, and neutral PBA in each quarter and the flows between them show how each category feeds into the subsequent quarter.

PBA = performance-based adjustment; PCF = Primary Care First; Q = quarter.

Practices generally understood the PCF Model's design but thought the PAA was unfair and felt that they had little control over it partly because of the methodology used to identify practitioner specialties. The PAA was more than 30 percent on average across all participating practices in 2023. Practices expressed concern that the PAA methodology miscategorized nurse practitioners and that specialist services they provided were counting toward the PAA. These concerns were supported in the data, with 70 percent of PAA-eligible primary care services delivered by nurse practitioners contributing to the PAA, compared with 21 percent of services delivered by physicians. Limitations in the data used to identify nurse practitioners' specialty are the likely source of this discrepancy. The current PAA methodology uses the National Plan and Provider Enumeration System to identify specialty, but this system's specialty designations are not updated regularly, and there are few specialty categories for nurse practitioners, making this a challenging issue to address.

Practices in larger health care organizations expressed concern that the PAA penalized organizations for expanding PCF beneficiaries' access to care at non-PCF practices, but the data did not support this claim. Despite the higher PAA for practices affiliated with a larger health care organization, we estimate the organization earned on average just over $1 PBPM more under the current PAA methodology than if all primary care services were delivered at the PCF practice. Our analysis, however, does not show how the PAA affected individual practices in the larger organization because this depends on the arrangements between the practices and the parent organization.

The perceived unpredictability of the PAA and PBA underscores the importance of CMS-provided data tools to help manage where patients seek care and inform practices' care delivery changes. Practices experienced challenges identifying how to improve and predict the PAA, and this contributed to the perception that they were unable to predict PCF payments in future quarters, since the PAA is applied to the PBP. Practices reported that the CMS-supplied data supports were challenging to use, and this deepened the sentiment that PCF payments were unpredictable.

The above factors have contributed to substantial attrition—27 percent of practices left the model by the end of 2023—and the reasons for leaving the model shifted over time, with fewer practices leaving to join other Innovation Center models and more practices leaving because of concerns about financial aspects of PCF such as the PAA. Most practices leaving the model voluntarily withdrew, and the practices that left were more likely than those that remained to be small, independent, or located in rural areas or areas with lower median household income. Yet practices that stayed in the model and practices that left had similar levels of PAA and PBA. In the first performance year, around half of practices that left the model left to join another Innovation Center model, and another 10 percent of practices reported withdrawing because of challenges implementing the PCF Model's requirements. In 2023 (Cohort 1's third performance year and Cohort 2's second), about half of exiting practices reported leaving the model because of concerns over the PAA.

PCF did not reduce hospitalizations and led to a 1 percent increase in Medicare expenditures (including model payments). A lack of favorable findings for the evaluation's primary outcomes is consistent with findings of few effects on secondary outcomes such as ED visits or on leading indicators—measures for which we may expect effects to emerge before effects on primary outcomes—such as visits to behavioral health specialists.

These findings likely reflect a combination of starting high performance, the limited role PCF had in influencing changes to care delivery activities and strategies, and the anticipated timing of impacts to emerge. For example, PCF was designed for practices with the capabilities to deliver advanced primary care, and practices started PCF with strong performance on hospitalizations. Cohort 1 practices entered the model with hospitalization rates and expenditures similar to those of CPC+ participants in 2020, their fourth performance year (see Exhibit 6.3). Through interviews and self-reported practice data, we know that PCF is playing a limited role in the changes practices are making, which may constrain PCF's ability to directly affect outcomes. Finally, CMS hypothesized that effects of the model would emerge around year four of participation, which is 2024 for Cohort 1 and 2025 for Cohort 2, so it may be too early to detect impacts.

Exhibit 6.3. In 2020, before PCF's launch, Cohort 1 PCF practices and CPC+ participants had similar levels of spending and acute hospitalizations

	PCF Cohort 1	CPC+ (Track 1)	CPC+ (Track 2)
Acute hospitalizations (annualized per 1,000 beneficiaries)	240	243	245
Total Medicare expenditures ($ per beneficiary per month)	$919	$944	$940

Source: Mathematica's analysis of Medicare FFS claims and enrollment data in 2020 and CPC+ Fourth Annual Report Supplementary Appendices

CPC+ = Comprehensive Primary Care Plus; PCF = Primary Care First.

We found no reduction in acute hospitalizations through 2023, but more than 69 percent of PCF practices received a positive PBA in at least one calendar quarter of that year indicating that the PBA and our estimated model impacts measure practice performance along different dimensions. The evaluation's impact estimates for acute hospitalization represent our best approximation of how much PCF participation has changed the practices' acute hospitalization rate, relative to what they would have achieved without PCF. (We estimate this by comparing the changes in PCF practices' outcomes with the changes in outcomes among a comparison group of primary care practices similar to the PCF participants.) In contrast, PBA amounts reflect (1) how well the PCF practices perform relative to national and regional benchmarks for acute hospitalizations and relative to their own historical performance and (2) performance on the quality measures included in PCF's Quality Gateway. As described in Chapter 5, we find evidence of these differing dimensions through the weak association between practice-level impacts and PBAs, meaning that achieving a high PBA was not strongly associated with estimated reductions in acute hospitalizations relative to the comparison group. However, it would not be practical for CMS to determine PBA amounts based on impact estimates from the evaluation because of the data lag required. PCF participants might also find performance benchmarks easier to understand and thus more transparent than impact estimates.

The lack of PCF impacts does not necessarily imply that PCF practices' care delivery changes had no effects on outcomes but rather that their changes did not lead to substantively different effects compared with the changes of non-PCF practices in the comparison group. PCF targeted practices that reported having the capability to deliver advanced primary care, and—because the evaluation aims to assess effects *caused* by the PCF Model—we purposely compare the PCF practices' performance with performance among non-PCF practices in the same local markets and that looked similar before the model began along dimensions suggesting advanced primary care. The comparison practices might have been motivated to improve care delivery for their patients in ways similar to PCF participants, despite not participating in the model. In addition, PCF participation is one factor among many that may have influenced how PCF participants make changes to care delivery. For example, participation in other value-based payment initiatives was common among participants, and they cited these initiatives as contributing to their care delivery changes. Some comparison practices likely also participated in other initiatives and were likely making care delivery changes in response to the initiatives they participated in and improving care for their patients. If we assume that other practices made changes to improve care delivery, then we interpret our results to mean that PCF did not have an additional impact on hospitalizations above and beyond what would have happened if practices made changes and improved care without PCF payments and supports.

A. Looking toward future evaluation activities

PCF is now more than halfway through the model test period, and, going forward, the evaluation will continue to examine how practices implement the model, including perceived barriers and facilitators, and investigate practitioners' and beneficiaries' experiences through new surveys. We will also continue to estimate impacts to see whether the model is meeting its goal of reducing Medicare expenditures.

The ability to use data to inform care delivery decisions and predict payments, and PCF's role in changes to staffing, have emerged as themes in our analysis, and we will analyze new PCF Portal questions on these topics. Questions include how practices use CCLF data files and the DFT as well as the barriers they encounter when using these data tools. Questions related to staffing will focus on challenges practices have faced in hiring and retaining different types of staff.

One of PCF's goals is to improve beneficiaries' experience of care, and we will conduct interviews in spring 2025 with beneficiaries to assess their experiences receiving the primary care services that PCF practices provide and whether these services help patients manage their medical conditions and improve their health. Findings from these interviews will be reported in early 2026 in the next (fourth) evaluation report.

In winter and spring 2025, we will finalize our exemplar study to identify factors and describe strategies that practices believe contribute to their high performance in reducing acute hospitalizations. We identified practices that were in the top quartile of PCF practices that reduced their acute hospitalization rate from baseline to 2023 while participating in the PCF Model and selected 19 practices for the study. We aim to describe strategies exemplar practices used during their participation in PCF and the role of PCF in motivating or supporting those strategies and will report results in the fourth evaluation report.

Findings from the exemplar study will inform content for a survey of practitioners in PCF and comparison practices that will be fielded in fall 2025. As we described, comparison practices may be implementing care delivery changes similar to those of PCF practices, and the survey can illuminate similarities and differences in care delivery approaches between participants and non-participants. We will present the survey findings in our fifth evaluation report in early 2027.

We will continue to estimate impacts on primary and secondary outcomes and leading indicators, adding additional years of data, and exploring the potential inclusion of additional measures and subgroups. Finally, we will monitor attrition, including reasons why practices and payers are leaving the model.

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APPENDICES

Appendix A.1. Primary data collection methods and processes

A.1.1. PCF Practice Portal data

The Centers for Medicare & Medicaid Services (CMS) requires all participating Primary Care First (PCF) practices to submit a Care Delivery Intervention Report annually through the PCF Practice Portal. The data in these reports provide a mechanism for tracking practices' efforts to implement the comprehensive primary care functions (that is, access and continuity, care management, planned care and population health, comprehensiveness and coordination, and patient and caregiver engagement and education) that CMS identified as drivers of model outcomes.

A. Content

The PCF Practice Portal reporting content is broadly divided into two main sections:

- **Care Delivery questions:** The CMS Innovation Center developed the Care Delivery questions to provide an annual self-assessment of practices' current levels of care delivery capabilities.
- **General Model questions:** Mathematica's evaluation team developed the General Model questions on a broad set of topics, such as reasons and goals for participation, planned and actual care delivery changes (as reported in a series of close-ended questions), planned and actual strategies to reduce avoidable hospitalizations or expenditures (as reported in an open-ended question and subsequently coded), confidence and challenges in reducing hospitalizations or costs, the role of practice leads or champions, practice site management, and other topics.

The full text of the portal questions is available in Section G below.

B. Data collection timing

For this third annual report, we primarily focus on General Model portal data collected at the end of practices' second year of PCF participation for Cohort 2 and third year of PCF participation for Cohort 1, which CMS began collecting in October 2023 (Exhibit A.1.1.1). This report also includes a longitudinal analysis comparing these data with data collected at the end of practices' first year of participation in PCF (2021 for Cohort 1, 2022 for Cohort 2) to see how practices' efforts to improve their care delivery have changed during the course of the model.

Exhibit A.1.1.1. Schedule for annual PCF Practice Portal data collection

Round	Cohort 1	Cohort 2
Baseline	March/April 2021	October/November 2021
PY 1	December 2021/January 2022	October 2022
PY 2	October 2022 (Care Delivery items only)[a]	October 2023[b]
PY 3	October 2023[b]	October 2024
PY 4	October 2024	October 2025[c]
PY 5	October 2025[c]	October 2026[c]

[a] Cohort 1 practices were inadvertently asked the incorrect set of General Model questions in October 2022, so the General Model data are not usable for performance year 2 for Cohort 1. This issue did not affect the performance year 2 Care Delivery items, nor did it impact Cohort 2 data.

[b] The green shaded cells (October 2023) indicate the focus of Annual Report 3 PCF Practice Portal data analysis.

[c] This indicates a planned future round of data collection.

PCF = Primary Care First; PY = performance year.

C. Data analysis inclusion criteria

Our analysis of the PCF Practice Portal data included practices that met the following criteria: (1) they were active in PCF as of the start of the data collection period for the respective cohorts and rounds, and (2) they answered at least one question (that is, they did not leave the portal reporting questions completely blank). Although reporting in the PCF Practice Portal is a mandatory part of participation in PCF, a few practices did not submit any responses in each round of data collection (see Exhibit A.1.1.2). For data analysis of October 2023 General Model items, the total number of practices across both cohorts was 2,483, with a response rate of 99.7 percent. In nearly all instances in which an active practice did not answer any portal reporting questions, the practice went on to drop out of PCF.[15]

Exhibit A.1.1.2. PCF Practice Portal data analysis sample sizes and response rates, by performance year and cohort

	Cohort 1	Cohort 2	Total
Baseline	**March 2021**	**October 2021**	
Number active as of the start of data collection	828	2,228	3,056
Number active that answered at least one question	GM: 814 CD: 828	GM: 2,198 CD: 2,211	GM: 3,012 CD: 3,039
Unweighted response rate	GM: 98% CD: 100%	GM: 99% CD: 99%	GM: 99% CD: 99%
Performance year 1	**December 2021**	**October 2022**	
Number active as of the start of data collection	807	2,178	2,985
Number active that answered at least one question	GM: 785 CD: 789	GM: 2,156 CD: 2,156	GM: 2,941 CD: 2,945
Unweighted response rate	GM: 97% CD: 98%	GM: 99% CD: 99%	GM: 99% CD: 99%

[15] Five Cohort 2 practices left the General Model section completely blank, so we dropped them from our analysis. These five practices have since dropped out of PCF.

	Cohort 1	Cohort 2	Total
Performance year 2/performance year 3	October 2023	October 2023	
Number active as of the start of data collection	576	1,912	2,488
Number active that answered at least one question	GM: 576 CD: 576	GM: 1,907 CD: 1,909	GM: 2,483 CD: 2,485
Unweighted response rate	GM: 100% CD: 100%	GM: 99.7% CD: 99.8%	GM: 99.8% CD: 99.9%

Note: Unweighted response rate is the number that answered at least one question divided by the number active as of the start of data collection.

CD = Care Delivery section; GM = General Model section; PCF = Primary Care First.

We conducted a longitudinal analysis comparing data collected at the end of practices' first year of participation in PCF (2021 for Cohort 1, 2022 for Cohort 2) with the most recent data collection period for both cohorts (2023 for Cohorts 1 and 2). Our longitudinal analysis includes practices that met the eligibility requirements described above for both rounds of data collection. Almost all practices eligible for inclusion in the analysis of portal data collected in 2023 (performance year 2 for Cohort 2 and performance year 3 for Cohort 1) were eligible for the longitudinal data analysis (99.5 percent).

D. Methods for analyzing quantitative data

We reviewed the frequencies of all quantitative, closed-ended items in the portal in aggregate and stratified by key practice characteristics subgroups: cohort, risk group, Comprehensive Primary Care Plus (CPC+) participation status, parent organization, practice size, Medicare Shared Savings Program participation status, specialty designation, and practice Social Vulnerability Index (SVI) quartile. Exhibit A.1.1.3 provides definitions and data sources for the subgroups. For some practice characteristics, we used data as of the end of practices' second year of PCF participation for Cohort 2 and third year of PCF participation for Cohort 1 to align with our contemporaneous focus on the portal data as a snapshot of practices at one point in time. For other practice characteristics, we used baseline data to align our analytic approach with other PCF evaluation analyses.

Exhibit A.1.1.3. Definitions and data sources for subgroup analyses of practice characteristics

Practice characteristic	Definition	Source	Date
Cohort	Cohort 1 practices began participating in PCF in 2021, and Cohort 2 practices began in 2022	PCF practice roster data	Cohort 1: September 2023 Cohort 2: September 2023
Risk group	PCF risk group *(data as of performance year 3 for Cohort 1 and performance year 2 for Cohort 2)*	PCF practice roster data	Cohort 1: September 2023 Cohort 2: September 2023
Practice size	Number of active providers for the practice site: small = fewer than three providers, medium = three to nine providers, and large = 10 or more providers *(this reflects provider counts reported in the September 2023 roster data)*	PCF practice roster data	Cohort 1: September 2023 Cohort 2: September 2023

Practice characteristic	Definition	Source	Date
CPC+ participation status	Whether the practice is a former CPC+ participant *(historical data)*	ITT participation data from Mathematica's evaluation of CPC+	Not applicable
Medicare Shared Savings Program participation status	Whether the practice participated in the Medicare Shared Savings Program *(baseline data)*	Master Data Management file (accessed via VRDC)	Cohort 1: 2019–2020 Cohort 2: 2020–2021
Parent organization	Type of affiliation with a parent organization: • Independent = the practice is marked as independent • Practices in hospital system= the practice is marked as being part of a parent organization that includes a hospital • Practices in other types of parent organizations = the practice is not marked as independent or part of a parent organization that includes a hospital *(baseline data)*	IQVIA OneKey database	Cohort 1: 2020 Cohort 2: 2021
Specialty designation	Whether the practice is multispecialty versus primary care only *(baseline data)*	IQVIA OneKey database	Cohort 1: 2020 Cohort 2: 2021
SVI quartile	What quartile practices' SVI score falls into compared to all other PCF practices. Practice SVI score was determined based on the mean SVI scores of the census-tract residences of assigned beneficiaries for the practice.[a] *(baseline data)*	Publicly available CDC data	Cohort 1: 2020 Cohort 2: 2020

[a] SVI score represents the relative level of a community's social vulnerability compared to other communities and is based on 15 U.S. Census variables such as poverty, lack of vehicle access, and crowded housing.

CDC = Centers for Disease Control and Prevention; CPC+ = Comprehensive Primary Care Plus; ITT = intention-to-treat; PCF = Primary Care First; SVI = Social Vulnerability Index; VRDC = Virtual Research Data Center.

When reviewing differences between subgroups, we focused on differences in which the proportion of practices that reported making that change differed by 10 percentage points or more compared with the other subgroup in a two-way comparison (such as participation versus non-participation in the Medicare Shared Savings Program) or compared with both other subgroups for that characteristic in a three-way comparison (such as small versus medium versus large practice size).

E. Methods for analyzing open-ended responses

For the October 2023 PCF Practice Portal data collected at the end of practices' second year of PCF participation for Cohort 2 and third year of PCF participation for Cohort 1, we used natural language processing to analyze the open-ended item ("What have been your practice site's main strategies for reducing hospitalizations or costs during your first year of participation in PCF?") included in the portal. We trained the natural language processing model using manually coded data for this question from previous rounds of data collection. The natural language processing model predicted whether practices' answers fell into one of the following categories: access and continuity, care management, planned care

and population health, comprehensiveness and coordination, patient and caregiver engagement and education, staffing, preventive care, and other.

F. Data interpretation guidance

A few important caveats about interpreting data from the PCF Practice Portal:

- These are self-reported data and are not objective measures of practice activities. For example, it is possible a practice reported in the portal that it did not increase its revenue when an objective comparison of revenue data would reveal it did increase practice revenue, or vice versa.
- Portal respondents, typically those affiliated with parent organizations that have multiple practices in PCF, sometimes provided identical responses for more than one practice. This is particularly evident in the free text responses, when it was sometimes clear that the answer was copied and pasted repeatedly for different practices.
- We know from interviews that parent organization–level respondents might not be in the same location as the practice sites for which they are answering questions and might have a perspective that differs from what is happening at an individual practice site, meaning that their responses might be more similar than if different respondents based at the individual sites filled out the portal.
- The close-ended question format means that practices' answers to these questions do not allow for nuanced answers or provide much information on the intensity or breadth of a given care delivery activity.

G. Items asked in the PCF Portal

A.1.1.4. Timing of the PCF Practice Portal reporting

Reporting wave	Cohort 1	Cohort 2
Baseline	March/April 2021	October/November 2021
PY 1	December 2021/January 2022	October 2022
PY 2	October 2022[a]	October 2023
PY 3	October 2023	October 2024
PY 4	October 2024	October 2025
PY 5	October 2025	October 2026

[a] Chapter 6 data (General Model items) are not usable for performance year 2 for Cohort 1 because, although both cohorts got the same wording, the wording was not correct for Cohort 1. This issue does not affect the performance year 2 Care Delivery items.

PY = performance year.

Chapter 1. Access and continuity

1.1. 24/7 access

	Baseline	Year 1	Oct 2023	Oct 2024
Does your practice provide 24/7 access to care informed, when necessary, by real-time access to the patient's EHR? ○ No, we do not have 24/7 access to care guided by the EHR when needed. ○ Yes, we have 24/7 access to a care team practitioner, guided by the EHR.	X	X	X	X

1.2. Enhanced access and communication

Services	Never	Rarely	Sometimes	Often	Always	Baseline	Year 1	Oct 2023	Oct 2024
When patients need it, my practice is able to provide…									
… same or next-day appointments.	○	○	○	○	○		X	X	X
… office visits on the weekend, evening, or early morning.	○	○	○	○	○				
… email or portal advice on clinical issues.	○	○	○	○	○				

	Baseline	Year 1	Oct 2023	Oct 2024
How does your practice manage timely callbacks to high-risk patients with complex needs and/or seriously ill patients? ○ We have not established protocols or pathways to ensure timely callbacks. ○ We are in the process of developing protocols or pathways to ensure timely callbacks to high-risk patients with complex needs and/or seriously ill patients. ○ We have basic protocols or pathways in place to ensure timely callbacks but not specifically for high-risk patients with complex needs and/or seriously ill patients. ○ We have specific protocols or pathways in place to ensure timely callbacks to patients with complex needs and/or seriously ill patients.		X	X	X
How does your practice use the payment flexibility in this model to provide enhanced access? (Select all that apply) ○ We do not provide any enhanced access approaches ○ Visits to hospitals, nursing facilities, or other locations by any staff as part of care management and coordination ○ Practitioner visits in alternate locations, including home-based visits ○ Visits in the home by designated staff for care management activities, home assessments, education, or self-management support ○ Practice group visits for purposes of disease management, self-management, and other support ○ Video-based conferencing for primary care visits (e.g., telehealth or telemedicine) ○ Visit over an electronic exchange (phone or, e-visit, portal, email) ○ Patient outreach by community health worker, health coach, and/or caregiver support staff ○ Activities that support the family/caregiver ○ Other: (textbox)		X	X	X

		Baseline	Year 1	Oct 2023	Oct 2024
Which model beneficiary engagement incentives is your practice providing to your Medicare beneficiaries? (Select all that apply)	To which of the following categories of beneficiaries and/or types of clinical needs is your practice providing these beneficiary engagement incentives? (Select all that apply)		X	X	X
○ None					
○ Reduced or waived applicable co-insurance for PCF flat visit fees	○ Medicare beneficiaries with financial needs ○ Medicare beneficiaries with complex health needs ○ Medicare beneficiaries with recent hospitalization(s) or Emergency Department (ED) visits ○ Medicare beneficiaries assigned to your practice through the SIP component of PCF (Cohort 1 performance year 1 data only) ○ All of the above ○ Other, please specify: (textbox)				
○ Transportation (e.g., practice-operated van or vouchers for ride sharing services for face-to-face care)	○ With financial need ○ With complex health needs ○ With recent hospitalization(s) and/or ED visits ○ Medicare beneficiaries assigned to your practice through the SIP component of PCF (Cohort 1 performance year 1 data only) ○ All of the above ○ Other, please specify: (textbox)				
○ Nutrition (e.g., food vouchers, Meals on Wheels services, Weight Watchers classes)	○ With financial need ○ With complex health needs ○ With recent hospitalization(s) and/or ED visits ○ Medicare beneficiaries assigned to your practice through the SIP component of PCF (Cohort 1 performance year 1 data only) ○ All of the above ○ Other, please specify: (textbox)				

		Baseline	Year 1	Oct 2023	Oct 2024
○ Medical equipment (e.g., blood pressure equipment; remote monitoring devices)	○ With financial need ○ With complex health needs ○ With recent hospitalization(s) and/or ED visits ○ Medicare beneficiaries assigned to your practice through the SIP component of PCF (Cohort 1 performance year 1 data only) ○ All of the above ○ Other, please specify: (textbox)				

	Baseline	Year 1	Oct 2023	Oct 2024
Coverage of diabetic shoes under current Medicare regulations requires a physician to certify that a patient has diabetes and has a therapeutic need for diabetic shoes. PCF is allowing a waiver that would allow nurse practitioners to certify the need for diabetic shoes. Is your practice currently using this waiver to allow nurse practitioners to certify the need for diabetic shoes? ○ Yes ○ No ○ Not sure		X (was in section 6.6)	X	X

1.3. Empanelment

	Baseline	Year 1	Oct 2023	Oct 2024
What percentage of patients are empaneled to a practitioner or care team? ○ None (0%) ○ Some (<50% of all patients) ○ Most (50-95%) ○ All (95-100%)	X	X	X	X
Please provide the current number of active patients the practice is currently seeing. _____ *(Numeric Field)*		X	X	X

1.4. Continuity of care

	Baseline	Year 1	Oct 2023	Oct 2024
Of a patient's face-to-face visits, what percentage is provided by their empaneled practitioner or care team on average? ○ None (0%) ○ Some (<50% of all patients) ○ Most (50-95%) ○ All (95-100%)		X	X	X

Chapter 2. Care management

2.1. Risk stratification

	Baseline	Year 1	Oct 2023	Oct 2024
Do you risk stratify your empaneled patients? ○ Yes ○ No	X	X	X	X
Is risk stratification integrated within your EHR or health information technology (IT) system? ○ Yes ○ No		X	X	X
Which of the following best describes your practice's risk stratification methodology? a) We use an EHR/IT-based, structured, data-driven algorithm b) We use clinical intuition and judgment c) Both a and b		X	X	X

2.2. Identifying patients for care management

	Baseline	Year 1	Oct 2023	Oct 2024
Which of the following best describes your practice's care management approach? a) Proactive, relationship-based (longitudinal) care management for patients identified as high need and/or high risk b) Short-term, goal-oriented episodic care management for patients who have acute or urgent needs (e.g. transitions of care, new serious diagnosis or injury, medical crisis, major life event, or other triggering event) c) Both a and b d) None of the above	X	X	X	X

2.3. Personalized care planning

	Baseline	Year 1	Oct 2023	Oct 2024
How do you use documented, personalized care plans? ○ For patients receiving care management only ○ For patients identified as at high risk or increased complexity regardless of whether they receive care management services ○ For SIP patients only (if a SIP practice) (Included in Baseline for both cohorts and in performance year 1 for Cohort 1 only) ○ Varies based on practitioner preference ○ Other: (textbox) ○ We don't use documented, personalized care plans	X	X	X	X

Elements	Never	Rarely	Sometimes	Often	Always	Baseline	Year 1	Oct 2023	Oct 2024
Which of the following elements are included in your care planning process and personalized care plan that you develop with patients?									
Mutually agreed upon and developed with patient and family.	○	○	○	○	○		X	X	X
Accessible to all team members providing care for the patient.	○	○	○	○	○				
Accessible to the patient in clear, simple language to make it easier for the patient/caregiver to understand and use	○	○	○	○	○				
Written care plan in clear, simple language for patient/caregiver to understand and use.	○	○	○	○	○				

	Baseline	Year 1	Oct 2023	Oct 2024
Our personalized care plan contains the following information: (Select all that apply) ○ Patient's overall health or functional goals ○ Treatment goals specific to the patient's condition(s) ○ Advance directives and preferences for care ○ Key contact information for the practice and, if applicable, referral specialists ○ Key actions the patient will take and important contingencies (if/then) specific for the patient and their conditions ○ Other: (textbox)		X	X	X

2.4. Staffing support for your high-need patients

	Baseline	Year 1	Oct 2023	Oct 2024
What type of clinicians and staff at your practice support your high-need and/or high-risk patients? *(Select all that apply)* ○ Practitioner specializing in high-need patients ○ Care manager ○ Social worker ○ Behavioral health specialist ○ Pharmacist ○ Community health aid or outreach ○ Health coach or educator ○ Other: (textbox) ○ None of the above	X	X	X	X

2.5. Hospital and ED patient follow-up

	Baseline	Year 1	Oct 2023	Oct 2024
Our practice routinely and proactively follows up **with patients discharged from hospital:** ○ Yes—All patients ○ Yes—Selectively, based on patient diagnosis, patient characteristics, and/or patient risk ○ No—We do not routinely and proactively follow up on patients discharged from hospital	X	X	X	X
Our practice follows up with patients discharged within ○ 24 hours ○ 48 hours ○ 72 hours ○ 1 week ○ 2 weeks ○ We do not have these data, or unknown timeframe	X	X	X	X
Our practice routinely and proactively follows up **with patients discharged from ED:** ○ Yes—All patients ○ Yes—Selectively, based on patient diagnosis, patient characteristics, and/or patient risk ○ No—We do not routinely and proactively follow up on patients discharged from ED	X	X	X	X
Our practice follows up with patients discharged within ○ 24 hours ○ 48 hours ○ 72 hours ○ 1 week ○ 2 weeks ○ We do not have these data, or unknown timeframe	X	X	X	X

Chapter 3. Comprehensiveness and coordination

3.1. Behavioral health integration

	Baseline	Year 1	Oct 2023	Oct 2024
Our strategy for integrating behavioral health services into our practice is best described by the following: ○ Behavioral Care Management or Collaborative Care Management ○ Primary Care Behaviorist model or co-located behavioral health professional ○ Blend of the two ○ Other, please specify: (textbox) (added in 2023) ○ None, we do not integrate behavioral health into our practice		X	X	X
Our practice also uses these approaches for Behavioral Health Care: (Select all that apply) ○ High-quality referral and coordination with behavioral health specialty care ○ Assess and track patient-reported outcomes for behavioral health conditions under active management (e.g., depression or anxiety) ○ No enhanced strategies beyond traditional referral ○ Other: (textbox)		X	X	X

3.2. Addressing health-related social needs

	Baseline	Year 1	Oct 2023	Oct 2024
Do you routinely screen your patients for health-related social needs? ○ We screen **a targeted subpopulation of patients for** health-related social needs. ○ We universally screen **all patients** for health-related social needs. ○ We **do not screen** patients for health-related social needs.		X	X	X
Do you maintain an inventory of social services and supports to meet patients' health-related social needs that is integrated with your EHR or health IT system? ○ No, we do not maintain an inventory of social service resources. ○ Yes, we have an inventory of social service resources, but it is not integrated with our EHR or health IT system. ○ Yes, we have an inventory of social service resources integrated with our EHR or health IT system.		X	X	X

	Baseline	Year 1	Oct 2023	Oct 2024
Do you have an established, ongoing relationship with social or community resources to address the following health-related social needs? (Select all that apply) ○ Food insecurity ○ Housing instability ○ Utility needs ○ Finance resources strain ○ Transportation ○ Employment ○ Social isolation ○ Safety ○ Activities of daily living or chores services ○ Other: (textbox) ○ We do not have established, ongoing relationship with social or community resources.		X	X	X

3.3. Coordinated referral management

	Baseline	Year 1	Oct 2023	Oct 2024
Which best describes your practice's approach to ensure a coordinated referral management system for your high-need patient population (patients who are high-risk, complex, or seriously ill)? (Select all that apply) ○ Our practice has established policies and procedures in place to ensure high-value referrals for specialty care and other care organizations. ○ Our practice uses data to determine high-volume and/or high-cost specialty providers. ○ Our practice employs collaborative care agreements to facilitate effective coordination between practice and referral site. ○ Our practice employs eConsultations to facilitate effective coordination between practice and referral site. ○ Our practice employs other tools to facilitate effective coordination between practice and referral site: (textbox)		X	X	X

Chapter 4. Patient and caregiver engagement

4.1. Advance care planning

	Baseline	Year 1	Oct 2023	Oct 2024
How does your practice identify patients for advance care planning? (Select all that apply) ○ We do not systematically identify patients for advance care planning ○ High-risk status (using the practice's risk stratification methodology) ○ Patients with serious illness and/or based on age (e.g., cancer diagnosis, end-stage kidney disease, heart failure, COPD) ○ Clinician or care team referral/identification ○ Other: (textbox)	X	X	X	X

4.2. Engaging patients and/or caregivers

	Baseline	Year 1	Oct 2023	Oct 2024
How does your practice engage patients/caregivers in your efforts to redesign or improve your practice? (Select all that apply) ○ We do not engage patients/caregivers to advise in practice improvement activities ○ Patient and Family Advisory Council ○ Focus groups ○ Patient surveys ○ Participation on improvement committees or workgroups ○ Other: (textbox)	X	X	X	X

Chapter 5. Planned care and population health

5.1. Continuous quality improvement

	Baseline	Year 1	Oct 2023	Oct 2024
Practitioners or care teams in our practice receive and review clinical quality, health care utilization, cost, and other outcomes data for their patients: ○ Weekly ○ Monthly ○ Quarterly ○ Semiannually ○ Annually ○ Never		X	X	X

5.2. Team-based care

	Baseline	Year 1	Oct 2023	Oct 2024
Care team members in our practice meet to plan care for your high-need or high-risk patients under care management: ○ Never ○ Only as needed or ad hoc ○ At least daily ○ At least weekly ○ At least monthly	X	X	X	X

Chapter 6. General model questions

6.1. Instruction

	Baseline	Year 1	Oct 2023	Oct 2024
The following questions are for assessing whether PCF achieves its overall goals. Please respond with your candid answers and opinions so that PCF can be clearly and fully understood. The answers to these questions will not be used to determine any type of PCF status or payment. All questions must be answered before you will be allowed to submit this section. * Note: wording of this introduction varied slightly across rounds	X	X	X	X

6.2. Primary reason for participation/assessing if PCF achieves its goals/goals attained

	Baseline	Year 1	Oct 2023	Oct 2024
What is the primary reason your practice site is participating in PCF? SELECT *ONE* ONLY ○ Improve quality of care ○ Be at the forefront of primary care transformation ○ Increase practice revenue ○ Align with other value-based purchasing initiatives or efforts ○ The decision was made by leadership ○ Other (please describe) (textbox)	X			

Yes, a great deal	Yes, to some extent	Not so far, but it is a goal	Not a goal	Baseline	Year 1	Oct 2023	Oct 2024
Performance year 1: Here are some goals that practices had in choosing to participate in PCF (including the SIP component, as applicable). For each one, please indicate if you feel that your practice site has achieved each of these goals so far during your participation in PCF.					X		
a) Improved quality of care					X	X	X
b) Been at the forefront of primary care transformation					X	X	X
c) Increased practice revenue					X	X	X
d) Aligned with other value-based payment initiatives or efforts					X	X	X
e) Other goals you've targeted (please describe) [500 characters]					X		
f) Lowering hospitalizations						X	X
g) Lowering costs to the Medicare program						X	X

Yes, a great deal	Yes, to some extent	Not so far, but it is a goal	No longer a goal	Never a goal	Baseline	Year 1	Oct 2023	Oct 2024
Performance year 2: Here are some goals that practices reported as reasons for participating in PCF. For each one, please indicate if you feel that your practice site has achieved the goal during your participation in PCF to date.							X	X
a) Improved quality of care						X	X	X
b) Been at the forefront of primary care transformation						X	X	X
c) Increased practice revenue						X	X	X
d) Aligned with other value-based payment initiatives or efforts						X	X	X
e) Other goals you've targeted (please describe) [500 characters]						X		
f) Lowering hospitalizations							X	X
g) Lowering costs to the Medicare program							X	X

6.3. Changes to care delivery/investments in care delivery

YES, change likely in the first year	NO, change not needed in the first year	NO, though change may be needed (insufficient resources or other barriers)	DON'T KNOW/ UNSURE	Baseline	Year 1	Oct 2023	Oct 2024
Baseline: In the first year of your participation in PCF, do you expect to make any of the following changes to care delivery at your practice site?				X			

YES, change completed	YES, in process, currently working on the change	NO, though change may be needed (insufficient resources or other barriers)	NO, because change not needed	Baseline	Year 1	Oct 2023	Oct 2024
Performance year 1: Primary care practices started PCF with different capabilities to implement the model; there is no expectation that every practice will make the same or all these changes. So far in your first year of participation in PCF, have you made any of the following changes at your practice site? [*also incorrectly used this wording in October 2022 for Cohort 1 (performance year 2), incorrectly referring to their first year, even though it was their second year – do not use the data for Cohort 1; same question was used for Cohort 2, but it's correct for them, as it was still their first year]*					X		

A great deal of change	Some change	No change, though change may be needed (insufficient resources or other barriers)	No change, because change not needed	Baseline	Year 1	Oct 2023	Oct 2024
Oct 2023: Primary care practices started PCF with different capabilities to implement the model; there is no expectation that every practice will make the same changes or all the changes listed below. During the past year of your participation in PCF, to what extent have you made the following changes at your practice site?						X	

Invested a lot in 2024, such as initiated new activities or changes	Invested a little in 2024, including ongoing maintenance of a prior investment	No investment, though may be needed (insufficient resources or other barriers)	No investment in 2024 because not needed at this time	Baseline	Year 1	Oct 2023	Oct 2024
Oct 2024: For each of the following activities, please indicate if this is something your practice site has invested staff time or other financial resources in addressing this year (2024). There is no expectation that practices are investing in all of the activities below.							X

	Baseline	Year 1	Oct 2023	Oct 2024
* Note: the wording in the rows shown below are from performance year 1; the wording in other years varied slightly in some rows. Also note that lettering does not match any particular year because some questions were not fielded in all years and some were in a different order.				
STAFFING				
i. Added more practitioners (MD/DO, CNS, NP, or PA)	X	X		
j. Added more medical assistants, nurses, or care managers	X	X		
k. Added behavioral health staff or in some other way enhance behavioral health integration at our practice site	X	X		
l. Reorganized roles or responsibilities of existing staff		X		
ACCESS				
m. Increased (Oct 2024: Increasing) patient access to practitioners via billable care (e.g., extended office hours, home visits)	X	X	X	X
n. Increased (Oct 2024: Increasing) patient access to practitioners via non-billable care (e.g., patient portal, email)	X	X	X	X
o. Scheduled (Oct 2024: Scheduling) longer appointments for more complex patients who needed it	X	X	X	X
p. Educated (Oct 2024: Educating) patients and caregivers about alternatives to the emergency department (ED)	X	X	X	X
CARE MANAGEMENT				
q. Improved or expanded (Oct 2024: Improving or expanding) care management processes to help patients manage their medical conditions between visits	X	X	X	X
r. Improved or expanded (Oct 2024: Improving or expanding) ability to be notified when a patient has a hospital discharge or ED visit	X	X	X	X

	Baseline	Year 1	Oct 2023	Oct 2024
s. Improved or developed (Oct 2024): Improving or developing) new processes to systematically follow up with patients after hospital discharge or ED visit	X	X	X	X
t. Improved or expanded (Oct 2024: Improving or expanding) comprehensive medication management for high-risk patients			X	X
u. Changed (Oct 2024: Changing) opioid prescribing behavior			X	X
COMPREHENSIVENESS AND COORDINATION				
v. Expanded (Oct 2024: Expanding) the types of medical services provided at the practice site to reduce referrals to specialty care (for example, mole removal for biopsy to reduce referrals to dermatologists)	X	X	X	X
w. Improved (Oct 2024: Improving) coordination with specialists	X	X	X	X
x. Improved (Oct 2024: Improving) coordination with other providers (for example, home health agencies, hospice agencies, pharmacists, durable medical equipment suppliers)	X	X	X	X
y. Reduced (Oct 2024: Reducing) use of lower-value tests or other services that on average provide little or no clinical benefit	X	X	X	X
z. Increased (Oct 2024: Increasing) screening for patients' (Oct 2024: health-related) social needs (for example, housing, transportation, food)	X	X	X	X
aa. Improved (Oct 2024: Improving) coordination with community resources to meet patients' (Oct 2024: health-related) social needs (for example, housing, transportation, food)	X	X	X	X
bb. Creating or enhancing a system for tracking referrals to community resources to address patients' health-related social needs				X
cc. Improved (Oct 2024: Improving) handoffs to new primary care provider when a patient leaves the practice	X	X	X	X
BEHAVIORAL HEALTH				
dd. Added (Oct 2024: Adding) behavioral health staff			X	X
ee. Increased (Oct 2024: Increasing) offering of care management to address behavioral health			X	X
ff. Improved (Oct 2024: Improving) integration of behavioral health into the primary care workflow			X	X
gg. Improved (Oct 2024: Improving) coordination with behavioral health providers outside the practice			X	X
PATIENT AND CAREGIVER ENGAGEMENT				
hh. Implemented or improved (Oct 2024: Implementing or improving) a process for patients and caregivers to advise practice improvement (such as surveys of patients or a Patient and Family Advisory Council)		X	X	X

	Baseline	Year 1	Oct 2023	Oct 2024
CARE FOR SERIOUSLY ILL AND OTHER COMPLEX PATIENTS				
ii. Initiated or increased (Oct 2024: Initiating or increasing) contact with patients potentially at risk for hospitalizations or ED visits who have not had a recent contact with our practice	X	X	X	X
jj. Increased (Oct 2024: Increasing) access to palliative care (for example, referrals to palliative care, training our staff in palliative care, or adding palliative care practitioner to our practice)	X	X	X	X
kk. Improved (Oct 2024: Improving) advance care planning (for example, discussing or documenting end-of-life care preferences)	X	X	X	X
ll. Developed or updated (Oct 2024: Developing or updating) care plans (a structured, personalized plan of care, developed with patient input) for seriously ill and other complex, chronically ill patients	X	X	X	X
HEALTH IT AND DATA FEEDBACK				
mm. Enhanced (Oct 2024: Enhancing) health information technology capabilities (for example, upgraded EHR/EMR functionality, added or improved telehealth technology, or other health IT changes)	X	X	X	X
nn. Improving health information data sharing, meaning sending data to and/or receiving data from other health care providers and hospitals				X
oo. Increased (Oct 2024: Increasing) use of available data to improve care delivery (for example, reviewing patient-level claims data or internal reports)	X	X	X	X

6.4. Main strategies for reducing hospitalizations or costs/implementation strategies

	Baseline	Year 1	Oct 2023	Oct 2024
As part of PCF, CMS is offering performance-based payment adjustments to participating practices for reducing acute hospitalizations (if your practice is in risk group 1 or 2) or total cost of care (if your practice is in risk group 3 or 4).	X	X	X	X
What will be your practice site's main strategies for reducing such hospitalizations or costs? (textbox)	X			
What have been your practice site's main strategies for reducing hospitalizations or costs during your first year of participation in PCF? (textbox)		X		
What have been your practice site's main strategies for reducing hospitalizations or costs during the past year of your participation in PCF? (textbox)			X	
a. What do you think has been the single most effective strategy your practice site has used to reduce hospitalizations or costs so far during your participation in PCF? (text box) b. What do you think has been the single biggest barrier to your practice site's ability to reduce hospitalizations or costs so far during your participation in PCF? (text box)				X

6.5. Implementation strategies (new question order/grouping for October 2024)

	Baseline	Year 1	Oct 2023	Oct 2024
As part of PCF, CMS is offering performance-based payment adjustments to participating practices for reducing acute hospitalizations (if your practice is in risk group 1 or 2) or total cost of care (if your practice is in risk group 3 or 4). What do you think has been the single most effective strategy your practice site has used to reduce hospitalizations or costs so far during your participation in PCF? (text box). What do you think has been the single biggest barrier to your practice site's ability to reduce hospitalizations or costs so far during your participation in PCF? (text box)				X
On a scale of 0 to 10, how challenging has it been for your practice site to reduce acute hospitalizations (risk group 1 or 2 practice) or total cost of care (risk group 3 or 4 practice) during the past year of your participation in PCF? 0 1 2 3 4 5 6 7 8 9 10 D Not at all challenging … Extremely challenging Don't know			X (asked in section 6.5)	X
Is your practice part of a larger health care delivery organization? ○ Yes, part of a larger health care delivery organization that includes a hospital (sometimes called a "health system") ○ Yes, part of a larger health care delivery organization that does not include a hospital ○ No, not part of any larger health care delivery organization (sometimes called an "independent practice") → **Skip next question**			X (asked in section 6.8)	X
(Skip this item if practice is not part of a larger system) If your practice site wanted to change a care delivery process or workflow related to PCF, who would need to be involved in the decision to change the process or workflow? ○ Decision made entirely by practice staff/leadership at this practice site ○ Decision made by a combination of practice staff/leadership at this practice site and staff/leadership from the larger health care delivery organization ○ Decision made entirely by staff/leadership from the larger health care delivery organization ○ Not sure ○ Practice is independent and not part of a larger health care delivery organization			X (asked in section 6.8)	X

	Baseline	Year 1	Oct 2023	Oct 2024
In some organizations, care managers work out of a centralized location to support numerous practices. In other organizations, the care manager works on-site in a specific practice or two. Which of the following best describes the work location of care managers who support your patients? ○ Care managers mostly work from a centralized location ○ Care managers are located mostly at our practice site ○ Care managers work mostly from home (may come into the practice sometimes) ○ We do not use care managers			X (asked in section 6.8)	X
Who leads or champions the implementation of PCF strategies for your practice site? *SELECT ALL THAT APPLY* ☐ Physician ☐ Nurse practitioner (NP) ☐ Clinical nurse specialist (CNS) ☐ Physician assistant (PA) ☐ Practice manager ☐ Quality lead or quality specialist ☐ Care manager or care coordinator ☐ Other clinical staff ☐ Other leadership/management staff ☐ Another staff member (please describe: _____) (textbox) ☐ Our practice site does not have a PCF lead or champion → **Skip next question** **(Skip if your practice site does not have a PCF lead or champion; skip if practice is not part of a larger system)** Is your PCF lead or champion, or are any of your PCF leads or champions, located at your practice site? ○ Yes ○ No			X (asked in section 6.7)	X

6.6. Confidence/challenges in reducing hospitalizations or costs

	Baseline	Year 1	Oct 2023	Oct 2024
How confident are you that your practice site will be able to meet this PCF target of reducing unnecessary acute hospitalizations or total cost of care? SELECT ONE ONLY ○ Completely confident ○ Somewhat confident ○ Not very confident ○ Not at all confident	X			
On a scale of 0 to 10, how challenging has it been for your practice site to reduce acute hospitalizations (risk group 1 or 2 practice) or total cost of care (risk group 3 or 4 practice) during your first year of participation in PCF? [*Wording from Dec 2021 and Sept 2022 guide, which is performance year 1 data, but also used this wording referring to their first year, in October 2022 for Cohort 1 (performance year 2), which is why we are not using those data]* 0 1 2 3 4 5 6 7 8 9 10 D Not at all challenging … Extremely challenging Don't know		X		
On a scale of 0 to 10, how challenging has it been for your practice site to reduce acute hospitalizations (risk group 1 or 2 practice) or total cost of care (risk group 3 or 4 practice) during the past year of your participation in PCF? 0 1 2 3 4 5 6 7 8 9 10 D Not at all challenging … Extremely challenging Don't know			X	X (moved to section 6.4)

6.7. Cost-sharing participation

	Baseline	Year 1	Oct 2023	Oct 2024
CMS is allowing PCF practices to provide cost-sharing support to Medicare FFS beneficiaries in the form of reduced or eliminated cost-sharing ("copays") for face-to-face visits under certain circumstances. Is your practice currently providing cost-sharing support for any Medicare FFS PCF beneficiaries attributed to the practice? ○ Yes ○ No → Skip next question ○ Not sure → Skip next question		X		
For which Medicare FFS PCF beneficiaries are you currently providing cost sharing support? [check all that apply] ☐ Beneficiaries experiencing financial hardship ☐ Beneficiaries with high disease burden ☐ Beneficiaries with a recent hospitalization or ED visit ☐ Other (Please describe:) (textbox)		X		
CMS is allowing PCF practices and practitioners to provide in-kind items and services to Medicare FFS PCF beneficiaries in order to advance a clinical goal or to support preventive care under certain circumstances. Examples of in-kind items and services include, but are not limited to, covering the cost of health-related transportation services or providing free medical supplies not otherwise covered by Medicare. As part of your PCF participation, is your practice currently providing in-kind items or services for any Medicare FFS PCF beneficiaries attributed to the practice? ○ Yes ○ No → Skip next question ○ Not sure → Skip next question		X		
Please describe the types of in-kind items and services your practice provides to Medicare FFS PCF beneficiaries. (textbox)		X		

	Baseline	Year 1	Oct 2023	Oct 2024
Coverage of diabetic shoes under current Medicare regulations requires a physician to certify that a patient has diabetes and has a therapeutic need for diabetic shoes. PCF is allowing a waiver that would allow nurse practitioners to certify the need for diabetic shoes. Is your practice currently using this waiver to allow nurse practitioners to certify the need for diabetic shoes? ○ Yes ○ No ○ Not sure		X	X (moved to the end of section 1.2)	X (moved to the end of section 1.2)

6.8. Practice site management

	Baseline	Year 1	Oct 2023	Oct 2024
Which of the following does your practice site typically do when introducing new medically-complex patients to your practice? (Select all that apply) ○ Conduct a complete health assessment using a health assessment instrument ○ Conduct a palliative care assessment using a palliative care assessment instrument ○ Conduct a social needs assessment ○ Conduct a visit in the home ○ Conduct a meeting with caregivers ○ Conduct patient education such as self-management of chronic conditions ○ Conduct patient education on best approaches to handle urgent care needs and use of the ED ○ Begin creating care plan ○ Obtain health records from previous primary care provider ○ Obtain health records from previous or current specialists/mental health providers ○ Obtain health records from recent acute care stay/ED visit ○ Other (please describe) (textbox) ○ None of the above		X		

	Baseline	Year 1	Oct 2023	Oct 2024
Overall, considering the amount of work required by PCF, how adequate or inadequate are the PCF payments from CMS in supporting changes to better manage the care of patients? ○ More than adequate ○ Adequate ○ Less than adequate ○ Don't know – not familiar with PCF payments or financial aspects of the practice		X	X (moved to section 6.12)	X (moved to section 6.12)
At your practice site, who leads or champions the implementation of PCF? SELECT ALL THAT APPLY ☐ Practicing physician (sees patients) ☐ Non-practicing physician (does not see patients) ☐ Nurse practitioner (NP) ☐ Clinical nurse specialist (CNS) ☐ Physician assistant (PA) ☐ Practice manager ☐ Another staff member at our practice site (please describe:) (textbox) ☐ System-level leadership or staff person who is not based at our practice site ☐ Our practice site does not have a PCF lead or champion ☐ Don't know		X		

	Baseline	Year 1	Oct 2023	Oct 2024
Who leads or champions the implementation of PCF strategies for your practice site? SELECT ALL THAT APPLY ○ Physician ○ Nurse practitioner (NP) ○ Clinical nurse specialist (CNS) ○ Physician assistant (PA) ○ Practice manager ○ Quality lead or quality specialist ○ Care Manager or care coordinator (Oct 2024 only) ○ Other clinical staff (Oct 2024 only) ○ Other leadership/management staff (Oct 2024 only) ○ Another staff member at our practice site (please describe: _____) (textbox) ○ Our practice site does not have a PCF lead or champion → Skip next question *(Skip if your practice site does not have a PCF lead or champion; Oct 2024 only: skip if practice is not part of a larger system)* Is your PCF lead or champion, or are any of your PCF leads or champions, located at your practice site? ○ Yes ○ No			X	X (moved to section 6.4)

Never	Rarely	Sometimes	Often	Always	Baseline	Year 1	Oct 2023	Oct 2024
Performance year 1: Thinking about the practicing physician who leads/champions the implementation of PCF at your practice site, please select the response for each row that most closely describes this practitioner's activities on PCF. Oct 2023: This question should be answered only if your practice site has a practicing physician who leads or champions PCF implementation (the first response in the prior question). All others can skip this set of three items. Thinking about the physician who leads/champions the implementation of PCF strategies at your practice site, please select the response for each row that most closely describes this physician's activities on PCF.						X	X	
pp. Physician lead/champion at my practice site is knowledgeable about PCF advanced primary care functions						X	X	
qq. Physician lead/champion at my practice site actively incorporates PCF advanced primary care functions into regular use						X	X	
rr. Physician lead/champion at my practice site provides leadership to practice staff in PCF implementation						X	X	

Never	Rarely	Sometimes	Often	Always	Baseline	Year 1	Oct 2023	Oct 2024
Now, thinking of the different types of staff at your practice site, how often are they involved in implementing [Oct 2023: strategies for] PCF?						X	X	
a. Other physicians						X	X	
b. Nurse practitioners (NPs), clinical nurse specialists (CNSs), or physician assistants (PAs)						X	X	
c. Clinical support staff						X	X	
d. Clerical support staff						X	X	
e. Practice manager						X	X	
f. Quality lead or quality specialist							X	
g. Care manager							X	
h. Social workers or psychologists							X	
i. System level staff (if applicable)						X	X	

Strongly agree	Agree	Disagree	Strongly disagree	Baseline	Year 1	Oct 2023	Oct 2024
Thinking about your practice site, please select how much you agree or disagree with each of the following statements.					X		
a. Practitioners can easily communicate any ideas and/or concerns they may have to practice leadership.					X		
b. Practice leadership is responsive to feedback from practitioners.					X		
c. Practitioners have adequate input into decisions that affect how they practice medicine.					X		

6.9. Health system

	Baseline	Year 1	Oct 2023	Oct 2024
Is your practice part of a larger health care delivery organization? ○ Yes, part of a larger health care delivery organization that includes a hospital (sometimes called a "health system") ○ Yes, part of a larger health care delivery organization that does <u>not</u> include a hospital ○ No, not part of any larger health care delivery organization (sometimes called an "independent practice") → Skip next question			X	X (moved to section 6.4)
(Skip this item if practice is not part of a larger system) If your practice site wanted to change a care delivery process or workflow related to PCF, who would need to be involved in the decision to change the process or workflow? ○ Decision made entirely by practice staff/leadership at this practice site ○ Decision made by a combination of practice staff/leadership at this practice site and staff/leadership from the larger health care delivery organization ○ Decision made entirely by staff/leadership from the larger health care delivery organization ○ Not sure ○ Practice is independent and not part of a larger health care delivery organization			X	X (moved to section 6.4)

	Baseline	Year 1	Oct 2023	Oct 2024
In some organizations, care managers work out of a centralized location to support numerous practices. In other organizations, the care manager works on-site in a specific practice or two. Which of the following best describes the work location of care managers who support your patients? ○ Care managers mostly work from a centralized location ○ Care managers are located mostly at our practice site ○ Care managers work mostly from home (may come into the practice sometimes) ○ We do not use care managers			X	X (moved to section 6.4)

6.10. Value-based purchasing/value-based care

	Baseline	Year 1	Oct 2023	Oct 2024
Does this practice site participate in other value-based (Oct 2024: care) programs (for example, through a public or commercial insurer or as part of an ACO, including the Medicare Shared Savings Program)? ○ Yes ○ No → skip next two questions			X	X
Please list the value-based (Oct 2024 care) programs your practice site participates in. (textbox)			X	X

Strongly agree	Agree	Disagree	Strongly disagree	Don't know	Baseline	Year 1	Oct 2023	Oct 2024
To what extent do you agree or disagree with the following statements:							X	X
d. Our practice site has made care delivery changes to support both PCF and other value-based initiatives at the same time							X	X
e. Our practice site has made care delivery changes specifically for PCF							X	X

6.11. Data sharing and data use

Less than 25%	25–50%	51–75%	More than 75%	Baseline	Year 1	Oct 2023	Oct 2024
For each of the following types of providers, please think of the specific providers where your patients obtain care outside of your health care organization. With how many of these providers does your practice site have the ability to electronically receive patient clinical data?							X
a. Hospitals outside of our healthcare organization b. Specialist practices outside of our healthcare organization c. Diagnostic service facilities (lab or imaging) outside of our healthcare organization							

	Baseline	Year 1	Oct 2023	Oct 2024
Does this practice site currently participate in a state or regional health information exchange? ○ Yes ○ No ○ Don't know				X

	Baseline	Year 1	Oct 2023	Oct 2024
CMS provides monthly Claims and Claim Line Feed (CCLF) data files to participating PCF practices. If your practice uses CCLF data files, how do you use the data to support your work on PCF? SELECT UP TO THREE ○ To anticipate or understand Payment Accuracy Adjustment ○ To describe or understand beneficiary population needs ○ To identify opportunities for cross-continuum coordination of care ○ To assess care patterns to identify high-value providers and care partners ○ To identify factors that may contribute to avoidable ED, inpatient, or post-acute care utilization ○ For risk stratification of patients ○ For understanding total patient costs ○ Other uses (Specify: _____) ○ Do not use the CCLF data files				X
What are the main barriers, if any, to using the CCLF data files in supporting your practice's work on PCF? SELECT UP TO THREE ○ Unaware of the CCLF data files ○ No barriers to using CCLF data files ○ The data are not current/timely ○ The data are not accurate or are incomplete ○ The data are too complicated or challenging to use ○ The data do not provide the right kind of information needed to support our PCF work ○ We prefer to use other data (from EHR or other payers) ○ Staff do not have training or experience needed to use the data ○ Staff do not have time to devote to this work ○ Practice does not have resources to hire a third-party vendor to process CCLF data files ○ Other barriers (Specify:_____)				X

	Baseline	Year 1	Oct 2023	Oct 2024
CMS provides a quarterly Data Feedback Tool (DFT) to participating PCF practices. If your practice uses the DFT, how do you use the tool to support your work on PCF? SELECT UP TO THREE ○ To anticipate or understand Payment Accuracy Adjustment ○ To describe or understand beneficiary population needs ○ To identify opportunities for cross-continuum coordination of care ○ To assess care patterns to identify high-value providers and care partners ○ To identify factors that may contribute to avoidable ED, inpatient, or post-acute care utilization ○ For risk stratification of patients ○ For understanding total patient costs ○ Other uses (Specify: _____) ○ Do not use the DFT				X
What are the main barriers, if any, to using the DFT in supporting your practice's work on PCF? SELECT UP TO THREE ○ Unaware of the DFT ○ No barriers to using DFT ○ The data are not current/timely ○ The lookback period is too short to be helpful ○ The data are not accurate or are incomplete ○ The tool is too complicated or challenging to use ○ The tool does not provide the right kind of information needed to support our PCF work ○ We prefer to use other data (from EHR or other payers) ○ Staff do not have training or experience needed to use the tool ○ Staff do not have time to devote to this work ○ Other barriers (Specify:_____)				X

6.12. Staffing and hiring

Yes, hired/added new staff only to replace departing staff/due to turnover at this practice site	Yes, hired/added new staff for a net increase at this practice site	No new hiring at this practice site this year	Baseline	Year 1	Oct 2023	Oct 2024
Has your practice site hired any of the following staff this year (2024)?						X
a. Primary care practitioners (MD/DO, CNS, NP, or PA) b. Care managers c. Nurses other than care managers d. Behavioral health staff e. Quality assurance or data manager f. Medical assistants						

	Baseline	Year 1	Oct 2023	Oct 2024
IF MADE ANY HIRES FOR A NET INCREASE (selected second answer option for any of the above staff): To what extent was the 2024 hiring at your practice site motivated, in full or in part, by PCF, that is, motivated by trying to achieve the goals of PCF to reduce hospitalizations or costs? SELECT ONE ONLY O Hiring motivated solely or mostly by PCF goals O Hiring motivated in part by PCF goals O Hiring not at all motivated by PCF goals				X
What kind of staff has your practice site found to be the most challenging to hire? SELECT ONE ONLY O Primary care practitioners (MD/DO, CNS, NP, or PA) O Care managers O Nurses other than care managers O Behavioral health staff O Quality assurance or data manager O Medical assistants				X

No, not a challenge	Yes, minor challenge	Yes, major challenge	Baseline	Year 1	Oct 2023	Oct 2024
OPTION 1 wording (using a FILL): Please indicate if any of the following are challenges that your practice generally faces in hiring [FILL IN PRIOR RESPONSE: Primary care practitioners/Care managers/Nurses other than care managers/Behavioral health staff/Quality assurance or data manager/Medical assistants]						X
a. Not enough qualified and experienced applicants b. Insufficient time/resources for recruitment of new staff c. Insufficient time/resources for training new staff d. Cannot offer competitive enough salary and/or benefits e. Applicants want to work remotely						

6.13. Overall impressions

Strongly agree	Agree	Disagree	Strongly disagree	Don't know	Baseline	Year 1	Oct 2023	Oct 2024
As a reminder, please respond with your candid answers and opinions so CMS can clearly and fully understand the experiences of PCF practices. Thinking about your practice site's experience with PCF's attribution methodology, please indicate how much you agree or disagree with the following statements.							X	X
a. Our practice understands the attribution methodology							X	X
b. Our practice feels that the attribution methodology is fair							X	X
OPTIONAL: If you'd like to say more about your responses above, please do so here. (textbox)							X	X

Strongly agree	Agree	Disagree	Strongly disagree	Don't know	Baseline	Year 1	Oct 2023	Oct 2024
Thinking about your practice site's experience with PCF's risk group assignment, please indicate how much you agree or disagree with the following statements.							X	X
a. Our practice understands the risk group assignment process							X	X
b. Our practice feels that the risk group assignment process is fair							X	X
OPTIONAL: If you'd like to say more about your responses above, please do so here. (textbox)							X	X

Strongly agree	Agree	Disagree	Strongly disagree	Don't know	Baseline	Year 1	Oct 2023	Oct 2024
Thinking about your practice site's experience with PCF's performance-based adjustment, please indicate how much you agree or disagree with the following statements.							X	X
a. Our practice understands how the performance-based adjustment is calculated							X	X
b. Our practice feels that the performance-based adjustment methodology is fair							X	X
OPTIONAL: If you'd like to say more about your responses above, please do so here. (textbox)							X	X

Strongly agree	Agree	Disagree	Strongly disagree	Don't know	Baseline	Year 1	Oct 2023	Oct 2024
Thinking about your practice site's experience with PCF's payment accuracy adjustment, please indicate how much you agree or disagree with the following statements.							X	X
a. Our practice understands how the payment accuracy adjustment is calculated							X	X
b. Our practice feels that the payment accuracy adjustment methodology is fair							X	X

	Baseline	Year 1	Oct 2023	Oct 2024
OPTIONAL: If you'd like to say more about your responses above, please do so here. (textbox)			X	X
Overall, considering the amount of work required by PCF, how adequate or inadequate are the PCF payments from CMS in supporting changes to better manage the care of patients? ○ More than adequate ○ Adequate ○ Less than adequate ○ Don't know – not familiar with PCF payments or financial aspects of the practice		X (asked in section 6.7)	X	X
Overall, how burdensome does your practice find the requirements of PCF? ○ Very burdensome ○ Somewhat burdensome ○ Not very burdensome ○ Not at all burdensome			X	X
Given this practice site's overall experience participating in PCF so far, how likely is it that this practice site would participate in PCF if you could do it all over again? ○ Very likely ○ Somewhat likely ○ Not very likely ○ Not at all likely			X	X

A.1.2. Practice Survey methods

In 2023, Mathematica fielded a survey to a random sample of PCF practices from Cohorts 1 and 2. The purpose of the PCF Practice Survey was to assess implementation of the model and collect information about practices' characteristics, what practices are doing as part of PCF, and their experience with PCF.

A. Content

Mathematica's evaluation team developed the PCF Practice Survey's content with input from the Innovation Center. The survey is broadly divided into four main sections:

- Care delivery changes that practices made since they joined the PCF Model and whether these changes were motivated by PCF goals or supported by PCF payments
- Barriers and facilitators that practices experience to reducing acute hospitalizations and total cost of care
- Presence of behavioral health staff at the practice and screening for behavioral health conditions
- Aspects of longitudinal care management provided at the practice

The full text of the PCF Practice Survey is available in Section F below.

Questionnaire development and pre-testing. We designed the practice survey to complement the information collected from practices in the PCF Practice Portal and in practice interviews. We received input from model experts at Mathematica and the Innovation Center on the priority topics for the survey and on the individual questions themselves.

Before finalizing the survey, we conducted pre-test interviews with people at PCF practices to confirm they would understand our questions as we intended. We conducted two rounds of pre-testing, with nine pre-test interviews in each round (seven cognitive interviews and two full survey debrief interviews).

The final survey contained 80 questions (we counted sub-items in a grid as separate questions). The survey was designed to be completed in 15 to 20 minutes. We informed practices that they could review the questions beforehand and did not need to complete the survey all at once.

B. Sampling

Sample frame. The sample frame was made up of the 2,567 participating PCF practices as of March 2023, identified in the participation database created from monthly PCF practice rosters. To support sampling, we augmented the participation database with data from the PCF applications on practice characteristics including whether the practice belongs to a larger health care organization.

Practice selection. To select practices, we took a random sample from the 2,567 PCF practices in the frame identified above, stratified by past CPC+ participation status, current practice risk group, and parent organization affiliation. We implicitly stratified the sample by CMS region to ensure geographic representativeness, and, because it is common for one person to serve as the primary point of contact for multiple practices affiliated with a larger parent organization, we also implicitly stratified by PCF primary point of contact to help minimize how many practices a single person could potentially be

asked to complete a survey for.[16] CPC+ participation status had two categories: those that ever participated and those that did not. Risk group was defined by two levels, combining risk groups 1 and 2 into one group and risk groups 3 and 4 into another. Parent organization affiliation had four categories: practices in a hospital system, practices in other types of parent organizations that do not include a hospital, independent practices with no parent organization affiliation, and affiliation of unknown type. Among the 16 possible combinations of these variables, 15 contained one or more practices, resulting in 15 explicit sampling strata. There are 10 CMS regions, and we constructed these regions using the state in which the practice was located.

The total selected sample size was 1,300 practices. Within strata, defined by the cross classification of CPC+ participation status, risk group, and organizational affiliation, we allocated the sample proportionally, except for the strata defined by risk groups 3 and 4. Because few practices are in risk groups 3 and 4, we selected a census of these practices.

C. Data collection

A sample of PCF practices received the PCF Practice Survey by web from May 17, 2023, to August 18, 2023. The survey was sent to the primary point of contact, as reported by practices in the PCF Practice Portal. The survey instructions encouraged the point of contact to seek input from others at the practice as needed.

We obtained email and mailing addresses for PCF practices from the implementation contractor for the PCF Model, which asks practices to update their contact information regularly in the PCF Practice Portal. The fielding period was 14 weeks. Practices received one invitation email, up to nine reminder emails, and reminder telephone calls from Mathematica. Practices received additional reminders in PCF-wide communications such as PCF newsletters, Connect message board posts, and an e-blast.[17] We did not continue fielding the survey to practices that withdrew or were terminated from PCF after we learned about their withdrawal or termination.

Incentive. Because participation in evaluation activities is a model requirement, we did not compensate participants for the survey.

Confidentiality. We informed survey respondents that their survey responses will not be tied to their name or practice in any report, that we will report responses in aggregate only (with other PCF practices combined), and that their responses will not have any consequences for payment or for their participation in PCF.

Minimizing respondent burden. To encourage response and minimize the burden on a practice's point of contact who could be responding on behalf of multiple practices, we implicitly stratified within CMS region by PCF primary point of contact information (telephone number or email address) and then selected the sample systematically within these strata. This selection method limited how often a practice primary point of contact was selected.

[16] Implicit stratification uses sorting to control the distribution of the sample within explicit strata for an auxiliary characteristic, in this sample CMS region.

[17] PCF Connect and the PCF First Edition Newsletter are general communications to PCF practices from the CMS Innovation Center and others, managed by the CMS Innovation Center.

In addition, to help minimize the burden on a practice's point of contact who has six or more practices selected for the sample, we consolidated survey outreach into a single email with a list of their sampled practices rather than send them individual emails for each sampled practice.

Supplemental outreach to improve data quality. Before analyzing the quantitative survey data, we discovered that some respondents had mistakenly skipped some survey questions in the grid in section A. In this grid, respondents were first asked whether they made a specific care delivery change (column A). If yes, respondents received two follow-up questions that asked whether the changes were motivated by PCF goals (column B) and whether PCF payments supported the changes (column C). Because this grid was large, it might have been difficult for respondents to see in its entirety if they were completing on a small screen. Because of this, we followed up with the 76 survey respondents that skipped most or all of the follow-up questions in columns B and C. When following up with these respondents, we provided them with their survey responses from A1 and highlighted the follow-up questions in the second and third columns that they did not respond to but would have received based on their prior responses. Of the 76 respondents that we reached out to, 49 (62 percent) replied to provide their missing survey responses, which we incorporated into their data.

D. Weighting

Design weights. The first step of our weighting process was to obtain design weights (also called sampling weights) to account for differences in the probability of being sampled so that the sum of the design weights across sampled units was equivalent to sample the frame size.

Adjustments of design weights for nonresponse. Nonresponse is inevitable for most surveys, and the PCF Practice Survey was no exception. Nonresponse reduces the effective size of the sample, which results in decreased precision on sample estimates and potentially leads to nonresponse bias if there are nonnegligible differences between the respondents and nonrespondents on measured variables. The size of the bias is a function of two factors: (1) the magnitude of the difference between respondents and nonrespondents and (2) the response rate. Therefore, even though the PCF Practice Survey had a response rate of 91.45 percent, we employed nonresponse adjustment to the design weights to mitigate potential nonresponse bias.

We selected the sample using the March 2023 PCF practice roster data, and the data collection period was between May 17 and August 18, 2023. Practices were considered eligible and included in the analytic sample if they were active in PCF as of August 18, 2023, the last date of our data collection period. If they withdrew or were terminated from PCF after March 31, 2023, but before August 18, 2023, they were considered ineligible and dropped from analysis. A total of 37 practices in the selected sample of 1,300 for the PCF Practice Survey were considered ineligible because they withdrew or were terminated during that time. To perform the nonresponse adjustment, we defined completeness (that is, whether an eligible practice completed a survey). We considered practice surveys complete if the survey respondent answered at least 50 percent of the survey items, regardless of which survey items these were.

The PCF Practice Survey had high response rates across and within strata, so large variability to the distribution of the weighting adjustments was not a concern. We conducted a traditional cell weighting adjustment (or ratio adjustment) for nonresponse weighting. In a cell weighting adjustment, weighting

classes are formed by cross-tabulating covariate information recorded for respondents and nonrespondents, and then the design weight of nonrespondents are distributed over respondents within each weighting class formed. In other words, the adjustment factor within each cell is the sum of the design weights for all sampled units in that cell divided by the sum of the design weights for the responding members of that group.

$$Adjnr_c = \frac{\sum_{i=1}^{S} sampleweight_{ci}}{\left(\sum_{i=1}^{R} sampleweight_{ci}\right)}$$

S indicates the number of sampled practices in cell *c,* and *R* indicates the number of responding practices in cell *c*.

The nonresponse-adjusted weights are then calculated as

$$sampleweightA_{ci} = Adjnr_c * sampleweight_{ci}$$

if the practice responded and 0 otherwise.

In our case, the variables we used for forming weighting cells were the same as the stratification variables. But because there were so few practices in strata defined by risk groups 3 and 4, we collapsed all those strata into one single weighting cell, regardless of their CPC+ participation or affiliation (shown as cell 7 in Exhibit A.1.2.1). Another weighting cell with collapsed strata because of sparse units is PCF risk groups 1 and 2 with unknown affiliation type, regardless of their CPC+ participation (shown as cell 8 in Exhibit A.1.2.1). The nonresponse-adjusted weights were then calculated as the product of design weight and nonresponse adjustment factor for all eligible respondents in the sample.

Exhibit A.1.2.1. Response rate by weighting cell

Cell	Weighting cell description	Response rate
1	PCF risk groups 1 and 2, practices in a hospital system, no past CPC+ participation	91.69%
2	PCF risk groups 1 and 2, practices in other types of parent organizations, no past CPC+ participation	87.40%
3	PCF risk groups 1 and 2, independent practices with no parent organization affiliation, no past CPC+ participation	86.96%
4	PCF risk groups 1 and 2, practices in a hospital system, has past CPC+ participation	91.60%
5	PCF risk groups 1 and 2, practices in other types of parent organizations, has past CPC+ participation	92.98%
6	PCF risk groups 1 and 2, independent practices with no parent organization affiliation, has past CPC+ participation	96.49%
7	PCF risk groups 3 and 4	89.36%
8	PCF risk groups 1 and 2, affiliation of unknown type	89.66%

Poststratification. The last step was a post-stratification adjustment meant to match the weighted sample cell counts to the population cell counts by applying a ratio adjustment to the weights for certain groups (Kish 1965). We did this to adjust the weights to the population as defined above (that is, the number of practices that were active in PCF as of August 18, 2023). Because of the way the sample was selected and the nonresponse adjustment made, it was not guaranteed that the estimated number of practices obtained by summing the nonresponse-adjusted weights of the responding practices would be equal to the true number of practices in the population. It was then necessary to adjust the nonresponse-adjusted design weights to agree with the known population totals. In our case, we post-stratified the nonresponse-adjusted weights to ensure proper representation by poststratification cell. For convenience, we defined the poststratification cells the same way as the weighting cells, and, within each cell, we calculated a ratio adjustment factor as the population count divided by the sum of nonresponse-adjusted weight.

$$Adjps_c = \frac{Population\ count_c}{\left(\sum_{i=1}^{R} sampleweightA_{ci}\right)}$$

R indicates number of responding practices in poststratification cell *c*. The post-stratified weights were then calculated as

$$PSweight_{ci} = Adjps_c * sampleweightA_{ci}$$

The post-stratified weights were calculated as the product of nonresponse-adjusted weight and the ratio adjustment factor. The final post-stratified analytic weights sum to the population counts within each poststratification cell, as shown in Exhibit A.1.2.2.

Exhibit A.1.2.2. The population count of practices versus the sum of post-stratified weights for responding practices

Cell #	Population count	Sum of nonresponse-adjusted weights	Sum of post-stratified weights	Frequency (completes)	Percentage of total weighted survey respondents
1	695	679	695	309	26.75
2	269	255	269	111	9.61
3	145	139	145	60	5.19
4	764	742	764	338	29.26
5	353	345	353	159	13.77
6	234	230	234	110	9.52
7	49	47	49	42	3.64
8	58	58	58	26	2.25
Total	2,567	2,495	2,567	1,155	100.00

E. Data analysis

Data analysis inclusion criteria. To be included in this analysis, PCF practices had to submit a practice survey with at least half of the survey items completed and be active in PCF as of August 18, 2023, the last date of our data collection period. Among the 1,263 sampled and eligible practices, 1,155 (91.4 percent) submitted completed questionnaires and were included in the analysis, for a final response rate of 91.4 percent.

Methods for analyzing quantitative data. For analysis of quantitative items, we reviewed weighted frequencies of the sample as a whole and stratified by several key practice characteristics subgroups: cohort, risk group, CPC+ participation status, parent organization, practice size, Medicare Shared Savings Program participation status, specialty designation, and national practice Social Vulnerability Index quartile. Exhibit A.1.1.3 in the PCF Practice Portal data section defines and provides data sources for these subgroups. For some practice characteristics, we used practice characteristics as of the end of performance year 2 for Cohort 2 and performance year 3 for Cohort 1 data collection to align with our contemporaneous focus on the PCF Practice Portal data as a snapshot of practices at one point in time. For other practice characteristics, we used baseline data to align our analytic approach with analyses other PCF evaluation teams were conducting.

When reviewing differences between subgroups, we focused on differences in which the proportion of practices that reported making that change differed by 10 percentage points or more compared with the other subgroups in a two-way comparison (such as participation versus non-participation in the Medicare Shared Savings Program) or compared with both other subgroups for that characteristic in a three-way comparison (such as small versus medium versus large practice size).

Methods for analyzing open-ended responses. We first reviewed and coded all open-ended responses to the "other (please specify)" questions throughout the survey. This coding included updating responses that could be coded to existing response options and coding to new response options. We also implemented data cleaning rules to drop some responses based on information provided in open-ended responses.

Software. We used SAS version 9.4 to clean and prepare the data for analysis. We constructed the data tables using Stata version 17.0.

F. Practice Survey questions

Primary Care First (PCF)
2023 Survey of Primary Care Practices

Sponsored by:

The Centers for Medicare & Medicaid Services (CMS)

INTRODUCTION

The Primary Care First (PCF) Practice Survey is a critical component of the independent evaluation of the PCF model funded by the Centers for Medicare & Medicaid Services (CMS).

You, the practice manager, or the person most knowledgeable about the practice should complete the survey. **We strongly encourage you to get input from others in your practice;** for example, you may ask others to review answers to questions and discuss the survey at a practice meeting. The survey will be most accurate if it represents a consensus view of your practice site's clinical and support staff, arriving at the best answers after discussion.

We encourage your candid responses and remind you that there is no "passing grade" for this survey. This survey was developed to understand how practices provide patient care.

Your responses to this survey will never be tied to your name or your practice in any report to CMS, other payers, or the public. Your responses will only be reported to CMS in aggregate (with other PCF practices combined). Your responses will **not** have any consequences for payment or for your participation in PCF. We are genuinely interested in your observations of how your practice operates today.

Questions? Contact Mathematica by email at PrimaryCareFirst@mathematica-mpr.com or by telephone (toll-free) at (833) 488-2667.

IMPORTANT

- ✓ If this practice has multiple physical locations/practice sites, **please respond *only* about the site listed below**.

  PRACTICE NAME AND ADDRESS ARE LISTED IN THE WEB SURVEY

COMMONLY USED TERMS AND DEFINITIONS

- ✓ PCF payments: The PCF payment model replaces traditional Medicare fee-for-service payments with the following:
  - Population-based payments, which are prospective monthly payments (paid quarterly) for each beneficiary attributed to the practice
  - Flat visit fees, which are set payments for certain face-to-face primary care visits with attributed beneficiaries
  - Performance-based adjustments, which can increase or decrease total primary care payments by +50%/-10%

- ✓ Primary care practitioner: A primary care practitioner is defined as a physician (MD or DO), nurse practitioner (NP), physician assistant (PA), or clinical nurse specialist (CNS) who has a primary specialty designation of family medicine, internal medicine, or geriatric medicine, and who practices under their own National Provider ID (NPI).

A. CHANGES TO CARE DELIVERY

A1. This question is about changes your practice may have made since joining Primary Care First (PCF). There is no expectation that every practice will make the same changes or all changes listed below.

Since joining PCF in [YEAR], to what extent has your practice site made changes in each of the following areas?

Then, for areas in which your practice has made changes (column A), please indicate at column B, the extent to which these changes were motivated by PCF goals of reducing unnecessary acute hospitalizations or total cost of care, and at column C, the extent to which PCF payments supported these changes.

	A					B				C			
	Made changes since joining PCF?					If made changes, were changes motivated by PCF goals?				If made changes, did PCF payments support these changes?			
	Made a lot of changes	Made some changes	Made no changes though they may be needed	Made no changes because they were not needed or already made	Don't know	Changes motivated solely or mostly by PCF goals	Changes motivated in part by PCF goals	Changes not at all motivated by PCF goals	Don't know	Changes funded solely or mostly by PCF payments	Changes funded in part by PCF payments	Changes not at all funded by PCF payments	Don't know
STAFFING													
a. Increased the number of primary care practitioners on staff	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍
ACCESS AND CONTINUITY													
b. Expanded patient access to primary care practitioners via billable care (for example, extending office hours or offering home visits)	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍

	A					B				C			
	Made changes since joining PCF?					If made changes, were changes motivated by PCF goals?				If made changes, did PCF payments support these changes?			
	Made a lot of changes	Made some changes	Made no changes though they may be needed	Made no changes because they were not needed or already made	Don't know	Changes motivated solely or mostly by PCF goals	Changes motivated in part by PCF goals	Changes not at all motivated by PCF goals	Don't know	Changes funded solely or mostly by PCF payments	Changes funded in part by PCF payments	Changes not at all funded by PCF payments	Don't know
c. Expanded patient access to primary care practitioners via non-billable care (for example, communication via a patient portal or email)	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍
d. Increased likelihood that patients see their usual primary care practitioner and not another primary care practitioner for face-to-face visits	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍
CARE MANAGEMENT													
e. Improved or expanded long-term, proactive, relationship-based care management, provided by a care manager to patients who would most benefit from additional support (sometimes called longitudinal care management)	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍
f. Improved or expanded short-term care management, often for patients discharged from the hospital or ED (sometimes called episodic or transitional care management)	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍

	A					B				C			
	Made changes since joining PCF?					If made changes, were changes motivated by PCF goals?				If made changes, did PCF payments support these changes?			
	Made a lot of changes	Made some changes	Made no changes though they may be needed	Made no changes because they were not needed or already made	Don't know	Changes motivated solely or mostly by PCF goals	Changes motivated in part by PCF goals	Changes not at all motivated by PCF goals	Don't know	Changes funded solely or mostly by PCF payments	Changes funded in part by PCF payments	Changes not at all funded by PCF payments	Don't know
CARE FOR PATIENTS AT HIGH RISK OR WITH COMPLEX CARE NEEDS													
g. Enhanced outreach to, or care for, high-risk patients or patients with specific conditions or complex care needs, outside of long-term (longitudinal) or short-term (episodic) care management	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍
BEHAVIORAL HEALTH AND HEALTH-RELATED SOCIAL NEEDS													
h. Integrated (or improved integration of) behavioral health into primary care services	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍
i. Increased screening for patients' health-related social needs	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍
j. Enhanced capabilities for connecting patients to community resources that can meet their health-related social needs	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍

	A					B				C			
	Made changes since joining PCF?					If made changes, were changes motivated by PCF goals?				If made changes, did PCF payments support these changes?			
	Made a lot of changes	Made some changes	Made no changes though they may be needed	Made no changes because they were not needed or already made	Don't know	Changes motivated solely or mostly by PCF goals	Changes motivated in part by PCF goals	Changes not at all motivated by PCF goals	Don't know	Changes funded solely or mostly by PCF payments	Changes funded in part by PCF payments	Changes not at all funded by PCF payments	Don't know
COMPREHENSIVENESS AND COORDINATION													
k. Refined or enhanced the provision of comprehensive medication management for high-risk patients; this includes action plans, individualized therapy goals, a planned follow-up strategy, and a full medication review	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍
l. Improved coordination with specialists (including collaborative care agreements or e-Consults)	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍
m. Expanded the types of conditions treated or medical services provided at the practice site to reduce referrals to specialty care (for example, conditions like poorly controlled diabetes, or services like point-of-care ultrasound)	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍
HEALTH IT													
n. Enhanced health IT capabilities	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍

	A					B				C			
	Made changes since joining PCF?					If made changes, were changes motivated by PCF goals?				If made changes, did PCF payments support these changes?			
	Made a lot of changes	Made some changes	Made no changes though they may be needed	Made no changes because they were not needed or already made	Don't know	Changes motivated solely or mostly by PCF goals	Changes motivated in part by PCF goals	Changes not at all motivated by PCF goals	Don't know	Changes funded solely or mostly by PCF payments	Changes funded in part by PCF payments	Changes not at all funded by PCF payments	Don't know
PLANNED CARE AND POPULATION HEALTH													
o. Increased use of data to improve care delivery or identify care gaps (such as data from your EHR or from CMS or other payers)	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍
p. Increased the frequency of or started conducting regular, structured team meetings to improve team-based care or promote practice change	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍
PATIENT AND CAREGIVER ENGAGEMENT													
q. Implemented or improved any process for patients and caregivers to provide feedback to inform practice improvement (such as surveys or a Patient and Family Advisory Council, PFAC)	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍

A2. What type of staff, full or part-time, if any, did this practice site hire or retain using PCF payments, either entirely or in conjunction with other funding streams?

MARK ALL THAT APPLY

- ☐ Primary care physician (including residents or fellows)
- ☐ Nurse practitioner, physician assistant, or clinical nurse specialist
- ☐ Psychiatrist
- ☐ Clinical psychologist or clinical social worker (behavioral health specialist)
- ☐ Medical assistant or nurse
- ☐ Care manager or care coordinator
- ☐ Quality improvement (QI) specialist
- ☐ Health educator, dietitian, or nutritionist
- ☐ Clinical pharmacist or doctor of pharmacy
- ☐ Practice or office manager (e.g., clinic manager, office coordinator, office supervisor)
- ☐ PCF project manager
- ☐ Administrative support staff (e.g., billing or finance staff, front desk staff)
- ☐ Data analytics staff (e.g., EHR analyst, health IT team)
- ☐ Community health worker
- ☐ Other (please specify) _____
- ❍ None of the above

Question A3

For practices that either made no changes to areas listed at A1a, or changes were made but none were funded by PCF payments (A1c), and no staff were hired or retained using PCF payments (A2).

A3. How has your practice site used PCF payments?

B. REDUCING ACUTE HOSPITALIZATIONS OR TOTAL COST OF CARE

B1. Since joining PCF, which of the following do you think have been the <u>greatest help</u> to your practice site in trying to reduce acute hospitalizations or total cost of care among Medicare FFS beneficiaries? Please select up to three.

Please note that options on the web may be presented in a different order than what is shown here.

- ☐ Practice offers same-day appointments
- ☐ Patients are able to see their usual practitioner for acute visits
- ☐ [FOR PRACTICES AFFILIATED WITH A PARENT ORGANIZATION OR LARGER HEALTH CARE DELIVERY ORGANIZATION] Additional staffing resources from our parent organization or larger health care delivery organization (e.g., staff to support care management or behavioral health integration)
- ☐ Care manager time to provide longitudinal care management for high-risk or complex patients who might benefit from it
- ☐ Care manager time to provide episodic care management for our patients after emergency department visits or hospitalizations
- ☐ Coordination with specialist practitioners to make changes that could lead to reductions in acute hospitalizations or total cost of care among Medicare FFS beneficiaries
- ☐ Timely information from hospitals about discharges or ED use
- ☐ Health IT infrastructure that allows providers at this practice site to access the EHR from anywhere
- ☐ EHR interoperability with other providers (for example, specialists and hospitals)
- ☐ Robust EHR functionalities that support care delivery activities (for example, by automating risk stratification or incorporating screening for health-related social needs)
- ☐ Other *(specify)*_____
- ❍ Nothing has been a help to this practice site in trying to reduce acute hospitalizations or total cost of care among Medicare FFS beneficiaries.

B2. Since joining PCF, which of the following do you think have been the <u>most significant barriers</u> to your practice site in trying to reduce acute hospitalizations or total cost of care among Medicare FFS beneficiaries? Please select up to three.

Please note that options on the web may be presented in a different order than what is shown here.

- ☐ Insufficient practitioner time to meet patients' acute and chronic needs
- ☐ Our practice does not offer enough same-day appointments to meet patient need
- ☐ Patients are not able to see their usual practitioner for acute visits
- ☐ Insufficient care manager time to provide longitudinal care management for all high-risk or complex patients who might benefit from it
- ☐ Insufficient care manager time to provide episodic care management for all patients after emergency department visits or hospitalizations
- ☐ Inadequate supply of qualified and experienced care managers to hire
- ☐ Patients' unmet health-related social needs (including those due to insufficient community-based resources)
- ☐ Insufficient behavioral health resources or specialists to meet patients' behavioral health needs
- ☐ Patients at this practice site are generally not engaged in their own care
- ☐ Difficult to get primary care practitioners engaged in making changes that could lead to reductions in acute hospitalizations or total cost of care among Medicare FFS beneficiaries
- ☐ Difficult to coordinate with specialist practitioners to make changes that could lead to reductions in acute hospitalizations or total cost of care among Medicare FFS beneficiaries
- ☐ Poor or delayed information from hospitals about discharges or ED use
- ☐ Challenges with EHR interoperability with other providers
- ☐ Challenges with our EHR (unrelated to interoperability with other providers)
- ☐ Other (specify)_____
- ❍ Nothing has been a barrier to this practice site in trying to reduce acute hospitalizations or total cost of care among Medicare FFS beneficiaries.

C. BEHAVIORAL HEALTH

C1. Are there behavioral health specialists working full-time or part-time <u>on-site</u> at your practice in any of the following job roles? Please include all staff who work on-site at your practice site, regardless of who employs them.

	YES	NO
a. Clinical psychologist	❍	❍
b. Psychiatrist	❍	❍
c. Clinical social worker	❍	❍
d. Other staff trained in behavioral health (please specify) _____	❍	❍

C2. How many of your practice site's patients do you screen at least once a year for each of these conditions?

	None	Some	Many	Most or all	Don't know
a. Depression.....	❍	❍	❍	❍	❍
b. Anxiety.....	❍	❍	❍	❍	❍
c Alcohol use	❍	❍	❍	❍	❍
d. Opioid use.....	❍	❍	❍	❍	❍

D. LONGITUDINAL CARE MANAGEMENT

D1. Approximately how many empaneled patients does your practice site have in total? (Empanelment assigns each active patient to a practitioner and/or care team.) Your best estimate is fine.

|__|__|__|__|__| NUMBER OF EMPANELED PATIENTS

❍ We do not empanel patients

D2. Approximately how many of these empaneled patients does your practice consider to be high risk or have complex care needs? Your best estimate is fine.

|__|__|__|__| NUMBER OF PATIENTS CONSIDERED TO BE HIGH RISK/COMPLEX CARE NEEDS

❍ We do not have any patients that meet our definition for being high-risk or having complex care needs

→ **GO TO D4**

❍ We do not categorize our patients by risk or need → **GO TO D4**

D3. Of your patients who are high risk or have complex care needs, approximately how many have conditions that may be amenable to longitudinal care management?

Your best estimate is fine.

|__|__|__|__| NUMBER OF HIGH RISK/COMPLEX CARE NEEDS PATIENTS WITH CONDITIONS AMENABLE TO LONGITUDINAL CARE MANAMENT

D4. The remaining questions in this section are about <u>longitudinal care management</u>, which is proactive, long-term, relationship-based care management provided by a care manager to high-risk patients who would most benefit from additional support. (Note that CMS distinguishes longitudinal care management from short-term ("episodic") care management for patients who had a recent hospital admission or emergency department visit.)

NOTE: We encourage you to reach out to a care manager for your practice site to help answer these questions (D4-D9) about <u>longitudinal care management</u>.

Approximately how many of your patients currently receive longitudinal care management services from a care manager located at your practice site or off-site?

Your best estimate is fine.

|__|__|__|__| NUMBER OF PATIENTS RECEIVING LONGITUDINAL CARE MANAGEMENT

❍ This practice site does not offer longitudinal care management with a care manager → **GO TO D10**

D5. What types of information does your practice site use to identify patients for longitudinal care management?

MARK ALL THAT APPLY

- ☐ Computed risk scores or categories
- ☐ Clinical judgment of practitioner or team member at the practice site
- ☐ [FOR PRACTICES AFFILIATED WITH A PARENT ORGANIZATION OR LARGER HEALTH CARE DELIVERY ORGANIZATION] Input or data from a person located at our parent organization or from the larger health care delivery organization
- ☐ Other *(specify)*_____

D6. Please indicate if any of the following are challenges that your practice faces in providing longitudinal care management to patients at high-risk or with complex care needs.

	NO, NOT A CHALLENGE	YES, MINOR CHALLENGE	YES, MAJOR CHALLENGE
a. Risk stratification methods used to identify patients for longitudinal care management are sometimes inaccurate or do not allow adjustment based on clinical judgment *Definition of "risk stratification": Risk stratification is a systematic approach to define risk of harm or adverse health outcomes for individuals in your practice population, particularly to identify patients who are at increased and rising risk and most likely to benefit from targeted, proactive, relationship-based care management and other strategies.*	☐	☐	☐
b. Insufficient care manager time to provide longitudinal care management	☐	☐	☐
c. Insufficient community-based resources to meet patient needs	☐	☐	☐
d. Logistical obstacles to reaching patients (such as incorrect patient contact information, patients don't answer the phone)	☐	☐	☐
e. Lack of patient interest in interacting with a care manager	☐	☐	☐
f. Insufficient practitioner buy-in regarding the benefit of longitudinal care management services to patients	☐	☐	☐
g. Insufficient organizational buy-in regarding the benefit of longitudinal care management services to patients	☐	☐	☐
h. Other challenges in providing longitudinal care management (*specify*) _____	☐	☐	☐

Question D7

If "insufficient care manager time to provide longitudinal care management" (row b in D6) is a minor or major challenge for this practice, answer Question D7 below.

D7. You indicated that insufficient care manager time to provide longitudinal care management is a [minor/major] challenge. What is the <u>main reason</u> your practice does not have sufficient care manager time to provide longitudinal care management?

MARK ONE ONLY

- ❍ Practice does not have the funding to support hiring more care managers
- ❍ [FOR PRACTICES AFFILIATED WITH A PARENT ORGANIZATION OR LARGER HEALTH CARE DELIVERY ORGANIZATION] Our parent organization or larger health care delivery organization does not provide the practice with as much care manager time as our patient population needs
- ❍ Care manager time is focused on episodic care management (for example, follow-up after hospital or ED visits)
- ❍ Inadequate supply of qualified care managers available to hire
- ❍ Other (specify) _____

D8. What is the <u>most common</u> reason that patients stop receiving longitudinal care management from your practice?

- ❍ Patients achieve their health goals
- ❍ Patients go into a long-term care facility/hospice
- ❍ Patients die
- ❍ Patients stop engaging in longitudinal care management
- ❍ Practice has time limits on how long longitudinal care management lasts
- ❍ Other (*specify*) _____
- ❍ Don't know

D9. We understand there is variation in how long patients receive longitudinal care management, due to resource constraints and differences in patient needs. On average, how long does a patient typically receive longitudinal care management with a care manager from your practice site?

- ❍ Less than 3 months
- ❍ 3 to 6 months
- ❍ 7-12 months
- ❍ 13-24 months
- ❍ More than 2 years

Question D10

For practices that do not offer longitudinal care management with a care manager.

D10. Why does your practice site not offer longitudinal care management with a care manager?

E. CONTACT INFORMATION AND SURVEY COMPLETION

E1. Please provide the name, title, email, and phone number of the person who completed this survey so we know who to contact if we have any questions.

Name: _____

Title: _____

Email: _____

Telephone Number: _____

E2. Who filled out this survey or provided input to complete this survey?

MARK ALL THAT APPLY

- ☐ Practice or office manager (e.g., clinic manager, office coordinator, office supervisor)
- ☐ Lead physician
- ☐ Other physicians
- ☐ Nurse practitioner (NP), clinical nurse specialist (CNS), or physician assistant (PA)
- ☐ Care manager or coordinator
- ☐ Nursing staff, including nurse manager or supervisor
- ☐ Medical assistant staff
- ☐ Quality improvement staff (e.g., quality manager or coach, population health staff)
- ☐ Administrative support staff (e.g., billing or finance staff, front desk staff)
- ☐ Non-physician owner of practice
- ☐ Leadership or staff from our parent organization or larger health care delivery organization
- ☐ Data analytics staff (e.g., EMR analyst, health IT team)
- ☐ PCF project manager
- ☐ Other *(specify)*

_____

E3. Please add any comments about this survey or about PCF here. If you have feedback about a specific survey question, please include the question number in your comment.

Thank you for completing the survey!

A.1.3. Practice exit interviews

From January to December 2023, 405 practices withdrew from the PCF Model voluntarily or through termination by CMS. CMS requests that, upon withdrawal, practices provide their reasons for leaving the model. We summarize these reasons in Exhibits A.1.3.1 and A.1.3.2.

In early 2024, we interviewed 13 practices that withdrew from the PCF Model. The goal of these interviews was to understand practices' reasons for leaving the model, the timing of their decision, and the long-term effects of their participation in PCF. Here, we briefly summarize how we identified practices for interviews and how we conducted these interviews.

The 405 practices that withdrew from the model were the sampling frame for our interviews. We excluded the practices that merged (27), closed (20), or were acquired by another practice or health care system (5). We also excluded practices that CMS terminated for noncompliance with the participation agreement (14), such as not meeting the minimum number of beneficiaries. We excluded 14 practices that exited for situational reasons that were not likely to provide valuable insight about the PCF Model, including leaving because of the Maui wildfires or having a practitioner switch to a concierge model. We also excluded one hospital-based parent organization, which withdrew its 63 practices, because its PCF point of contact participated in a payment interview earlier in the year. In total, we excluded 143 practices.

From the 262 practices remaining in our sample frame, we strove for diverse perspectives based on the reason for withdrawal that practices reported to CMS and the categorization of the practice as either independent or affiliated with a parent organization, with a focus on independent practices because we had reported on practices affiliated with a parent organization in prior years. We grouped practices into strata that reported similar reasons for withdrawing and were thus likely to have similar perspectives.

There were 82 sampling units: 25 units representing multiple practices and 57 units representing individual practices because many of the 262 practices in our exit interview sample were affiliated through a parent organization. Because these practices were not independent from one another (and likely had similar reasons for withdrawing), we grouped them at the parent organization level and treated practices affiliated with the same parent organization as a single sampling unit.

In the end, we interviewed 13 of the 82 sampling units: two at the parent organization level and 11 at the individual practice level. In April 2024, we conducted 30-minute interviews using semistructured protocols. We contacted 23 practices to complete 13; by then, we reached the saturation point at which we were not identifying new themes. We offered respondents a $100 gift card for participation.

Each interview included a primary interviewer and a notetaker and was audio recorded. Immediately after the interview, the interview team met to discuss the major takeaways, after which the notetaker edited the detailed interview notes. The interview team used these notes to identify and summarize recurring themes across all respondents.

Exhibit A.1.3.1. Reasons for withdrawing reported by practices excluded from sample

Reason for withdrawing	Number of practices
Merged with another PCF practice	27
Closed	20
Acquired by another organization	5
Noncompliant with participation agreement (practices terminated by CMS)	14
Situational reasons, including Maui wildfires, having a practitioner switch to a concierge model, not intending to join, or challenges reporting eCQMs that affected practices' ability to meet Quality Gateway measures	14
Participated in a payment interview in 2024 regarding participation in 2023 (this parent organization has 63 practices that withdrew because of the payment accuracy adjustment)	63
Total	**143**

Source: Mathematica's analysis of PCF Model Practice Roster and Mathematica's internal data, January 2024.
CMS = Centers for Medicare & Medicaid Services; eCQM = electronic clinical quality measure; PCF = Primary Care First.

Exhibit A.1.3.2. Reasons for withdrawing reported by practices included in the sample

Reasons for withdrawing	Number of practices
Practice moved to a different CMS model	**57**
Joining a CMS program with no-overlap policy: ACO REACH	57
Practice had concerns with the financial aspects of PCF	**186**
Payment accuracy adjustment	89
Performance-based adjustment	5
Patient Experience of Care Survey	3
Risk group assignment	1
Finances less than anticipated	2
Financial losses	4
Inadequate earnings	10
General financial	1
Business decision	34
Payment terms	37

Reasons for withdrawing	Number of practices
Other	**19**
Inadequate resources at the practice needed to support PCF	5
Prefers to participate in Medicare Shared Savings Program only	9
Poor performance and organizational changes	4
Concerns about model fit – not appropriate for a frail population	1
Total	**262**

Source: Mathematica's analysis of PCF Model Practice Roster, January 2024.

ACO REACH = Accountable Care Organizations Realizing Equity, Access, and Community Health; CMS = Centers for Medicare & Medicaid Services; PCF = Primary Care First.

A.1.4. Payer exit interviews

We interviewed two of the three payer partners that chose to end their PCF partnerships in 2023. Similar to the payer partner interviews, two-person interview teams conducted the exit interviews virtually using semistructured interview guides. Interview topics included the reasons for participating in PCF and for ending their PCF partnership, the barriers to and facilitators of PCF implementation, and whether payers plan to continue primary care transformation work. We used the same analysis approach for the payer exit interviews as we used for the general payer interviews.

A.1.5. Methods for identifying and interviewing a sample of practices about PCF Model payments

A. Introduction

In this section, we describe our methods for identifying and collecting data for a special study on PCF Model payments for the third annual report. Interviews occurred from November 2023 to February 2024.

The special study on PCF Model payments sought to answer the following research questions:

1. To what extent do practices perceive the PCF Model's payment methodology as fair and adequate?
2. To what extent are practices able to predict the performance-based adjustment (PBA) and payment accuracy adjustment (PAA)?
3. To what extent are practices and practitioners exposed to the financial incentives and penalties of the PCF Model?
4. How does the PCF Model align with practices' participation in other value-based payment programs?
5. Do practices perceive alignment between the PCF Model and payer partners?

Through interviews, we collected data on practices' experiences with the PCF Model's payment methodology that determined the payments CMS made to them and asked about their payments from other partnering payers in 2023. We further explored topics that were included in the second annual

report, including practices' perceptions of the adequacy and fairness of PCF Model's payments as well as behavioral changes that practices made in 2023 to improve their financial performance under the model. This year, we investigated how participation in the PCF Model affects practices' participation in other value-based care contracts, including whether and how the PCF Model's incentives align with the model's payer partners and other value-based payment programs. Finally, we explored how changes to the PCF Model's payments or future payment models may affect practices' perceptions of payments and participation decisions.

B. Identifying practices for payment-focused interviews

Our goal was to obtain a sample of 16 practices. Practices were eligible for the payment-focused interviews if they were Cohort 2 practices and not participating in the longitudinal site visits. We then stratified eligible practices and sampled based on our stratum.

We sampled by risk group, experience with CPC+, quality and cost performance, and practice ownership type. Exhibit A.1.5.1 provides an overview of the sampled practices. We interviewed Cohort 2 practices exclusively because these practices experienced the important payment adjustments, such as the PBA and PAA, for the first time in 2023 just before our interviews began. We did not include Cohort 1 practices as a part of this special study because we did not expect that these practices' experience with the PCF Model's payments would have changed significantly since their interviews in late 2022 and early 2023, which we summarized in the second annual report.

Exhibit A.1.5.1. Characteristics of practices included in payment interviews

Practice characteristics	Practices proposed for inclusion in payment interviews (N = 16)	
	Number of practices	Percentage of practices
2023 risk group		
1 and 2	12	75
3 and 4	4	25
CPC+ participation		
Yes	9	56
No	7	44
PBA results in Q2 2023		
Positive	6	38
Neutral	5	31
Negative	5	31
Parent organization affiliation		
Vertically integrated system	6	38[a]
Horizontally integrated network	6	38
Independent	4	25

[a] Percentages do not add up to 100 percent because of rounding.

CPC+ = Comprehensive Primary Care Plus; PBA = performance-based adjustment; Q = quarter.

We had two goals when sampling based on risk group assignment: first, to draw a sample that was primarily made up of lower-risk group practices, which comprise most PCF practices, and second, to ensure that we include enough higher-risk group practices and represent their viewpoints. These goals guided our decision to select 12 practices in risk groups 1 and 2 and four practices in risk groups 3 and 4.

Another goal of our interviews was to better explain the experience with the PCF Model's payments among CPC+ participants who transitioned to PCF compared with non-CPC+ participants. We selected nine practices with CPC+ experience and seven practices without CPC+ experience. This mirrors the proportion of CPC+ participants in Cohort 2 generally (59 percent).

We selected six practices with positive PBA results in Q2 2023, five practices with neutral PBA results, and five practices with negative PBA results, which allowed us to probe on potential differences in perception of the PCF Model's payments between higher-performing and lower-performing practices.

We selected six practices in hospital systems, six practices in other types of parent organizations, and four independent practices. This mix of parent organization affiliations allowed us to explain the differences in management of PCF Model funds, including the extent to which providers are compensated in a way that aligns with the model's incentives.

C. Data collection methodology

We interviewed Cohort 2 practices from November 2023 to February 2024, which coincided with the end of this cohort's second performance year. We first reached out to each practice's point of contact and asked which people associated with the practice are most involved in the accounting and management of PCF Model funds or who manage value-based contracts.

Two-person teams interviewed respondents using semistructured protocols that we tailored to reflect the practice's or parent organization's characteristics and financial performance in the PCF Model.

We audio recorded and transcribed all interviews and then imported the transcripts into a qualitative data analysis software. We coded the transcripts based on the themes, codes, and definitions included in a codebook specific to this study and then applied deductive content analysis techniques. Next, we generated analytic summaries for each coded data segment and completed cross-case analyses across all interviewed practices. These analyses focused on responses to the key research questions covered in the payment interviews and allowed for us to identify any new and emerging themes.

A.1.6. Methods for identifying and interviewing a sample of practices participating in the PCF Model

A. Introduction

In this section, we describe our methods for identifying and collecting data from a sample of Cohort 1 practices as part of the third round of virtual site visits. The interviews occurred from October 2023 to February 2024, and we had a goal to interview the 20 practices that participated in the round 1 interviews in 2021 that were still actively participating in the PCF Model at the time of the interviews. The primary purpose of this round of data collection was to examine the trajectory of care delivery changes among practices during the first three years of participation in the model. Specifically, we sought to determine:

1. Which of the care delivery activities that practices planned in year one to reduce acute hospital utilization and lower total per-capita cost of care remained by year three?
2. To what extent have practices continued to modify their originally planned activities?
3. Have practices abandoned any of their originally planned activities over the three years of participation?
4. Have practices added new care delivery activities that were not part of their original implementation plans?

As with earlier interviews, we sought to identify the factors that helped or hindered practices' ability to remain actively engaged in PCF, seeking new ways to achieve the model's goals over time as well as to assess the extent to which practices benefited from using the model supports that CMS offered.

B. Identifying the sample frame

To answer these research questions, we used a longitudinal study design. First, we reinterviewed the 18 practices we had interviewed in 2021 (performance year 1) that continued to participate in the model in 2023 (performance year 3). These 18 practices were drawn from the 28 practices that participated in round 1 interviews in 2021. In 2021, we used a stepwise sampling approach to identify a sample of 30 practices. First, we divided our sample so that we could have 20 practices assigned to risk groups 1 or 2 and 10 practices assigned to risk groups 3 or 4. We purposively selected practices from different geographic regions, of varying practice sizes, with and without system affiliation, and with and without experience with advanced payment programs and models such as Medicare Shared Savings Program and Independence at Home. After contacting practices to ask them to participate in a virtual site visit, we ended with a sample of 28 practices for round 1 interviews in 2021.

From these 28 practices, we removed any practices that were no longer participating in PCF by performance year 3 of the PCF Model. This left us with 20 practices for performance year 3's virtual site visits, which became a sample of 18 after we removed two that were unresponsive to our contact. In all, 15 of the interviewed practices had a parent organization and 3 were independent. There were 13 in risk groups 1 and 2 and 5 in risk groups 3 and 4. Further, they represented 12 of 26 regions and had an average PAA of 27.4 percent and an average PBA of 6.1 percent. We summarize these characteristics in Exhibit A.1.6.1.

Exhibit A.1.6.1. Characteristics of practices interviewed between October 2023 and February 2024

Practice	Risk group	Practice size	Affiliated with a parent organization
1.	1 or 2	Small	System
2.	1 or 2	Medium	Independent
3.	1 or 2	Medium	Independent
4.	1 or 2	Medium	Independent
5.	1 or 2	Medium	System
6.	1 or 2	Medium	System
7.	1 or 2	Medium	System
8.	1 or 2	Large	System
9.	1 or 2	Large	System
10.	1 or 2	Large	System
11.	1 or 2	Large	System
12.	1 or 2	Large	System
13.	1 or 2	Large	System
14.	3 or 4	Small	System
15.	3 or 4	Large	System
16.	3 or 4	Large	System
17.	3 or 4	Large	System
18.	3 or 4	Large	System

C. Data collection methodology

We conducted interviews starting in October 2023 and ending in February 2024. In our initial communications with practices, we described our data collection goals and the perspectives we hoped to gain, most notably those of administrative and clinical staff who were most knowledgeable about and engaged in the practice's activities and experience under the PCF Model. When a practice belonged to a larger health care system, we also interviewed leaders from the system with which they were affiliated.

Two-person teams interviewed all respondents using a semistructured protocol that we tailored to each respondent based on what we knew about the practice from various sources, including its portal data, web searches, and prior interview data. Interview teams typically asked all questions of all respondents based on the time allowed and respondents' knowledge and expertise. We conducted 48 interviews across 18 primary care practices to identify the trajectory of care delivery changes among practices during the first three years of participation in the model.

We audio recorded and transcribed all interviews. We then imported the transcripts into a qualitative data analysis software package and coded the transcripts using a codebook and deductive content analysis techniques. Next, we generated analytic summaries for each coded data segment, taking into consideration the practice's characteristics, such as whether it was owned by a hospital. Finally, we synthesized the findings by key research question, guided by the causal pathways.

A.1.7. Payer worksheet

In early fall 2023, we asked 15 participating payer partners to complete a short worksheet to describe their approach to aligning with the PCF Model. We prepopulated the worksheet with data from the prior year's worksheet to reduce the burden on the person completing it. The data collected in the worksheets helped us streamline the interviews we conducted with payers, particularly the data that might be challenging or time consuming for a respondent to accurately recall during an interview, such as payment approaches and the number of attributed lives.

A.1.8. Payer interviews

In late fall 2023, we interviewed 10 of the 15 payer partners active in the PCF Model. The sample includes all eight Cohort 2 payers and two Cohort 1 payers, selected by CMS and Mathematica based on their prior year interview and worksheet responses. Interviews focused on how payer partners' PCF implementation has progressed, their payment approaches, their efforts to contract with PCF practices, and the barriers to and facilitators of partnering in PCF.

Two-person teams interviewed payer partners virtually using semistructured interview guides. We typically interviewed the respondent most familiar with the payer's value-based program portfolio.

We audio recorded and transcribed interviews when possible and took detailed notes when respondents did not consent to being recorded. Using inductive and deductive analysis strategies, our analysts reviewed the data to identify hypothesized and emerging themes. We triangulated the interview data and the data from the payer worksheets.

Appendix A.2. Additional methodological details of processing and analyzing secondary data

A.2.1. Attribution and assignment

Attribution is a methodology used to identify the group of beneficiaries served by a particular practitioner, practice, or organization. CMS attributes beneficiaries to each PCF practice to calculate population-based payments (PBPs) and to track PCF beneficiaries' utilization and costs for PBAs. Similarly, for the evaluation, we attribute beneficiaries to each PCF practice and to comparison practices so that we can test whether beneficiaries served by PCF practices experience better care or have lower Medicare spending than beneficiaries served by comparison practices.

In this section, we first explain the purpose of beneficiary attribution for this evaluation, which is distinct from how beneficiaries are attributed to practices for the purpose of calculating payments to PCF practices (Subsection A). We then describe the steps we used to attribute beneficiaries to PCF and comparison practices and explain how quarterly attribution informs our evaluation's intention-to-treat (ITT) approach to assigning beneficiaries to the first practice to which they were attributed (Subsection B). In short, we *attributed* beneficiaries each calendar quarter to the practice where they received their most recent Medicare Annual Wellness Visit (AWV), including Welcome to Medicare Visits, or the practice where they received the plurality of their primary care services in the previous two years. We then *assigned* beneficiaries to the practice to which they were first attributed during the baseline period (the two years before PCF launch) or the intervention period (starting with the PCF launch), depending on the analysis. In Subsection C, we compare how our evaluation attribution process differs from CMS' process of attributing beneficiaries for payment. In Subsection D, we explore differences between the samples of beneficiaries attributed to PCF practices using the two processes. Finally, in Subsection E, we examine the extent to which beneficiaries' assigned practices under the ITT framework diverge from their attributed practices (that is, the practices at which they receive care), over time.

A. Description of beneficiary attribution

PCF provides each participating practice with PBPs and flat visit fees (FVFs) for its Medicare fee-for-service (FFS) beneficiaries. To determine the payments that practices receive, CMS attributes beneficiaries to determine the size and acuity of the Medicare FFS population receiving regular continuous care from the practice. The PCF payment attribution uses Medicare administrative data (including claims and enrollment data) to identify the Medicare FFS beneficiaries associated with each PCF practice.[18]

As part of our evaluation of PCF, we use a similar claims-based attribution process to attribute Medicare beneficiaries, but our attribution methodology differs slightly from payment attribution so we can attribute beneficiaries not only to PCF practices but also to non-PCF practices that we include in the evaluation's comparison group. We attribute eligible Medicare beneficiaries to practices for each

[18] Please see CMS' PCF Payment and Attribution Methodologies for details on payment attribution, which includes voluntary alignment (Center for Medicare & Medicaid Innovation 2024). We summarize differences between this and our evaluation attribution methods in Exhibit A.2.1.4.

calendar quarter: for this report, this period included eight baseline quarters each for Cohort 1 (2019 and 2020) and Cohort 2 (2020 and 2021) practices, twelve intervention quarters for Cohort 1 practices (2021 through 2023), and eight intervention quarters for Cohort 2 practices (2022 and 2023).

B. Attribution methodology

The PCF evaluation attribution process has six steps:

1. We identify the set of primary care practices that compete for beneficiaries in the attribution process.
2. Because Medicare claims report the practitioners (rather than the practice) who provided services, we group practitioners into the practices identified in the first step; we define a practice as being composed of a unique group of practitioners at a given point.
3. We identify the set of Medicare beneficiaries eligible for attribution.
4. We specify the set of primary care services considered when determining whether a beneficiary receives regular care from each practice.
5. We use the information from the above steps to attribute each eligible Medicare beneficiary to a single practice in each quarter.
6. We assign each beneficiary during the baseline and intervention periods to the first practice to which they were attributed.

Step 1. Identify primary care practices

We start with a roster of all practices in the United States with at least one practitioner (defined as a physician, nurse practitioner, physician assistant, or clinical nurse specialist) with a primary care specialty (defined for physicians as specializing in family practice, general practice, geriatrics, or internal medicine). Each practice is intended to be a single physical location or practice site. (For practice organizations with several sites, each site is considered a distinct practice.) We define each practice for attribution as comprising a unique group of practitioners who work at the address at a given point. We purchased yearly rosters from 2019 to 2023 from IQVIA, a commercial health care data vendor that maintains and verifies lists of practitioners who work in practices throughout the United States. The IQVIA OneKey database contains information about practices (such as name and physical location), the providers affiliated with the practice (such as name, specialty, and National Provider Identifier [NPI]), and corporate parents of the practices (including ownership type and name). We augment the OneKey data with practitioner specialty taxonomy codes and fill in missing NPIs by linking practitioner-level OneKey data with the National Plan and Provider Enumeration System (NPPES) NPI registry. We then identify PCF practices within the roster of OneKey practices using a combination of address, name, and practitioner information matched to CMS records on PCF participants. For PCF practices not found in the OneKey data, we appended practice and practitioner information from those practices' PCF application data.

Although we had extensive validated information about PCF practices from their applications and subsequent roster files, for the purposes of our evaluation, we opted to identify practice and practitioner information—such as location and specialty—from the same OneKey data source for each year. As part of the evaluation, we constructed a matched comparison group of practices not participating in PCF, so we must rely on OneKey data for those practices' practitioner composition. By using OneKey data for all practices, we remove bias that could result from using different data sources for PCF versus non-PCF practices.

Step 2. Group practitioners into practices

To facilitate attribution for the evaluation, we construct a roster of practitioners working at primary care practices across the United States and their associated Taxpayer Identification Numbers (TINs) (and CMS Certification Numbers when applicable).

Step 2.1. Create initial roster of NPIs from yearly OneKey rosters

As a starting point, we use practitioner rosters purchased from IQVIA for 2019 to 2023. (We use the 2019 roster to reflect practice composition for years 2017 to 2019.) The rosters link a unique practice identifier to a list of practitioners affiliated with the practice in each year. Providers can be affiliated with multiple practices in a given year in the OneKey data, so to better reflect PCF's participation rules, we choose a single practice for each practitioner for each year, preferring to keep a practitioner affiliated with a practice consistently over time.

Step 2.2. Assign TINs to each practice for each year.

Because OneKey data do not include TINs, we use claims data to assign a TIN to a practice for each year from 2018 to 2023.[19,20] To do so, we select the TIN most frequently billed in Medicare claims data for primary care services by the NPIs of primary care practitioners in each practice. For each year, we assign the TIN based on claims in that year and then we maintain the TIN assigned to the practice based on claims occurring during the year before and year after that year.[21]

Step 3. Identify Medicare beneficiaries eligible for attribution

We start with the list of beneficiaries who had at least one eligible primary care visit (see Step 4 for the list) with any NPI with a primary care specialty, as determined in Steps 1 and 2. Following the payment attribution methodology, we then limit the pool of beneficiaries who meet the following eligibility criteria in a given calendar quarter, as indicated by the Medicare enrollment database: (1) are enrolled in Medicare Part A and Part B at the start of the quarter, (2) have Medicare as their primary payer, (3) are

[19] We chose not to assign a TIN in 2017, which we needed to attribute beneficiaries in 2019, because the practice rosters would have been too out of date to reliably assign a TIN. Rather, we relied on our backdating of the 2018 TIN, which we describe in more detail later in the paragraph.

[20] For PCF practices, we examined the overlap between the assigned TINs and reported TINs in the PCF application: for nearly 99 percent of practices, at least one assigned TIN was also on the PCF roster. Using the assigned TINs when attributing beneficiaries, rather than using TINs on the application, increases the risk of misattributing beneficiaries to PCF practices if we assigned an incorrect or invalid TIN to those practices.

[21] Specifically, we use these historical and backdated TINs to avoid cases in which TINs switched mid-year and we only capture one of the two TINs because we use a plurality approach to assigning TINs for a given year.

not covered under a Medicare Advantage or other Medicare health plan, (4) are not incarcerated, (5) are not institutionalized, and (6) are alive at the start of the quarter. These criteria ensure we can reliably measure beneficiaries' outcomes in the Medicare FFS claims data, unlike, for example, for beneficiaries enrolled in a Medicare Advantage plan.

Step 4. Identify primary care claims used in attribution

We next narrow the set of all billed Medicare services to the primary care services used in beneficiary attribution. There are four criteria for a claim to be used in attribution for a given quarter: claim type, claim date, service type, and specialty of the practitioner who provided the service.

Claim type. For attribution, we use national Medicare FFS physician (Part B carrier) and outpatient claims. Most attribution-eligible visits are in the physician claims file, except claims submitted by Critical Access Hospitals (CAHs), which are in the outpatient file. Similar to CMS' payment attribution approach, our approach excludes claims from Federally Qualified Health Centers (FQHCs) and Rural Health Clinics (RHCs).[22]

Claim date. We use primary care services occurring during a two-year lookback period in the attribution process. This is the same as for the payment attribution, although we use a slightly different lookback period. For each quarter, our lookback period is the 24-month period that ends the day before the quarter (Exhibit A.2.1.1). For example, for the first quarter of 2019, we use claims from January 1, 2017, to December 31, 2018. (In contrast, for the payment attribution, the lookback period is lagged by three months to allow prospective payments. See Subsection C of this appendix section for more detail.) We extracted the claims for this report between January and April 2024.

Exhibit A.2.1.1. Lookback periods used in attribution

Attribution quarter	Lookback period
Q1 2019	1/1/2017 to 12/31/2018
Q2 2019	4/1/2017 to 3/31/2019
Q3 2019	7/1/2017 to 6/30/2019
Q4 2019	10/1/2017 to 9/30/2019
Q1 2020	1/1/2018 to 12/31/2019
Q2 2020	4/1/2018 to 3/31/2020
Q3 2020	7/1/2018 to 6/30/2020
Q4 2020	10/1/2018 to 9/30/2020
Q1 2021	1/1/2019 to 12/31/2020
Q2 2021	4/1/2019 to 3/31/2021
Q3 2021	7/1/2019 to 6/30/2021
Q4 2021	10/1/2019 to 9/30/2021

[22] This restriction means that, in payment and evaluation attribution, even if beneficiaries have most of their care or their most recent visits at an FQHC or RHC, they would not be attributed to that practice. Rather, if they had visits at a practice other than the FQHC or RHC during the lookback period, they would be attributed to the practice that provided the plurality of their services outside of FQHCs and RHCs, or they would not be attributed at all for that quarter if all of their visits were at FQHCs or RHCs.

Attribution quarter	Lookback period
Q1 2022	1/1/2020 to 12/31/2021
Q2 2022	4/1/2020 to 3/31/2022
Q3 2022	7/1/2020 to 6/30/2022
Q4 2022	10/1/2020 to 9/30/2022
Q1 2023	1/1/2021 to 12/31/2022
Q2 2023	4/1/2021 to 3/31/2023
Q3 2023	7/1/2021 to 6/30/2023
Q4 2023	10/1/2021 to 9/30/2023

Q = quarter.

Service type. We limit claims to eligible primary care services using the Current Procedural Terminology (CPT) code reported on each claim. Exhibit A.2.1.2 lists the CPT codes of services we consider to be related to primary care, which follows the list CMS uses for PCF payment attribution (Center for Medicare & Medicaid Innovation 2024). AWVs, including Welcome to Medicare Visits, receive precedence in the attribution algorithm, as we describe in Step 5.

Exhibit A.2.1.2. Primary care services eligible for attribution

Service	CPT codes
Office or outpatient visit E&M	99201–99205, 99211–99215
Prolonged non-face-to-face E&M	99358
Home care	99324–99328, 99334–99337, 99339–99345, 99347–99350
Welcome to Medicare and Annual Wellness Visits	G0402, G0438, G0439
Advance care planning	99497
Collaborative care model	G0502–G0504, 99492–99494
Cognition and functional assessment for patient with cognitive impairment	G0505, 99483
Outpatient clinic visit for assessment and management (Critical Access Hospitals only)	G0463
Transitional care management services	99495–99496
Chronic care management services	99490
Complex chronic care management services	99487
Assessment or care planning for patients requiring chronic care management services	G0506
Care management services for behavioral health conditions	G0507, 99484, 99491
Prolonged services without face-to-face contact	99358

CPT = Current Procedural Terminology; E&M = evaluation and management.

Specialty of practitioner who provided service. Only claims that have a practitioner with a primary or secondary specialty of primary care, based on NPPES specialty information, are included in attribution (Exhibit A.2.1.3). This differs slightly from payment attribution methodology, in which claims are considered for all practitioners in PCF practices regardless of their specialty.

Exhibit A.2.1.3. Practitioner primary care specialty codes

Specialty	Health Care Provider Taxonomy code
Family Medicine	207Q00000X
Adult Medicine	207QA0505X
Geriatric Medicine	207QG0300X
Hospice and Palliative Medicine	207QH0002X
General Practice	208D00000X
Internal Medicine	207R00000X
Geriatric Medicine	207RG0300X
Hospice and Palliative Medicine	207RH0002X
Clinical Nurse Specialist	364S00000X
Acute Care	364SA2100X
Adult Health	364SA2200X
Chronic Care	364SC2300X
Community Health/Public Health	364SC1501X
Family Health	364SF0001X
Gerontology	364SG0600X
Holistic	364SH1100X
Women's Health	364SW0102X
Nurse Practitioner	363L00000X
Acute Care	363LA2100X
Adult Health	363LA2200X
Community Health	363LC1500X
Family	363LF0000X
Gerontology	363LG0600X
Primary Care	363LP2300X
Women's Health	363LW0102X
Physician Assistant	363A00000X
Medical	363AM0700X

Note: Specialties in bold correspond to level II classification categories in the National Uniform Claim Code list, and specialties without bold are subcategories for areas of specialization.

Step 5. Running the attribution algorithm

After we identify eligible beneficiaries and their eligible primary care services, we apply the following algorithm to attribute beneficiaries based on AWVs, including Welcome to Medicare Visits, or the plurality of services (shown in Exhibit A.2.1.2). If a beneficiary had one or more AWVs during the two-year lookback period, we attribute the beneficiary to the practice that provided the *most recent* visit. If the beneficiary did not have any qualifying AWVs, but had other eligible primary care services, we attribute the beneficiary based on the plurality of those services occurring at a practice during the two-year lookback period for that quarter.[23] This mirrors the algorithm used for PCF Model payments since 2022.

The payment attribution removes beneficiaries with end-stage renal disease (ESRD) or use of hospice services at this stage, as long as those beneficiaries were not previously attributed to a PCF practice. In the evaluation attribution algorithm, we instead impose a similar restriction as part of Step 6 (assignment), at which time we can determine whether a beneficiary had ESRD or used hospice services as of the start of that beneficiary's baseline or intervention periods. Exhibit A.2.1.4 of this appendix describes differences between the evaluation and payment attribution methodologies in more detail.

Step 6. Assigning beneficiaries based on attribution

For the impact analyses shown in Chapter 5, we assigned beneficiaries during baseline (that is, before PCF began) and, separately, during the intervention period, to the first PCF or comparison practice to which they were attributed during the relevant period, following an ITT approach. Beneficiaries first attributed to a practice that is neither a PCF practice nor a selected comparison practice could later become assigned to a PCF or comparison practice if attributed there.

Through this assignment method, a beneficiary would continue to be assigned to the same practice for the entire period (either baseline or intervention), regardless of whether the beneficiary continued to receive care at that practice, as long as they were eligible in those subsequent quarters based on the eligibility criteria listed in Step 3. By tracking beneficiaries as part of their initial practice during either period, ignoring any practice switching, we (1) help to remove potential bias that could occur if PCF practices systematically changed the types of beneficiaries served in response to the model, and (2) ensure we include beneficiaries in the analytic population who might still be benefitting from high-quality comprehensive primary care received earlier. For example, if a beneficiary received longitudinal care management services from a PCF practice for the first three years of the model, we might expect that beneficiary to experience a reduced hospitalization rate as a result of this care, even if the beneficiary moved away and started visiting a new primary care practice; under the ITT approach, we continue to count the beneficiary among the group that might have benefitted from the intervention. To better reflect the care that beneficiaries receive over time, however, we allow beneficiaries to change practice assignment between baseline and intervention periods. In Subsection E, we examine the extent to which beneficiaries' assigned practices are different from their attributed practices for any given evaluation year.

[23] Ties are broken by choosing the practice that provided the most recent service to the beneficiary; if ties remain, the beneficiary is attributed to a OneKey practice over an NPI not in OneKey. Any remaining ties are attributed to one of the remaining practices at random.

We created additional assignment rules for calendar year 2021, which is both an intervention year for Cohort 1 practices and a baseline year for Cohort 2 practices. This is to prevent a situation in which a beneficiary might be simultaneously assigned to both a Cohort 1 PCF or comparison practice for the intervention period and a Cohort 2 practice for the baseline period and is then assessed for impacts twice. In these instances of assignment conflict, we preferentially assign beneficiaries to Cohort 1 practices over Cohort 2 practices. This prevents a beneficiary from contributing to the baseline of a Cohort 2 practice while receiving the benefit of the PCF intervention from a Cohort 1 practice. Finally, we also remove beneficiaries with ESRD or who are in hospice when they first enter either the baseline or the intervention period, consistent with eligibility criteria for payment attribution. Beneficiaries are allowed to remain in the baseline or intervention sample if they develop ESRD or enter hospice during those respective periods.

C. Differences between evaluation and payment beneficiary attribution methods

Our evaluation attribution method identifies Medicare beneficiaries attributed to any practice in each quarter using roughly the same claims-based attribution method that CMS uses to attribute beneficiaries for PCF payments. Our attribution approach for the evaluation, however, differs in the following ways (Exhibit A.2.1.4):

The evaluation approach uses practitioner rosters from OneKey data for PCF and non-PCF practices

Payment attribution uses rosters of practitioners that practices participating in PCF (or, until the end of 2021, participating in CPC+) submit to CMS to determine the composition of practices and their practitioner NPIs and TINs. To maintain consistency for all practices in our analytic population, including those not participating in PCF or CPC+, the evaluation uses a OneKey roster to identify the practitioners affiliated with a practice each year and assigns TINs to practices each year by selecting the most frequently billed TIN in Medicare claims for primary care services by those practitioners in the relevant year, the previous year, and the subsequent year.

The evaluation lookback period begins immediately before the start of the quarter

Because of the prospective nature of payment attribution, CMS attributes beneficiaries using a two-year lookback period that ends three months before the start of that attribution quarter. For example, CMS attributed beneficiaries for the first quarter of 2021, which started January 1, 2021, based on claims from October 1, 2018, to September 30, 2020. For the evaluation, however, the three-month gap between the lookback period and attribution quarter is unnecessary because we want to identify the most appropriate sample of beneficiaries attributed to PCF practices without a need for calculating payments, outcomes, or any other characteristic prospectively. For this reason, the evaluation attribution uses a two-year lookback period ending the day before the start of the attribution quarter. For example, we attribute beneficiaries for the first quarter of 2021 based on claims from January 1, 2019, to December 31, 2020.

Relatedly, the beneficiary eligibility requirements reflect the different timing of the two methods. For payment attribution, CMS checks for eligibility one month before the start of the attribution quarter, but for the evaluation, we determine eligibility at the beginning of the quarter. For example, for attributing beneficiaries in the first quarter of 2021, beneficiaries had to meet the eligibility requirements described

in Step 3 as of December 2020 to be eligible for payment attribution, and those beneficiaries would have had to meet requirements as of January 2021 to be eligible to be attributed for the evaluation.

The evaluation approach does not consider voluntary alignment or, for the earliest quarters, give priority to chronic care management services

For payment attribution, CMS first attributes the beneficiaries who voluntarily attested that an eligible practitioner in a PCF (or, until the end of 2021, CPC+) practice is their primary care physician. Because potential comparison practices have no real incentive to encourage beneficiaries to use voluntary alignment, we cannot replicate the voluntary alignment criterion adequately for the potential comparison group we constructed for the evaluation, so we do not include it in our attribution algorithm. Diagnostics from payment attribution indicated that few beneficiaries are attributed based on voluntary alignment: fewer than 1 percent of beneficiaries attributed to PCF practices in the first and most recent intervention quarter (the first quarter of 2021 and last quarter of 2023) voluntarily attested to a practitioner; further, over 80 percent of these voluntarily aligned beneficiaries would have been attributed to the same PCF practice based on claims.

In addition, CMS changed its attribution rules between the 2021 PCF performance year and the 2022 PCF performance year, and the evaluation approach adopted the 2022 change for all periods. Specifically, the payment attribution rules set forth in 2022 no longer attribute beneficiaries based first on the most recent chronic care management services received. (Instead, these services are treated like any other primary care service when calculating the plurality of services provided.) The evaluation applied this change for all attribution quarters to ensure a consistent definition of the study population over time.

Exhibit A.2.1.4. Similarities and differences between beneficiary attribution methods for payment and evaluation

	Payment attribution	Evaluation attribution
Similarities between methods		
Frequency of attribution	Quarterly	Same as payment attribution
Beneficiary eligibility criteria for observability	**1.** Be enrolled in Medicare Part A and B **2.** Not be covered under Medicare Advantage or other Medicare health plan **3.** Not be incarcerated **4.** Be alive	Same as payment attribution
Criteria used to identify eligible services for attribution	Evaluation and management HCPCS codes (Exhibit A.2.1.2)	Same as payment attribution

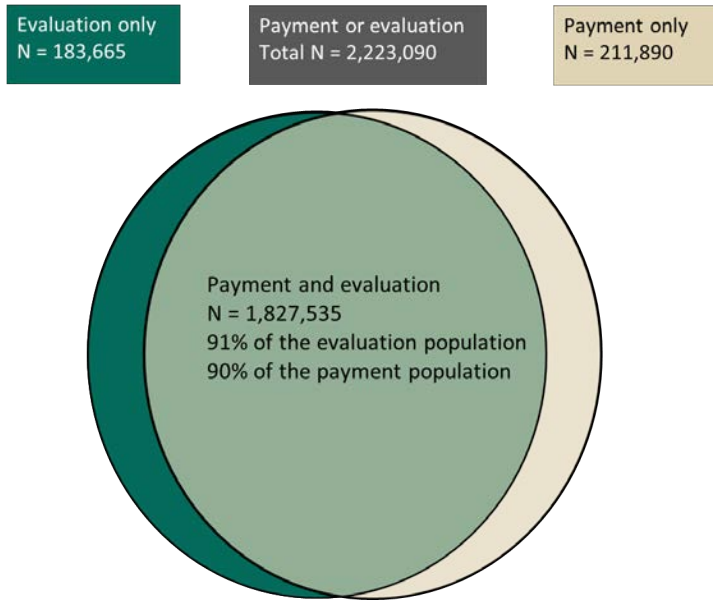
	Payment attribution	Evaluation attribution
Differences between methods		
Attribution algorithm for 2019 and 2020	Beneficiaries not attributed for payment for quarters before the start of the intervention	Attributed based on the following hierarchy: **1.** Practice at which the beneficiary received most recent Annual Wellness Visit or Welcome to Medicare Visit **2.** Practice at which the beneficiary received the plurality of their eligible primary care services
Attribution algorithm for 2021	Attributed based on the following hierarchy: **1.** Practice to which the beneficiary is voluntarily aligned **2.** Practice at which the beneficiary received most recent chronic care management **3.** Practice at which the beneficiary received most recent Annual Wellness Visit or Welcome to Medicare Visit **4.** Practice at which the beneficiary received the plurality of their eligible primary care services	Same as for 2019 and 2020
Attribution algorithm for 2022 onwards	Attributed based on the following hierarchy: **1.** Practice to which the beneficiary is voluntarily aligned **2.** Practice at which the beneficiary received most recent Annual Wellness Visit or Welcome to Medicare Visit **3.** Practice at which the beneficiary received the plurality of their eligible primary care services (including chronic care management)	Same as for 2019 to 2021
Criteria used to identify eligible practitioners for attribution	Practitioners in PCF and CPC+ rosters and (competing with those practitioners for attribution) practitioners with NPPES primary or secondary specialty of primary care not in rosters (Exhibit A.2.1.3)	Practitioners affiliated with OneKey practices as well as those not in OneKey data but observed in claims data, all restricted to those with NPPES primary or secondary specialty of primary care (Exhibit A.2.1.3)

	Payment attribution	Evaluation attribution
Source for practice and practitioner rosters	PCF and (through 2021) CPC+ participation rosters, with all non-participating providers (all other NPI-TIN combinations observed in claims) competing as though they were single-provider practices	OneKey
Source for TINs	PCF and (through 2021) CPC+ participation rosters, with all non-participating providers (all other NPI-TIN combinations observed in claims) competing as though they were single-provider practices	Assigned TIN based on claims of practitioners affiliated with practices in OneKey, with all providers not in OneKey (all other NPI-TIN combinations observed in claims) assigned the TIN used on the claim
Practices and practitioners with which PCF practices compete for beneficiaries	NPI-TIN combinations grouped as CPC+ practices in model rosters through 2021; NPI-TIN combinations not in PCF rosters or (2021 only) in CPC+ rosters but observed in claims	NPI-TIN combinations grouped as non-PCF practices in OneKey with an assigned TIN and at least one primary care provider; NPI-TIN combinations not in OneKey but observed in claims
Additional beneficiary eligibility criteria	**1.** Cannot have ESRD or be in hospice when first attributed **2.** Cannot be in a long-term care institution **3.** Cannot be in a shared savings initiative other than the Medicare Shared Savings Program, primary care transformation efforts, or state-based reform efforts	**1.** Cannot have ESRD or be in hospice when first attributed during baseline or when first attributed during intervention (restriction applied as part of assignment process) **2.** Cannot be in a long-term care institution in the quarter of attribution **3.** No restrictions based on participation in other programs
Time frame of evaluating eligibility	One month before the start of the quarter	Day of the start of the quarter
Lookback period for claims	Two years ending three months before the start of the quarter	Two years ending the day before the start of the quarter
Tiebreaking for practices competing for attribution	Preference given to PCF and CPC+ practices over single NPIs not in PCF and CPC+ rosters	Preference given to OneKey practices over single NPIs not in OneKey, but no preference between PCF and non-PCF practices in OneKey

CPC+ = Comprehensive Primary Care Plus; ESRD = end-stage renal disease; HCPCS = Healthcare Common Procedure Coding System; NPI = National Provider Identifier; NPPES = National Plan and Provider Enumeration System; PCF = Primary Care First; TIN = Taxpayer Identification Number.

D. Quantifying the overlap in beneficiaries using evaluation and payment beneficiary attribution methods

Exhibit A.2.1.5. Overlap between beneficiaries attributed to PCF Cohort 1 and 2 practices for the evaluation and those attributed for payment



Overall, the beneficiary population attributed to PCF practices used for the evaluation has a high degree of overlap with the attributed beneficiary population CMS used to calculate PCF payments. Exhibit A.2.1.5 illustrates this by showing the overlap for one calendar quarter for pooled Cohort 1 and Cohort 2 practices. Specifically, we used beneficiaries attributed for the evaluation in the last quarter before PCF launched (2020 Q4 for Cohort 1 and 2021 Q4 for Cohort 2) and compared them with those attributed for payment in the first quarter of the PCF Model (2021 Q1 for Cohort 1 and 2022 Q4 for Cohort 2). These groups were selected because the time periods used the same two-year lookback period for the respective claims-based attribution (October 1, 2018, to September 30, 2020, for Cohort 1 and October 1, 2019, to September 30, 2021, for Cohort 2). In this comparison, about 91 percent of beneficiaries in the evaluation population were attributed to PCF practices for payment, and about 90 percent of the payment population was attributed to PCF practices for the evaluation. Roughly 184,000 beneficiaries were attributed to PCF practices only by the evaluation, and about 212,000 beneficiaries were attributed to PCF practices only for payment.

For the evaluation, we are primarily concerned with the proportion of beneficiaries in the evaluation population who are also included in the payment population (that is, the 91 percent). Excluding 211,890 payment-attributed beneficiaries from the evaluation does not bias our estimates of model impacts, although it will somewhat reduce our statistical power to detect effects. In contrast, by including beneficiaries in the evaluation population for whom the practices do not receive payments, we might attenuate our impact estimates relative to PCF's true impact if the 183,665 affected beneficiaries are not all receiving the PCF intervention.

E. Assessing the divergence between beneficiaries' attributed and assigned practices over time

Under our ITT framework, beneficiaries continue to be assigned to the same practice for the entire period (either baseline or intervention) regardless of whether they continue to receive care at that practice. This approach is designed (1) to limit bias in the impact estimates from practices selectively choosing which beneficiaries to serve (or from beneficiaries self-selecting into practices) as a result of the intervention and (2) to ensure the evaluation reflects PCF's impacts on long-term outcomes, such as

hospitalizations, which might be affected by high-quality primary care received one or more years earlier. The ITT approach can, however, dilute impact estimates in two ways. First, beneficiaries assigned to a PCF practice in a given intervention quarter might no longer be receiving care from the practice in future quarters and might no longer receive the intervention's full benefits, although their outcomes would continue to contribute to impact estimates. Second, beneficiaries attributed to PCF practices in a given quarter could be assigned to a comparison practice because they were attributed to that comparison practice in the past. In this case, the outcomes for the comparison group would absorb the intervention's benefits.

To estimate the magnitude of this dilution, we examined how often beneficiaries assigned to a practice in a given year were attributed in any quarter of that year to (1) the same practice, (2) a different practice in the same overall treatment arm (PCF or comparison), and (3) a practice in the opposite treatment arm. We found the vast majority of beneficiaries assigned to a PCF practice were attributed to the same practice for at least one quarter of the year in all years, with similar proportions for beneficiaries assigned to PCF versus comparison practices (Exhibit A.2.1.6). As expected because of the evaluation's ITT logic, however, the proportion of assigned beneficiaries no longer attributed to their assigned practice grew over time in the baseline and intervention periods.

Exhibit A.2.1.6. Comparison of beneficiaries' assigned practices with their attributed practices, by year, cohort, and intervention status

Year	PCF practices			Matched comparison practices		
	Percentage of beneficiaries assigned in the year who were…					
	…attributed to the *same practice* in any quarter	…attributed to a *different practice in the same overall treatment arm* in any quarter	…attributed to the *opposite treatment arm* in any quarter	…attributed to the *same practice* in any quarter	…attributed to a *different practice in the same overall treatment arm* in any quarter	…attributed to the *opposite treatment arm* in any quarter
Cohort 1						
Baseline						
Year 1 (2019)	100.0%	2.2%	0.9%	100.0%	1.7%	1.0%
Year 2 (2020)	90.8%	3.8%	1.8%	90.8%	3.7%	1.4%
Intervention						
Year 1 (2021)	100.0%	3.1%	0.9%	100.0%	2.3%	1.1%
Year 2 (2022)	87.4%	5.2%	2.0%	86.7%	4.8%	1.7%
Year 3 (2023)	78.5%	7.5%	2.9%	78.0%	6.7%	2.4%
Cohort 2						
Baseline						
Year 1 (2020)	100.0%	1.8%	0.7%	100.0%	1.7%	0.6%
Year 2 (2021)	94.2%	4.1%	0.1%	95.0%	2.1%	1.3%
Intervention						
Year 1 (2022)	100.0%	2.5%	0.8%	100.0%	2.1%	0.7%
Year 2 (2023)	89.1%	5.6%	1.7%	87.4%	4.6%	1.6%

Notes: Columns are not mutually exclusive. Beneficiaries are attributed separately in each calendar quarter of the year, so they can be attributed to more than one practice during a given year. For example, a single beneficiary could be attributed in the first quarter to the same practice as assigned but then be attributed to a different a practice (same treatment arm, opposite treatment arm, or neither) in the next.

A.2.2. Payment Accuracy Adjustment (PAA) analysis

A. Introduction

In this section, we describe how we obtained the PAA results presented in the "In Focus" section in Chapter 3. The goal of this analysis was to quantify how components of the PAA policy that practices perceived as unfair may influence PAA rates, and thus reimbursement under the model. Specifically, the analysis had three objectives: (1) to describe out-of-practice primary care services counting against participating practices under the current PAA policy; (2) to quantify how changes to the PAA calculation (as suggested by practices) may influence PAA rates and reimbursement; and (3) to determine whether organizations that include PCF and non-PCF practices lose revenue by expanding PCF beneficiaries' access to care at their non-PCF practices.

The PAA is calculated quarterly based on a rolling one-year period of service dates, lagged for claims processing. For example, the PAA in quarter 3 of 2023 is based on services beneficiaries received from January 1, 2022, to December 31, 2022. PCF practices' professional PBPs are adjusted for the PAA starting in the third quarter of the practices' second performance year. As a result, quarter 3 of 2023 was the first model quarter in which both Cohort 1 and 2 practices received the PAA.

We based our calculation of the PAA on the PCF Payment and Attribution Methodology Performance Year 2023, Version 2, April 2023. The PAA calculates the fraction of qualifying primary care visits and services provided by a practitioner who is not on the roster of the practice to which the beneficiary was attributed (out-of-practice services). In other words, the PAA is calculated as the number of qualifying primary care out-of-practice services divided by the total number of qualifying primary care services for a practice's attributed beneficiaries. The PAA is then used to reduce the PBP by multiplying the total PBP by (1 – PAA). For example, a practice with a PAA of 30 percent—meaning that, on average, 30 percent of primary care services for the attributed beneficiaries were furnished outside the practice—would receive 70 percent of the (unadjusted) PBP.

Exhibit A.2.2.1 outlines the criteria for services to qualify for inclusion in the PAA. Services must be billed with a qualifying primary care Health Care Common Procedure Coding System (HCPCS) code; by a physician, nurse practitioner, or clinical nurse specialist with a specified primary taxonomy code[24]; in a place of service where primary care services are usually provided; and without a "CS" modifier (indicating COVID-19-related services). Chronic care management services (HCPCS 99487, 99490, 99491) qualify for the PAA regardless of the practitioner's primary taxonomy code.[25] As most qualifying services

[24] Nurse practitioner and physician assistant taxonomy codes available in the NPPES are not as accurate and specific as physician taxonomy codes, making it harder to distinguish between nurse practitioners' and physician assistants'' specialist and primary care office visits. For this reason, CMS excludes all services provided by physician assistants from the PAA and excludes services provided by nurse practitioners with certain taxonomy codes: "Acute Care" (363LA2100X) and "Women's Health" (363LW0102X).

[25] See Tables 2.4 and 2.5 and Appendices B and H in PCF Payment and Attribution Methodologies Performance Year 2023, Version 2, April 2023.

are billed in carrier claims, with the exception of claims submitted by CAHs, we chose to limit our analysis to carrier claims, thus excluding CAHs participating in PCF in 2022 (n = 4).

Exhibit A.2.2.1. Qualifying PAA service criteria

Criteria	Variable	Definition
Primary care service type	HCPCS code	Office/outpatient E&M: 99202–99205, 99211–99215 Transitional care management services: 99495, 99496 Home care/domiciliary care E&M or oversight: 99324–99328, 99334–99337, 99341–99345, 99347–99350, 99339, 99340 Advance care planning: 99497 Welcome to Medicare and Annual Wellness Visits: G0402, G0438, G0439 Chronic care management[a]: 99487, 99490, 99491
Primary care practitioner	Practitioner's primary NPPES taxonomy code	Physician: 207Q00000X (Family Medicine), 207QA0505X (Family Medicine: Adult Medicine), 207QG0300X (Family Medicine: Geriatric Medicine), 207QH0002X (Family Medicine: Hospice and Palliative Medicine), 208D00000X (General Practice), 207R00000X (Internal Medicine), 207RG0300X (Internal Medicine: Geriatric Medicine), OR 207RH0002X (Internal Medicine: Hospice and Palliative Medicine) Nurse practitioner: 363L00000X (Nurse Practitioner), 363LA2200X (Adult Health), 363LC1500X (Community Health), 363LF0000X (Family), 363LG0600X (Gerontology), 363LP2300X (Primary Care) Clinical nurse specialist: 364S00000X (Clinical Nurse Specialist), 364SA2100X (Acute Care), 364SA2200X (Adult Health), 364SC2300X (Chronic Care), 364SC1501X (Community Health/Public Health), 364SF0001X (Family Health), 364SG0600X (Gerontology), 364SH1100X (Holistic), 364SW0102X (Women's Health)
Place of service	POS code	Telehealth (02, 10), Indian Health Service (05, 06), Tribal 638 (07, 08), Office (11), Home (12), Assisted-living facility (13), Group home (14), Mobile unit (15), Temporary lodging (16), Walk-in retail health clinic (17), Place of employment (18), Off campus outpatient hospital (19), Urgent care facility (20), On campus outpatient hospital (22), Custodial care facility (33), Independent clinic (49), Federally qualified health center (50), Community mental health center (53), Mass immunization center (60), Public health clinic (71), Rural health clinic (72), Other place of service (99)
Not COVID-19 related	Modifier	Not "CS"

Source: PCF Payment and Attribution Methodologies Performance Year 2023, Version 2, April 2023.

[a] Chronic care management services qualify for the PAA regardless of the practitioner's taxonomy code.

E&M = evaluation and management; HCPCS = Healthcare Common Procedure Coding System; POS = place of service; NPPES = National Plan and Provider Enumeration System.

We conducted all analyses using calendar year 2022 dates of service, corresponding to the PAA administered to Cohort 1 and 2 practices in quarter 3 of 2023. We used the OneKey practice roster and the attribution algorithm described in Appendix A.2.1 to identify beneficiaries attributed to PCF practices in 2022. Here, we describe the analytic methods used to meet each objective.

B. Objective 1: Describe qualifying primary care out-of-practice services

Using the approach described above, we used carrier claims to identify services qualifying for the PAA among beneficiaries attributed to active PCF practices in calendar year 2022 (N = 2,881 practices). Among these services, we identified out-of-practice services counting against practices in the calculation of the PAA. Using carrier claims, we created categorical variables (as delineated in **Exhibit A.2.2.1**) to describe service characteristics.

We then compared the overall distribution of out-of-practice versus within-practice services to the distribution within each service characteristic using chi-square tests to identify characteristics of services that were more likely to be provided out of practice. In addition to statistical significance, we defined meaningful differences as those that were at least 15 percentage points different from the distribution in the overall sample.

C. Objective 2: Quantify the effect of changes to the PAA methodology

Continuing with the analytic sample of 2,881 PCF practices active in 2022, we calculated the PAA, as described previously, as the number of qualifying out-of-practice primary care services divided by the total number of qualifying primary care services for a practice's attributed beneficiaries. We also calculated two variations of the PAA, with each variation altering the PAA calculation logic based on concerns that PCF practices raised.

The first variation pertains to practices' concerns that visits with nurse practitioners who provide specialty care might count as qualifying out-of-practice primary care services in the calculation of the PAA. We calculated the PAA under the following variation to examine this concern:

1. **Exclude nurse practitioners completely.** In line with the approach CMS uses for physician assistants, we excluded all visits with nurse practitioners from the PAA calculation (numerator and denominator). Implementing this variation would require the assumption that the proportion of out-of-practice services provided to attributed beneficiaries by nurse practitioners is equivalent to the proportion of out-of-practice services provided by the types of providers remaining in the PAA. Because physician assistants are already excluded, excluding nurse practitioners from the PAA would mean that PBPs are essentially adjusted by the proportion of out-of-practice care delivered by physicians (as clinical nurse specialists and other provider types made up only 1% of all PAA-eligible services in 2022).

The second variation pertains to concerns from practices affiliated with larger parent organizations. Such practices believe that they are financially penalized by the PAA when they offer expanded access to care for their attributed beneficiaries outside the PCF practice but within the parent organization. We calculated the PAA under the following variation to examine these concerns:

2. **Apply the PAA at the organization level.** We updated the definition of out-of-practice services to exclude qualifying primary care services provided outside a PCF practice (that is, provided by a practitioner who is not on the roster of the practice to which the beneficiary was attributed) but billed under the same organization (defined by the TIN). As a result, all services billed under the same TIN were considered within-practice instead of out-of-practice. In Objective 3 (described below), we explore the reimbursement implications of this approach.

We reported distributional statistics (mean, standard deviation, median, and interquartile range) for the PAA calculated under the current policy and each of the two variations, both for the full sample of 2,881 practices active in PCF in 2022 and stratified by practice characteristics. The following practice characteristics were defined as of the start of the intervention period (January 2021 for Cohort 1 practices and January 2022 for Cohort 2 practices) using a combination of OneKey and practice application data: affiliation with a parent organization, practice multispecialty status, participation in the Medicare Shared Savings Program, past CPC+ participation, risk group, and practice size (based on the number of practitioners). Within each PAA variation, we conducted t-tests and analysis of variance (ANOVA) for the equivalence of means to identify statistically significant differences in the PAA between practices with different characteristics.

D. Objective 3: Determine whether practices affiliated with a parent organization lose revenue by providing access to a wider range of providers

For the final objective, we limited our sample to affiliated PCF practices with a consistent TIN throughout calendar year 2022 (2,276 practices affiliated with 429 TINs). Affiliated practices include practices in health systems or owned by another type of parent organization. Because of data limitations, we defined organizations for the current analysis based on TIN. We assessed whether organizations would get paid more for a PCF-attributed beneficiary to visit the practice they were attributed to versus another practice within the organization. We did this by calculating per beneficiary per month (PBPM) organization-level reimbursement for primary care services provided to PCF-attributed beneficiaries. We calculated reimbursement for each TIN under two scenarios (Exhibit A.2.2.2):

1. **Current reimbursement:** Each organization receives PCF payments with the PAA applied for within-practice services + regular Medicare FFS payments for out-of-practice services within the organization.
2. **Hypothetical reimbursement if primary care was retained by PCF practices:** Each organization receives PCF payments for all eligible primary care services performed for PCF-attributed beneficiaries with the organization-level PAA applied, as described in Objective 2.

Exhibit A.2.2.2. Overview of organization-level reimbursement received in each scenario

Reimbursement types	Scenario	
	Current reimbursement	Hypothetical reimbursement if primary care was retained by PCF practices
PAA-adjusted population-based payment	Paid for PCF-attributed beneficiaries, adjusted by standard PAA	Paid for PCF-attributed beneficiaries, adjusted by a reduced PAA calculated at the organization-level
PCF flat visit fee + coinsurance	Paid for PCF-attributed beneficiaries' visits within-practice (excluding CCM services)[a]	Paid for PCF-attributed beneficiaries' visits within-organization (excluding CCM services)[a]
Medicare fee for service, paid according to the 2022 Medicare physician fee schedule	Paid for PCF-attributed beneficiaries' out-of-practice visits within the organization	n.a.

[a] Chronic care management services are not reimbursed in the flat visit fee because they are considered part of the population-based payment.

CCM = chronic care management; n.a. = not applicable; PAA = payment accuracy adjustment.

When comparing payments under the two scenarios, we used primary care services performed for beneficiaries attributed to PCF practices in calendar year 2022. Because we calculated payments for organizations (TINs), we included all primary care services performed within the organization associated with the beneficiary's attributed practice. That is, we included services conducted within the attributed PCF practice as well as out-of-practice services conducted within the practice's affiliated organization.

We defined primary care services as evaluation and management (E&M) services billed with HCPCS qualifying for the PCF FVF- or chronic care management-related services (Exhibit A.2.2.3). These codes overlap with, but are not limited to, the PAA-eligible HCPCS codes listed in Exhibit A.2.2.1.

Exhibit A.2.2.3. Primary care services included in reimbursement analysis

Primary care service types	Eligible HCPCS codes
Flat visit fee (evaluation and management, transitional care management, advance care planning, Welcome to Medicare and Annual Wellness Visits)	99201–99205, 99211–99215, 99324–99328, 99334–99337, 99341–99345, 99347–99350, 99354, 99355, 99415, 99416, 99495–99498, G0402, G0438, G0439
Chronic care management	99339, 99340, 99487, 99489, 99491, G2211, G2212

Source: PCF Payment and Attribution Methodologies Performance Year 2023, Version 2, April 2023.

HCPCS = Healthcare Common Procedure Coding System.

Reimbursement for both scenarios included relevant geographic adjustments and sequestration. We did not incorporate Merit-based Incentive Payment System (MIPS) adjustments because we assumed these would be roughly the same regardless of whether practices were reimbursed FFS or through PCF Model payments.

We conducted t-tests for the equivalence of means to compare the mean PBPM reimbursement (overall and by reimbursement type: PBP, FVF, Medicare FFS) between the two scenarios.

A.2.3. Comparison group selection

In this section, we describe the comparison group used to estimate impacts for Medicare beneficiaries attributed to PCF practices in both cohorts. We selected a group of comparison practices that was as similar to the PCF group (or as balanced) as possible in several practice, market, and beneficiary characteristics. This similarity helps support the assumptions underlying the difference-in-differences regression framework used to estimate PCF impacts.

We selected our comparison group using a three-step process.

A. Step 1. Define the pool of eligible comparison practices

We defined practices eligible for the comparison group as primary care practice locations for which we observed full information in OneKey (a proprietary database of health care provider information) that are in the same state as a PCF practice.

We excluded the following practices from the pool of eligible comparisons because these practice types were generally not eligible to participate in PCF:

- FQHCs, RHCs, and concierge practices
- Participants in a no-overlap Innovation Center model: Global and Professional Direct Contracting, Accountable Health Communities, or Value in Opioid Use Disorder Treatment
- Practices with few Medicare FFS beneficiaries (generally no fewer than 60 assigned during the baseline period; see Appendix A.2.1)
- Practices with a low proportion of services billed for primary care (less than or equal to 40 percent)

We also excluded the following practices from the comparison pool to limit the risk that comparison practices might be affected by PCF:

- Practices that shared a TIN with a PCF practice during the baseline period
- Practices that shared an NPI with a PCF practice during the baseline period

B. Step 2. Select characteristics for practice-level matching

We determined the practice, market, and beneficiary characteristics for which we would require balance between the PCF group and our comparison group. Exhibits in this appendix below show balance for important characteristics.

C. Step 3. Match PCF practices to potential comparison practices

We created matched sets for PCF practices, which means we matched each PCF practice included in the impact evaluation (Exhibit A.2.3.1) with one or more comparison practices. Each PCF practice could have up to five matched comparison practices, and each comparison practice could have up to five matched PCF practices in cases in which no other suitable comparison practice was available.

For each state and for each PCF cohort, we used a method known as optimal matching (Sekhon 2011) to select a comparison group with the smallest collective difference between it and the PCF group. We

measured differences between PCF practices and their matched comparisons by the combination of (1) a Mahalanobis distance (Rubin 1980), which represented the difference between practices in the nine characteristics we determined as having the highest priority, and (2) a measure of driving time between practices (described below) to encourage geographic proximity between matched practices. Further, we allowed optimal matching to select only comparison practices that fell within a certain range of the PCF practice's propensity score, which predicts participation in PCF based on the practices' characteristics (Rubin and Thomas 1996). In our case, the propensity score is based on about 50 of the characteristics shown in Exhibits A.2.3.2 and A.2.3.3. Finally, after selecting matched comparison practices, we weighted them to account for (1) differences within matched sets in the number of comparison and PCF practices and (2) differences within states in the number of comparison and PCF beneficiaries.[26]

There was one important limitation to this approach. We excluded 173 PCF practices from matching (and therefore the impact analyses) because there were no available comparison practices within range of their propensity score. These 173 practices were in addition to the 149 PCF practices we excluded before matching because we determined they were ineligible for the impact evaluation. We show these sample changes in Exhibit A.2.3.1.

After matching, we conducted several diagnostics to assess the quality of the comparison group.

- First, we assessed balance on characteristics, with all characteristics measured at baseline, before PCF began. We did this by examining the difference in the PCF and comparison groups' average values, with each practice's value for a given characteristic weighted by its number of assigned beneficiaries during the baseline period. (These weights approximate the influence of each practice in our impact analysis.) We show the balance results in Exhibits A.2.3.2 and A.2.3.3 for the first and second PCF cohort, respectively, as well as for CPC+ alumni and non-CPC+ alumni in Exhibits A.2.3.4 and A.2.3.5. We did not require PCF practices that formerly participated in CPC+ to match only with comparison practices that participated in CPC+.
- Second, we assessed the mean travel time in minutes between PCF practices and their matches with Google's automobile travel time, shown in Exhibit A.2.3.6. To estimate travel time, we approximated practice location based on a central location in the practice's Public Use Microdata Area (PUMA). Because we approximated practices' locations in this way, two practices in the same PUMA are considered to have a travel time between them of 0 minutes.
- Finally, for the evaluation's two primary outcomes, we assessed whether the trend in outcomes in the selected comparison group differed from the trend in the PCF group during the baseline period by a statistically significant amount, as shown in Exhibit A.2.3.7. Results from this test support the

[26] Specifically: (1) We weighted comparisons so that the sum of the weighted comparison practices equals the number of PCF practices in that matched set. For example, if we matched three comparison practices to a single PCF practice, we gave each of the three comparison practices a weight of 1/3. If we matched two PCF practices to a single comparison, we gave the comparison practice a weight of 2. (2) We then reweighted each comparison group practice so the number of weighted comparison beneficiaries in the state would equal the number of PCF beneficiaries in the state. For example, if a state had 100,000 PCF beneficiaries but only 80,000 matched comparison beneficiaries in a given cohort, we multiplied the weight for each comparison practice in the state and cohort by 5/4 (that is, 100,000/80,000). Therefore, on a reweighted basis, that state's PCF group and comparison group would both represent 100,000 beneficiaries. This ensured that the comparison group selected in each state had equal influence on the overall analysis as the PCF group in its state.

parallel trends assumption underlying our difference-in-differences strategy for estimating impacts (Appendix A.2.7). The assumption is that outcomes for PCF and comparison practices would follow the same trends in the absence of PCF.

We believe the selected comparison group performed sufficiently well on all of these criteria to analyze the impact of PCF.

Exhibit A.2.3.1. The sample of PCF practices in the impact evaluation

	Cohort 1	Cohort 2	Overall
All practices that started PCF	845	2,221	3,066
Exclusions pre-matching			
Not located in a PCF region (qualified for PCF through participation in the Independence at Home Demonstration)	2	0	2
Glide path participation in PCF[a]	77	69	146
Rural Health Clinics during the baseline period[b]	0	1	1
Exclusions because of matching requirements			
No available valid comparison group within PCF state[c]	36	137	173
Resulting samples for matching			
PCF practices with matched comparisons (final ITT sample for evaluation)	730	2,014	2,744
PCF practices with matched comparisons and assigned beneficiaries in the baseline (practices reflected in baseline diagnostics)	730	2,010	2,740

[a] CMS accepted practices with at least 100 attributed beneficiaries but fewer than 125 into PCF on a glide path, which refers to a practice's conditional acceptance to PCF pending updated beneficiary counts in the future. We excluded these practices from the impact evaluation because we cannot identify a suitable comparison for practices that expand because of PCF.

[b] This includes any practices that were Rural Health Clinics in the two-year baseline period before their participation in PCF because they are not measured in our data during this period. This is the case for the single practice listed.

[c] These were PCF practices with no available comparison practices to use in their matched set in the state. This occurred when (1) the propensity score of all available comparison practices was not within an acceptable range of the PCF practice's score or (2) there was no available comparison practice with an acceptable propensity score within four hours' drive of the PCF practice.

CMS = Centers for Medicare & Medicaid Services; ITT = intention-to-treat; PCF = Primary Care Firs

Exhibit A.2.3.2. Cohort 1 post-matching balance on characteristics and outcomes measured in the baseline period

Measure	Characteristic type	Source	PCF mean	Comparison mean	Difference	Standardized difference
CDC Social Vulnerability Index of the Census tract (mean across assigned beneficiaries)	Geographic area	ATSDR CDC	0.41	0.42	-0.01	-0.05
Hospital beds per capita in the county of practice location	Geographic area	AHRF	2,805	2,608	196	0.04
Hospital Herfindahl-Hirschman Index (measure of market concentration, for the PUMA of the practice's location)	Geographic area	HCRIS	2,938	2,755	183	0.14
HRSA-designated health professional shortage score for mental health for the practice location (nine-digit ZIP code)	Geographic area	HRSA	18	18	0	0.00
HRSA-designated health professional shortage score for primary care for the practice location (nine-digit ZIP code)	Geographic area	HRSA	17	16	0	0.06
Percentage in poverty (mean across PUMAs of assigned beneficiaries)	Geographic area	ACS five-year sample	11%	11%	0%	-0.04
Unemployment rate (mean across PUMAs of assigned beneficiaries)	Geographic area	ACS five-year sample	5%	5%	0%	0.04
Mean household (mean across PUMAs assigned beneficiaries)	Geographic area	ACS five-year sample	$86,788	$85,810	$978	0.04
Medicare Advantage market penetration rate in the county of the practice location	Geographic area	CMS Geographic Public Use File	43	43	0	0.03
COVID-19 cases in the county where the practice is located (per 100,000) in the year before PCF started[a]	Geographic area, COVID-19	USAFacts	1,362	1,341	21	0.04
COVID-19 deaths in the county where the practice is located (per 100,000) in the year before PCF started[a]	Geographic area, COVID-19	USAFacts	41	39	2	0.06
Pandemic Vulnerability Index in the county where the practice is located	Geographic area, COVID-19	NIEHS	0.50	0.50	0.00	0.02

Measure	Characteristic type	Source	PCF mean	Comparison mean	Difference	Standardized difference
U.S. COVID Community Vulnerability Index in the county where the practice is located	Geographic area, COVID-19	Surgo Ventures	0.60	0.58	0.01	0.06
Percentage of assigned beneficiaries dually eligible for Medicare and Medicaid	Beneficiary demographics and Medicare enrollment characteristics	MBSF	14%	13%	1%	0.04
Percentage of beneficiaries younger than age 50	Beneficiary demographics and Medicare enrollment characteristics	EDB	4%	4%	0%	0.07
Percentage of beneficiaries ages 50 to 54	Beneficiary demographics and Medicare enrollment characteristics	EDB	2%	2%	0%	0.03
Percentage of beneficiaries ages 55 to 59	Beneficiary demographics and Medicare enrollment characteristics	EDB	3%	3%	0%	0.02
Percentage of beneficiaries ages 60 to 64	Beneficiary demographics and Medicare enrollment characteristics	EDB	6%	5%	0%	0.05
Percentage of beneficiaries ages 65 to 69	Beneficiary demographics and Medicare enrollment characteristics	EDB	25%	25%	0%	0.01
Percentage of beneficiaries ages 70 to 74	Beneficiary demographics and Medicare enrollment characteristics	EDB	23%	23%	0%	-0.01
Percentage of beneficiaries ages 75 to 79	Beneficiary demographics and Medicare enrollment characteristics	EDB	17%	17%	0%	-0.09
Percentage of beneficiaries ages 80 to 84	Beneficiary demographics and Medicare enrollment characteristics	EDB	11%	11%	0%	-0.05
Percentage of beneficiaries ages 85 to 89	Beneficiary demographics and Medicare enrollment characteristics	EDB	6%	6%	0%	-0.01

Measure	Characteristic type	Source	PCF mean	Comparison mean	Difference	Standardized difference
Percentage of beneficiaries age 90 or older	Beneficiary demographics and Medicare enrollment characteristics	EDB	4%	4%	0%	0.01
Percentage of female beneficiaries	Beneficiary demographics and Medicare enrollment characteristics	EDB	58%	58%	0%	0.03
Percentage of beneficiaries residing in rural areas	Beneficiary demographics and Medicare enrollment characteristics	AHRF (2020)	11%	12%	-1%	-0.05
Percentage of beneficiaries with an advance care plan	Beneficiary demographics and Medicare enrollment characteristics	MBSF	5%	6%	0%	-0.04
Percentage of beneficiaries with old age as the original reason for their Medicare entitlement	Beneficiary demographics and Medicare enrollment characteristics	MBSF	81%	82%	0%	-0.02
Percentage of beneficiaries with disability insurance as the original reason for their Medicare entitlement	Beneficiary health	MBSF	18%	18%	0%	0.02
Beneficiaries' mean HCC score	Beneficiary health	Claims, EDB, MBSF	0.92	0.92	0.00	0.00
Percentage of beneficiaries with advanced cancer	Beneficiary health	Claims (HCC indicator)	13%	14%	0%	-0.12
Percentage of beneficiaries with Alzheimer's disease or dementia	Beneficiary health	Claims (HCC indicator)	4%	4%	0%	0.05
Percentage of beneficiaries with any arthritis	Beneficiary health	Claims (HCC indicator)	8%	8%	0%	-0.03
Percentage of beneficiaries with chronic kidney disease	Beneficiary health	Claims (HCC indicator)	7%	7%	0%	0.00
Percentage of beneficiaries with chronic obstructive pulmonary disease	Beneficiary health	Claims (HCC indicator)	11%	12%	0%	-0.11
Percentage of beneficiaries with diabetes	Beneficiary health	Claims (HCC indicator)	24%	25%	-1%	-0.13

Measure	Characteristic type	Source	PCF mean	Comparison mean	Difference	Standardized difference
Percentage of beneficiaries with heart failure	Beneficiary health	Claims (HCC indicator)	10%	10%	0%	-0.16
Percentage of beneficiaries with hyperlipidemia	Beneficiary health	Claims (CCW indicator)	66%	66%	0%	-0.03
Percentage of beneficiaries with hypertension	Beneficiary health	Claims (CCW indicator)	66%	67%	-1%	-0.13
Percentage of beneficiaries with ischemic heart disease	Beneficiary health	Claims (HCC indicator)	6%	6%	0%	0.07
Percentage of beneficiaries with any substance use disorder	Beneficiary health	Claims	3%	3%	0%	-0.03
Percentage of beneficiaries with any anxiety	Beneficiary health	Claims	13%	13%	0%	0.03
Percentage of beneficiaries with any depression	Beneficiary health	Claims	10%	9%	1%	0.18
Percentage of beneficiaries with high fragmentation of ambulatory care	Beneficiary health	Claims	51%	47%	4%	0.34
Practice risk group 1 (projected[b])	Beneficiary health	Claims	96%	97%	-1%	-0.04
Practice risk group 2 (projected[b])	Beneficiary health	Claims	4%	3%	1%	0.04
Practice risk group 3 (projected[b])	Beneficiary health	Claims	1%	1%	0%	0.00
Practice risk group 4 (projected[b])	Beneficiary health	Claims	0%	0%	0%	0.04
Acute hospitalizations, annualized over the two-year baseline period (per 1,000 beneficiaries per year)	Beneficiary service use and expenditures	Claims	264	265	-1	-0.02
Acute medical (i.e., non-surgical) hospitalizations, annualized over the two-year baseline (per 1,000 beneficiaries per year)	Beneficiary service use and expenditures	Claims	220	221	-2	-0.03
Acute surgical hospitalizations, annualized over the two-year baseline (per 1,000 beneficiaries per year)	Beneficiary service use and expenditures	Claims	93	93	0	0.01
Acute hospitalizations in the first year of the two-year baseline period (per 1,000 beneficiaries per year)	Beneficiary service use and expenditures	Claims	285	285	0	0.00

Measure	Characteristic type	Source	PCF mean	Comparison mean	Difference	Standardized difference
Acute hospitalizations in the second year of the two-year baseline period (per 1,000 beneficiaries per year)	Beneficiary service use and expenditures	Claims	244	246	-2	-0.03
Acute hospitalizations in the year before the two-year baseline period (per 1,000 beneficiaries per year)	Beneficiary service use and expenditures	Claims	286	283	3	0.04
Outpatient ED visits in the first year of to the two-year baseline period (per 1,000 beneficiaries per year)	Beneficiary service use and expenditures	Claims	496	503	-7	-0.04
Outpatient ED visits in the second year of the two-year baseline period (per 1,000 beneficiaries per year)	Beneficiary service use and expenditures	Claims	381	390	-9	-0.06
Outpatient ED visits in the year before the two-year baseline period (per 1,000 beneficiaries per year)	Beneficiary service use and expenditures	Claims	500	501	-1	-0.01
Percentage of index discharges with a readmission within 30 days of discharge over the two-year baseline	Beneficiary service use and expenditures	Claims	15%	15%	0%	0.05
Percentage of index ED discharges with an unplanned acute care visit within 30 days of discharge over the two-year baseline	Beneficiary service use and expenditures	Claims	27%	27%	0%	-0.08
Percentage of index hospital discharges with an unplanned acute care visit within 30 days of discharge over the two-year baseline	Beneficiary service use and expenditures	Claims	25%	25%	0%	0.03
Ambulatory telehealth visits with a primary care provider, annualized over the two-year baseline (per 1,000 beneficiaries per year)	Beneficiary service use and expenditures	Claims	860	847	13	0.03
Potentially preventable ED visits, annualized over the two-year baseline (per 1,000 beneficiaries per year)	Beneficiary service use and expenditures	Claims	41	42	-1	-0.06

Measure	Characteristic type	Source	PCF mean	Comparison mean	Difference	Standardized difference
Potentially preventable hospitalizations, annualized over the two-year baseline (per 1,000 beneficiaries per year)	Beneficiary service use and expenditures	Claims	51	52	-1	-0.05
Primary-care-substitutable ED visits, annualized over the two-year baseline (per 1,000 beneficiaries per year)	Beneficiary service use and expenditures	Claims	158	162	-4	-0.07
Primary care visits to non-behavioral health specialists in ambulatory settings, annualized over the two-year baseline (per 1,000 beneficiaries per year)	Beneficiary service use and expenditures	Claims	4,476	4,327	149	0.11
Urgent care center visits, annualized over the two-year baseline (per 1,000 beneficiaries per year)	Beneficiary service use and expenditures	Claims	170	174	-4	-0.03
Percentage of beneficiaries with Part D coverage with claims for high-risk medications over the two-year baseline	Beneficiary demographics and Medicare enrollment characteristics	MBSF	14%	15%	0%	-0.01
Total inpatient expenditures, annualized over the two-year baseline (per beneficiary per month)	Beneficiary service use and expenditures	Claims	$330	$328	$2	0.02
Acute hospitalization expenditures, annualized over the two-year baseline (per beneficiary per month)	Beneficiary service use and expenditures	Claims	$311	$313	-$1	-0.01
Home health expenditures, annualized over the two-year baseline (per beneficiary per month)	Beneficiary service use and expenditures	Claims	$52	$50	$2	0.05
Post-acute care expenditures, annualized over the two-year baseline (per beneficiary per month)	Beneficiary service use and expenditures	Claims	$160	$159	$1	0.02
SNF expenditures, annualized over the two-year baseline (per beneficiary per month)	Beneficiary service use and expenditures	Claims	$56	$58	-$2	-0.06
Total Medicare expenditures, annualized over the two-year baseline (per beneficiary per month)	Beneficiary service use and expenditures	Claims	$966	$963	$3	0.01

Measure	Characteristic type	Source	PCF mean	Comparison mean	Difference	Standardized difference
Total Medicare expenditures in the first year of the two-year baseline period (per beneficiary per month)	Beneficiary service use and expenditures	Claims	$989	$984	$5	0.02
Total Medicare expenditures in the second year of the two-year baseline period (per beneficiary per month)	Beneficiary service use and expenditures	Claims	$944	$944	$0	0.00
Total Medicare expenditures in the year before the two-year baseline period (per beneficiary per month)	Beneficiary service use and expenditures	Claims	$941	$936	$4	0.02
One or two provider clinicians (any specialty)	Practice	OneKey	12%	23%	-11%	-0.33
Three or four provider clinicians (any specialty)	Practice	OneKey	36%	36%	1%	0.01
Six to nine provider clinicians (any specialty)	Practice	OneKey	26%	21%	5%	0.12
10 or more provider clinicians (any specialty)	Practice	OneKey	26%	21%	5%	0.11
Advanced APM participation for at least part of the two-year baseline	Practice	OneKey	78%	71%	7%	0.18
Advanced APM participation for the full two-year baseline	Practice	OneKey	20%	27%	-7%	-0.17
CPC+ participation at any time	Practice	OneKey	0%	4%	-4%	-0.61
Direct Contracting participation for the full two-year baseline	Practice	OneKey	0%	0%	0%	
Final MIPS composite score for each practice, averaged across all assigned NPIs within the practice	Practice	OneKey	90	85	5	0.52
Number of assigned beneficiaries during the baseline period	Practice	OneKey	1,334	1,113	221	0.18
Number of hours practice is open after 5 p.m. on weekdays and hours open Saturday or Sunday	Practice	Claims and PCF payment algorithm	4	3	1	0.09
Number of providers (any specialty)	Practice	OneKey	13	10	2	0.05
Number of primary care providers	Practice	Claims	6	5	1	0.08

Measure	Characteristic type	Source	PCF mean	Comparison mean	Difference	Standardized difference
Participation in a Medicare Shared Savings Program advanced APM track in the two years before baseline	Practice	Claims	14%	14%	0%	0.00
Participation in Medicare Shared Savings Program (any track) in the two years before baseline	Practice	MDM	50%	48%	2%	0.04
Percentage of charges that were for primary care during the two-year baseline	Practice	MDM	77%	77%	-1%	-0.05
Percentage of providers at the practice that are primary care providers	Practice	OneKey	66%	65%	1%	0.04
Percentage owned by a health system that includes a hospital	Practice	OneKey	72%	61%	11%	0.24
Independent ownership status	Practice	OneKey	15%	28%	-13%	-0.35
Multispecialty practice	Practice	OneKey	44%	38%	7%	0.14
Practice TIN bills hospital-based services	Practice	Claims	17%	19%	-2%	-0.06

Notes: All mean amounts are weighted by assigned beneficiaries during the two-year baseline at each practice. Per-beneficiary measures are defined over the assigned beneficiaries at each practice.

[a] COVID-19 vaccination information was not available in the Cohort 1 baseline, which ended in 2020, before the widespread availability of COVID-19 vaccines.

[b] Risk groups are projected based on the mean HCC scores among assigned beneficiaries and might differ from CMS' risk groups. This is necessary to have a single risk group definition for PCF and non-PCF practices.

ACS = American Community Survey; AHRF = Area Health Resource File; APM = Alternative Payment Model; ATSDR = Agency for Toxic Substances and Disease Registry; CCW = Chronic Conditions Data Warehouse; CDC = Centers for Disease Control and Prevention; CMS = Centers for Medicare & Medicaid Services; CPC+ = Comprehensive Primary Care Plus; ED = emergency department; EDB = Medicare enrollment database; HCC = Hierarchical Condition Category; HCRIS = Healthcare Provider Cost Reporting Information System; HRSA = Health Resources and Services Administration; MBSF = Master Beneficiary Summary File; MDM = Master Data Management System; MIPS = Merit-based Incentive Payment System; NIEHS = National Institute of Environmental Health Sciences; NPI = National Provider Identifier; PCF = Primary Care First; PUMA = Public Use Microdata Area; RTI = Research Triangle Institute; SNF = skilled nursing facility; TIN = Taxpayer Identification Number.

Exhibit A.2.3.3. Cohort 2 post-matching balance on characteristics and outcomes

Measure	Characteristic type	Source	PCF mean	Comparison mean	Difference	Standardized difference
CDC Social Vulnerability Index of the Census tract (mean across assigned beneficiaries)	Geographic area	ATSDR CDC	0.39	0.39	-0.01	-0.07
Hospital beds per capita in the county of practice location	Geographic area	AHRF	1,948	1,834	114	0.04
Hospital Herfindahl-Hirschman Index (measure of market concentration, for the PUMA of the practice's location)	Geographic area	HCRIS	2,672	2,749	-76	-0.06
HRSA-designated health professional shortage score for mental health for the practice location (nine-digit ZIP code)	Geographic area	HRSA	18	18	0	-0.02
HRSA-designated health professional shortage score for primary care for the practice location (nine-digit ZIP code)	Geographic area	HRSA	16	16	0	0.02
Percentage in poverty (mean across PUMAs of assigned beneficiaries)	Geographic area	ACS five-year sample	11%	11%	-1%	-0.15
Unemployment rate (mean across PUMAs of assigned beneficiaries)	Geographic area	ACS five-year sample	5%	5%	0%	-0.01
Mean household (mean across PUMAs assigned beneficiaries)	Geographic area	ACS five-year sample	$86,825	$84,201	$2,623	0.12
Medicare Advantage market penetration rate in the county of the practice location	Geographic area	CMS Geographic Public Use File	44	43	1	0.04
COVID-19 cases in the county where the practice is located (per 100,000) in the year before PCF started	Geographic area, COVID-19	USAFacts	10,195	10,391	-196	-0.08
COVID-19 deaths in the county where the practice is located (per 100,000) in the year before PCF started	Geographic area, COVID-19	USAFacts	174	178	-4	-0.06
Pandemic Vulnerability Index in the county where the practice is located	Geographic area, COVID-19	NIEHS	0.49	0.50	-0.01	-0.10

Measure	Characteristic type	Source	PCF mean	Comparison mean	Difference	Standardized difference
Percentage of adults age 65 and older fully vaccinated for COVID-19 in in the county where the practice is located during the baseline period	Geographic area, COVID-19	CDC	86	86	0	0.05
U.S. COVID Community Vulnerability Index in the county where the practice is located	Geographic area, COVID-19	Surgo Ventures	0.52	0.51	0.01	0.04
Percentage of assigned beneficiaries dually eligible for Medicare and Medicaid	Beneficiary demographics and Medicare enrollment characteristics	MBSF	10%	11%	0%	-0.04
Percentage of beneficiaries younger than age 50	Beneficiary demographics and Medicare enrollment characteristics	EDB	3%	3%	0%	-0.02
Percentage of beneficiaries ages 50 to 54	Beneficiary demographics and Medicare enrollment characteristics	EDB	1%	1%	0%	-0.03
Percentage of beneficiaries ages 55 to 59	Beneficiary demographics and Medicare enrollment characteristics	EDB	2%	2%	0%	-0.03
Percentage of beneficiaries ages 60 to 64	Beneficiary demographics and Medicare enrollment characteristics	EDB	5%	5%	0%	-0.05
Percentage of beneficiaries ages 65 to 69	Beneficiary demographics and Medicare enrollment characteristics	EDB	26%	26%	0%	0.00
Percentage of beneficiaries ages 70 to 74	Beneficiary demographics and Medicare enrollment characteristics	EDB	24%	24%	0%	0.04
Percentage of beneficiaries ages 75 to 79	Beneficiary demographics and Medicare enrollment characteristics	EDB	17%	17%	0%	0.03
Percentage of beneficiaries ages 80 to 84	Beneficiary demographics and Medicare enrollment characteristics	EDB	11%	11%	0%	0.01

Measure	Characteristic type	Source	PCF mean	Comparison mean	Difference	Standardized difference
Percentage of beneficiaries ages 85 to 89	Beneficiary demographics and Medicare enrollment characteristics	EDB	6%	6%	0%	0.00
Percentage of beneficiaries age 90 or older	Beneficiary demographics and Medicare enrollment characteristics	EDB	4%	4%	0%	0.00
Percentage of female beneficiaries	Beneficiary demographics and Medicare enrollment characteristics	EDB	58%	57%	0%	0.04
Percentage of beneficiaries residing in rural areas	Beneficiary demographics and Medicare enrollment characteristics	AHRF (2020)	13%	15%	-1%	-0.05
Percentage of beneficiaries with an advance care plan	Beneficiary demographics and Medicare enrollment characteristics	MBSF	5%	4%	0%	0.03
Percentage of beneficiaries with old age as the original reason for their Medicare entitlement	Beneficiary demographics and Medicare enrollment characteristics	MBSF	84%	83%	0%	0.05
Percentage of beneficiaries with disability insurance as the original reason for their Medicare entitlement	Beneficiary health	MBSF	16%	17%	0%	-0.06
Beneficiaries' mean HCC score	Beneficiary health	Claims, EDB, MBSF	0.89	0.89	0.00	0.03
Percentage of beneficiaries with advanced cancer	Beneficiary health	Claims (HCC indicator)	14%	13%	0%	0.13
Percentage of beneficiaries with Alzheimer's disease or dementia	Beneficiary health	Claims (HCC indicator)	4%	4%	0%	0.02
Percentage of beneficiaries with any arthritis	Beneficiary health	Claims (HCC indicator)	7%	7%	0%	0.06
Percentage of beneficiaries with chronic kidney disease	Beneficiary health	Claims (HCC indicator)	8%	8%	0%	0.05

Measure	Characteristic type	Source	PCF mean	Comparison mean	Difference	Standardized difference
Percentage of beneficiaries with chronic obstructive pulmonary disease	Beneficiary health	Claims (HCC indicator)	10%	11%	0%	-0.09
Percentage of beneficiaries with diabetes	Beneficiary health	Claims (HCC indicator)	23%	24%	0%	-0.06
Percentage of beneficiaries with heart failure	Beneficiary health	Claims (HCC indicator)	10%	10%	0%	0.01
Percentage of beneficiaries with hyperlipidemia	Beneficiary health	Claims (CCW indicator)	65%	64%	0%	0.05
Percentage of beneficiaries with hypertension	Beneficiary health	Claims (CCW indicator)	65%	65%	-1%	-0.08
Percentage of beneficiaries with ischemic heart disease	Beneficiary health	Claims (HCC indicator)	6%	6%	0%	-0.07
Percentage of beneficiaries with any substance use disorder	Beneficiary health	Claims	2%	2%	0%	0.05
Percentage of beneficiaries with any anxiety	Beneficiary health	Claims	13%	12%	1%	0.12
Percentage of beneficiaries with any depression	Beneficiary health	Claims	10%	10%	0%	0.09
Percentage of beneficiaries with high fragmentation of ambulatory care	Beneficiary health	Claims	51%	47%	4%	0.37
Practice risk group 1 (projected[a])	Beneficiary health	Claims	98%	98%	0%	0.00
Practice risk group 2 (projected[a])	Beneficiary health	Claims	2%	1%	0%	0.02
Practice risk group 3 (projected[a])	Beneficiary health	Claims	0%	0%	0%	-0.01
Practice risk group 4 (projected[a])	Beneficiary health	Claims	0%	0%	0%	-0.07
Acute hospitalizations, annualized over the two-year baseline period (per 1,000 beneficiaries per year)	Beneficiary service use and expenditures	Claims	233	233	0	0.00
Acute medical (i.e., non-surgical) hospitalizations, annualized over the two-year baseline (per 1,000 beneficiaries per year)	Beneficiary service use and expenditures	Claims	194	193	1	0.01
Acute surgical hospitalizations, annualized over the two-year baseline (per 1,000 beneficiaries per year)	Beneficiary service use and expenditures	Claims	83	83	1	0.04

Measure	Characteristic type	Source	PCF mean	Comparison mean	Difference	Standardized difference
Acute hospitalizations in the first year of the two-year baseline period (per 1,000 beneficiaries per year)	Beneficiary service use and expenditures	Claims	229	228	1	0.02
Acute hospitalizations in the second year of the two-year baseline period (per 1,000 beneficiaries per year)	Beneficiary service use and expenditures	Claims	237	238	-1	-0.01
Acute hospitalizations in the year before the two-year baseline period (per 1,000 beneficiaries per year)	Beneficiary service use and expenditures	Claims	273	273	0	0.00
Outpatient ED visits in the first year of to the two-year baseline period (per 1,000 beneficiaries per year)	Beneficiary service use and expenditures	Claims	348	353	-5	-0.04
Outpatient ED visits in the second year of the two-year baseline period (per 1,000 beneficiaries per year)	Beneficiary service use and expenditures	Claims	381	394	-13	-0.11
Outpatient ED visits in the year before the two-year baseline period (per 1,000 beneficiaries per year)	Beneficiary service use and expenditures	Claims	458	467	-8	-0.05
Percentage of index discharges with a readmission within 30 days of discharge over the two-year baseline	Beneficiary service use and expenditures	Claims	14%	14%	0%	0.05
Percentage of index ED discharges with an unplanned acute care visit within 30 days of discharge over the two-year baseline	Beneficiary service use and expenditures	Claims	26%	26%	0%	-0.05
Percentage of index hospital discharges with an unplanned acute care visit within 30 days of discharge over the two-year baseline	Beneficiary service use and expenditures	Claims	23%	24%	0%	-0.01
Ambulatory telehealth visits with a primary care provider, annualized over the two-year baseline (per 1,000 beneficiaries per year)	Beneficiary service use and expenditures	Claims	1,155	1,081	74	0.12

Measure	Characteristic type	Source	PCF mean	Comparison mean	Difference	Standardized difference
Potentially preventable ED visits, annualized over the two-year baseline (per 1,000 beneficiaries per year)	Beneficiary service use and expenditures	Claims	32	33	-2	-0.12
Potentially preventable hospitalizations, annualized over the two-year baseline (per 1,000 beneficiaries per year)	Beneficiary service use and expenditures	Claims	43	43	0	-0.01
Primary-care-substitutable ED visits, annualized over the two-year baseline (per 1,000 beneficiaries per year)	Beneficiary service use and expenditures	Claims	121	124	-3	-0.08
Primary care visits to non-behavioral health specialists in ambulatory settings, annualized over the two-year baseline (per 1,000 beneficiaries per year)	Beneficiary service use and expenditures	Claims	3,900	3,838	62	0.06
Urgent care center visits, annualized over the two-year baseline (per 1,000 beneficiaries per year)	Beneficiary service use and expenditures	Claims	172	172	0	0.00
Percentage of beneficiaries with Part D coverage with claims for high-risk medications over the two-year baseline	Beneficiary demographics and Medicare enrollment characteristics	MBSF	14%	14%	0%	-0.06
Total inpatient expenditures, annualized over the two-year baseline (per beneficiary per month)	Beneficiary service use and expenditures	Claims	$308	$307	$1	0.01
Acute hospitalization expenditures, annualized over the two-year baseline (per beneficiary per month)	Beneficiary service use and expenditures	Claims	$291	$290	$0	0.00
Home health expenditures, annualized over the two-year baseline (per beneficiary per month)	Beneficiary service use and expenditures	Claims	$38	$37	$1	0.05
Post-acute care expenditures, annualized over the two-year baseline (per beneficiary per month)	Beneficiary service use and expenditures	Claims	$141	$138	$3	0.06
SNF expenditures, annualized over the two-year baseline (per beneficiary per month)	Beneficiary service use and expenditures	Claims	$54	$54	$0	0.00

Measure	Characteristic type	Source	PCF mean	Comparison mean	Difference	Standardized difference
Total Medicare expenditures, annualized over the two-year baseline (per beneficiary per month)	Beneficiary service use and expenditures	Claims	$921	$918	$3	0.02
Total Medicare expenditures in the first year of the two-year baseline period (per beneficiary per month)	Beneficiary service use and expenditures	Claims	$857	$850	$7	0.04
Total Medicare expenditures in the second year of the two-year baseline period (per beneficiary per month)	Beneficiary service use and expenditures	Claims	$985	$984	$1	0.01
Total Medicare expenditures in the year before the two-year baseline period (per beneficiary per month)	Beneficiary service use and expenditures	Claims	$919	$913	$5	0.03
One or two provider clinicians (any specialty)	Practice	OneKey	9%	21%	-11%	-0.40
Three or four provider clinicians (any specialty)	Practice	OneKey	27%	31%	-4%	-0.09
Six to nine provider clinicians (any specialty)	Practice	OneKey	28%	24%	4%	0.08
10 or more provider clinicians (any specialty)	Practice	OneKey	36%	24%	12%	0.25
Advanced APM participation for at least part of the two-year baseline	Practice	OneKey	46%	64%	-18%	-0.37
Advanced APM participation for the full two-year baseline	Practice	OneKey	53%	31%	22%	0.45
CPC+ participation at any time	Practice	OneKey	66%	21%	45%	0.95
Direct Contracting participation for the full two-year baseline	Practice	OneKey	0%	0%	0%	0.04
Final MIPS composite score for each practice, averaged across all assigned NPIs within the practice	Practice	OneKey	89	89	0	-0.01
Number of assigned beneficiaries during the baseline period	Practice	OneKey	1,366	1,116	251	0.24
Number of hours practice is open after 5 p.m. on weekdays and hours open Saturday or Sunday	Practice	Claims and PCF payment algorithm	4	3	0	0.05
Number of providers (any specialty)	Practice	OneKey	11	9	2	0.16

Measure	Characteristic type	Source	PCF mean	Comparison mean	Difference	Standardized difference
Number of primary care providers	Practice	Claims	6	5	1	0.26
Participation in a Medicare Shared Savings Program advanced APM track in the two years before baseline	Practice	Claims	13%	11%	2%	0.08
Participation in Medicare Shared Savings Program (any track) in the two years before baseline	Practice	MDM	42%	39%	3%	0.07
Percentage of charges that were for primary care during the two-year baseline	Practice	MDM	76%	76%	1%	0.05
Percentage of providers at the practice that are primary care providers	Practice	OneKey	63%	64%	0%	-0.02
Percentage owned by a health system that includes a hospital	Practice	OneKey	67%	57%	10%	0.22
Independent ownership status	Practice	OneKey	16%	30%	-14%	-0.38
Multispecialty practice	Practice	OneKey	42%	37%	5%	0.09
Practice TIN bills hospital-based services	Practice	Claims	13%	11%	2%	0.07

Notes: All mean amounts are weighted by assigned beneficiaries during the two-year baseline at each practice. Per-beneficiary measures are defined over the assigned beneficiaries at each practice.

[a] Risk groups are projected based on the mean HCC scores among assigned beneficiaries and might differ from CMS' risk groups. This is necessary to have a single risk group definition for PCF and non-PCF practices.

ACS = American Community Survey; AHRF = Area Health Resource File; APM = Alternative Payment Model; ATSDR = Agency for Toxic Substances and Disease Registry; CCW = Chronic Conditions Data Warehouse; CDC = Centers for Disease Control and Prevention; CMS = Centers for Medicare & Medicaid Services; CPC+ = Comprehensive Primary Care Plus; ED = emergency department; EDB = Medicare enrollment database; HCC = Hierarchical Condition Category; HCRIS = Healthcare Provider Cost Reporting Information System; HRSA = Health Resources and Services Administration; MBSF = Master Beneficiary Summary File; MDM = Master Data Management System; MIPS = Merit-based Incentive Payment System; NIEHS = National Institute of Environmental Health Sciences; NPI = National Provider Identifier; PCF = Primary Care First; PUMA = Public Use Microdata Area; RTI = Research Triangle Institute; SNF = skilled nursing facility; TIN = Taxpayer Identification Number.

Exhibit A.2.3.4. CPC+ alumni post-matching balance on high priority characteristics and outcomes

Measure	Characteristic type	Source	PCF mean	Comparison mean	Difference	Standardized difference
CDC Social Vulnerability Index	Geographic area	ATSDR CDC (2018)	0.38	0.39	-0.01	-0.10
Percentage of beneficiaries residing in rural areas	Beneficiary demographics and Medicare enrollment characteristics	AHRF (2020)	12%	14%	-2%	-0.07
Beneficiary HCC score in the first baseline year	Beneficiary health	Claims, EDB, MBSF	0.88	0.89	0.00	-0.02
Number of assigned beneficiaries during the baseline period	Practice	Claims and PCF payment algorithm	1397	1140	257	0.25
Number of providers (any specialty)	Practice	Claims	10	8	2	0.19
Percentage owned by a health system	Practice	OneKey	70%	59%	10%	0.22
Practice TIN bills hospital-based services	Practice	Claims	12%	12%	1%	0.02
Participation in a Medicare Shared Savings Program advanced APM track in two years before baseline	Practice	MDM	14%	7%	7%	0.23
Participation in Medicare Shared Savings Program (any track) in two years before baseline	Practice	MDM	40%	37%	3%	0.07
Acute hospitalizations in the first year of the two-year baseline period (per 1,000 beneficiaries per year)	Beneficiary service use and expenditures	Claims	227	228	-1	-0.02
Acute hospitalizations in the second year of the two-year baseline period (per 1,000 beneficiaries per year)	Beneficiary service use and expenditures	Claims	234	238	-4	-0.07
Acute hospitalizations in the year before the two-year baseline period (per 1,000 beneficiaries per year)	Beneficiary service use and expenditures	Claims	269	272	-2	-0.04
Total Medicare expenditures in the first year of the two-year baseline period (dollars per beneficiary per month)	Beneficiary service use and expenditures	Claims	$839	$841	-$2	-0.01

Measure	Characteristic type	Source	PCF mean	Comparison mean	Difference	Standardized difference
Total Medicare expenditures in the second year of the two-year baseline period (dollars per beneficiary per month)	Beneficiary service use and expenditures	Claims	$961	$972	-$11	-0.07
Total Medicare expenditures in the before the two-year baseline period (dollars per beneficiary per month)	Beneficiary service use and expenditures	Claims	$900	$903	-$3	-0.02

Notes: All mean amounts are weighted by assigned beneficiaries during the two-year baseline at each practice. Per-beneficiary measures are defined over the assigned beneficiaries at each practice.

APM = Alternative Payment Model; AHRF = Area Health Resource File; ATSDR = Agency for Toxic Substances and Disease Registry; CDC = Centers for Disease Control and Prevention; CPC+ = Comprehensive Primary Care Plus; EDB = enrollment database; HCC = Hierarchical Condition Category; MBSF = Master Beneficiary Summary File; MDM = Master Data Management; PCF = Primary Care First; TIN = Taxpayer Identifier Number.

Exhibit A.2.3.5. Non-CPC+ alumni post-matching balance on high priority characteristics and outcomes

Measure	Characteristic type	Source	PCF mean	Comparison mean	Difference	Standardized difference
CDC Social Vulnerability Index	Geographic area	ATSDR CDC (2018)	0.40	0.41	0.00	-0.03
Percentage of beneficiaries residing in rural areas	Beneficiary demographics and Medicare enrollment characteristics	AHRF (2020)	13%	14%	-1%	-0.03
Beneficiary HCC score in the first baseline year	Beneficiary health	Claims, EDB, MBSF	0.91	0.91	0.01	0.04
Number of assigned beneficiaries during the baseline period	Practice	Claims and PCF payment algorithm	1321	1092	229	0.20
Number of providers (any specialty)	Practice	OneKey	13	10	2	0.06
Percentage owned by a health system	Practice	OneKey	67%	57%	10%	0.22
Practice TIN bills hospital-based services	Practice	Claims	16%	15%	2%	0.04
Participation in a Medicare Shared Savings Program advanced APM track in two years before baseline	Practice	MDM	12%	16%	-3%	-0.10
Participation in Medicare Shared Savings Program (any track) in two years before baseline	Practice	MDM	48%	46%	2%	0.06
Acute hospitalization utilization in the first year of the two-year baseline period (per 1,000 beneficiaries per year)	Beneficiary service use and expenditures	Claims	260	257	3	0.04
Average acute hospitalization utilization in the second year of the two-year baseline period (per 1,000 beneficiaries per year)	Beneficiary service use and expenditures	Claims	244	242	2	0.03
Average acute hospitalization utilization in the year before the two-year baseline period (per 1,000 beneficiaries per year)	Beneficiary service use and expenditures	Claims	282	279	4	0.04
Total Medicare expenditures in the first year of the two-year baseline period (dollars per beneficiary per month)	Beneficiary service use and expenditures	Claims	$942	$927	$15	0.06

Measure	Characteristic type	Source	PCF mean	Comparison mean	Difference	Standardized difference
Total Medicare expenditures in the second year of the two-year baseline period (dollars per beneficiary per month)	Beneficiary service use and expenditures	Claims	$986	$974	$12	0.05
Total Medicare expenditures in the year before the two-year baseline period (dollars per beneficiary per month)	Beneficiary service use and expenditures	Claims	$947	$935	$13	0.05

Notes: All mean amounts are weighted by assigned beneficiaries during the two-year baseline at each practice. Beneficiary measures are defined over the assigned beneficiaries at each practice.

APM = Alternative Payment Model; AHRF = Area Health Resource File; ATSDR = Agency for Toxic Substances and Disease Registry; CDC = Centers for Disease Control and Prevention; CPC+ = Comprehensive Primary Care Plus; EDB = enrollment database; HCC = Hierarchical Condition Category; MBSF = Master Beneficiary Summary File; MDM = Master Data Management; PCF = Primary Care First; TIN = Taxpayer Identifier Number.

Exhibit A.2.3.6. Distribution of PCF practices across PCF regions and their average travel time (in minutes) to matched comparison practices

PCF regions	Cohort 1		Cohort 2	
	Number of PCF practices	Mean travel time	Number of PCF practices	Mean travel time
Arizona	11	30	98	14
California	84	34	93	17
Colorado	8	24	116	22
Delaware	14	41	4	14
Florida	95	31	77	18
Hawaii	3	7	33	7
Louisiana	3	12	11	29
Massachusetts	59	41	41	29
Maine	41	35	13	61
Michigan	33	37	270	22
Kansas City	8	40	86	46
Montana	0	N.A.	16	78
North Dakota	0	N.A.	15	32
Nebraska	13	20	19	17
New Hampshire	5	37	8	29
New Jersey	65	27	244	19
New York (Hudson Valley and Greater Buffalo regions)	30	57	94	39
Ohio and northern Kentucky	80	58	400	42
Oklahoma	24	45	79	25
Oregon	14	37	75	20
Greater Philadelphia	51	48	154	40
Rhode Island	13	N.A.	33	15
Tennessee	34	27	23	19
Virginia	55	42	12	19

Notes: To speed computation, we approximated practices' locations based on a central location of their PUMA. These areas are defined by the U.S. Census Bureau to be non-overlapping statistical geographic areas that partition each state into geographic areas containing no fewer than 100,000 people each. Because we approximated practices' locations as a central location within the PUMA, two practices in the same PUMA are considered to have a travel time of 0 minutes between them.

PCF = Primary Care First; PUMA = Public Use Microdata Area.

Exhibit A.2.3.7. Test of differences in trends among PCF practices and matched comparisons between the first and second years of the two-year baseline period

Outcome	Slope	Standard error	*p*-value
Overall			
Total Medicare expenditures per beneficiary per month	-1.1	3.6	0.76
Acute hospitalizations per 1,000 beneficiaries	-1.8	1.4	0.17
Cohort 1			
Total Medicare expenditures per beneficiary per month	1.7	6.3	0.78
Acute hospitalizations per 1,000 beneficiaries	-1.5	2.4	0.53
Cohort 2			
Total Medicare expenditures per beneficiary per month	-3.4	4.2	0.42
Acute hospitalizations per 1,000 beneficiaries	-1.7	1.5	0.26

PCF = Primary Care First.

A.2.4. Empirical strategy of the frequentist (main) regression analyses

This section describes the regression approach used to produce frequentist impact estimates for Medicare claims-based outcomes. We used a difference-in-differences regression model to estimate impacts during the first three performance years of the model for PCF practices relative to their matched comparisons. In brief, this method estimated the impacts of PCF as the difference in outcomes observed between PCF and comparison practices, minus any difference in outcomes that existed between those same practices before PCF started, adjusting for differences in practice characteristics (such as practice size or demographic makeup of the patient panel). This section describes the method in detail. We first describe the study population and unit of observation in the regressions (Section 1) and then discuss details of the regression specification and estimation approach (Section 2). Next, we describe control variables included in the regression (Section 3) and the regression weights (Section 4). Finally, we describe the subgroup analyses (Section 5) and our test for parallel outcome trends (Section 6).

A. Study population and unit of observation in the regression analysis

Population covered

The analysis of Medicare outcomes included beneficiaries with Part A and B coverage for whom Medicare is the primary payer, including beneficiaries dually eligible for Medicaid. We used a cross-sectional approach to define the study population, with different—but highly overlapping—cross-sections in each baseline and performance year (Exhibit A.2.4.1). Using these definitions, it was possible for a beneficiary to be in the study population (1) only during the baseline years (for example, if the beneficiary died during the baseline years or was no longer attributed to a PCF or comparison practice during the performance years or (2) only during the performance years—which occurred if the beneficiary was first attributed to an intervention or comparison practice during one of the performance years (for example, when new to Medicare). Yet a substantial proportion of beneficiaries were included in the study population for the baseline and performance years (See Appendix A.2.1 for details of attribution and assignment).

Exhibit A.2.4.1. Population covered under the cross-sectional study design

Cross-section	Time period covered	Study population definition
First baseline year	Cohort 1: January 1, 2019 to December 31, 2019 Cohort 2: January 1, 2020 to December 31, 2020	Beneficiaries assigned to the intervention or comparison practices based on attribution during the year
Second baseline year	Cohort 1: January 1, 2020 to December 31, 2020 Cohort 2: January 1, 2021 to December 31, 2021	Beneficiaries assigned to the intervention or comparison practices based on attribution during the second baseline year or the previous year
First performance year	Cohort 1: January 1, 2021 to December 31, 2021 Cohort 2: January 1, 2022 to December 31, 2022	Beneficiaries assigned to the intervention or comparison practices based on attribution during the year
Second performance year	Cohort 1: January 1, 2022 to December 31, 2022 Cohort 2: January 1, 2023 to December 31, 2023	Beneficiaries assigned to the intervention or comparison practices based on attribution during the year or the previous performance year
Third performance year	Cohort 1: January 1, 2023, to December 31, 2023	Beneficiaries assigned to Cohort 1 intervention or comparison practices based on attribution during the year or the previous performance years

Unit of observation

Although the population covered for the analysis of claims-based outcomes was a cross-section of beneficiaries, the unit of observation in the regression models was the *practice year* (or *practice subgroup year* in the case of beneficiary-subgroup models). Specifically, we aggregated beneficiary-year observations to (weighted) practice-year averages. The weights incorporated assigned beneficiary counts each year so we could interpret impact estimates as effects of PCF on the average beneficiary, not as effects on the average practice. As a result of aggregating to the practice-year level, practices had observations for as many years as they had at least one assigned beneficiary. For observations for calendar year 2020 (a baseline year), we measured most outcomes (see Appendix A.2.3) only during the last two quarters of the year because the outcomes from the first two quarters of the year were highly unusual as a result of delayed service use during the early months of the COVID-19 pandemic.

For service-use outcomes defined at the discharge level—proportion of inpatient discharges with unplanned 30-day readmission; proportion of inpatient discharges with unplanned 30-day acute care; and proportion of inpatient discharges, ED visits, or observation stays with follow-up billable service within seven days—we estimated impacts of PCF on the proportion of index events with a qualifying follow-up event, such as an unplanned hospitalization within 30 days of the index event. Before rolling up to the practice level, we limited the study population for each measure to only the subset of the study population that had at least one index event during the measurement period. Instead of cross-sections of beneficiaries, the data for the analysis comprised cross-sections of index events in each observation period, with the possibility of some overlap in and across periods among beneficiaries who had those index events. For example, someone who had two index events in the first performance year would have two observations that got rolled up to the practice level in the first performance year (one for each index event).

B. Model specification and interpretation of key coefficients

With the study population and unit of observation defined above, we estimated a linear difference-in-differences regression model for each claims-based outcome specified as follows:

$$(1) \qquad \bar{y}_{jt} = \rho_j + \alpha_t + \sum_c \sum_{\tau \neq -1} \delta_{c,\tau} PCF_j * 1\{C_j = c\} * 1\{t - C_j = \tau\} + \beta_t X_j + \beta_t \bar{X}_{jt} + \varepsilon_{jt}$$

- $\bar{y}_{jt}$ represents a claims-based outcome (averaged across beneficiaries at the practice) measured for practice *j* in year t. Years were defined so that $t = 0$ corresponds to the reference year before the intervention and $t = 1$ corresponds to the first performance year.
- ρ_j denotes practice fixed effects that control for practice characteristics—observed or unobserved—that are constant over time. Including these characteristics was intended to improve the precision of the impact estimates and net out effects of differences in characteristics between the intervention and comparison groups that remained despite matching.
- α_t denotes calendar year fixed effects, intended to control for characteristics that are constant across practices but vary across calendar years (such as any nationwide trends in the outcome).
- The model includes a three-way interaction between the treatment indicator PCF_j, cohort indicators $1\{C_j = c\}$, where *c* corresponds to the year when the cohort starts the intervention, and relative-time indicators indexed by τ so that -1 corresponds to the reference year before the intervention.
- X_j represents practice characteristics, such as health system affiliation, measured at the start of the period (baseline or intervention) and interacted with relative-year dummies to allow the association between practice characteristics and outcomes to vary over time. These variables adjust for cross-practice differences in characteristics that are plausibly correlated with intervention status and outcome trends. We describe the list of practice characteristics in more detail below.
- $\bar{X}_{jt}$ denotes practice averages of beneficiary characteristics. $\bar{X}_{jt}$ varies with *t* because the beneficiary population included in the practice average could change over time, even though all characteristics were measured at the start of the period (baseline or intervention). Beneficiary characteristics included demographics (age and sex), variables capturing Medicare and Medicaid eligibility (that is, original reason for Medicare eligibility, and dual Medicare–Medicaid status), chronic condition flags, and HCC score. As with the practice characteristics we described previously, we interacted these characteristics with year indicators to account for possible changes in the relationship between the characteristic measured at the start of the baseline or performance years and outcomes. We describe beneficiary characteristics covariates in more detail below.
- ε_{jt} is an idiosyncratic error term that represents unexplained variation in the outcome variable for each practice *j* in year t.

Accounting for possible contamination because of a staggered intervention start for Cohort 1 and Cohort 2

There is a growing literature that studies difference-in-differences models used to estimate dynamic treatment effects in settings in which cohorts are aligned to an intervention at different times. This literature has largely focused on models that adjust for unit (such as practices) and time fixed effects (also referred to as two-way fixed effects models or TWFE models). Importantly, this literature has identified that these TWFE models *do not* generally recover the average treatment effect of an intervention in each relative period unless the assumption of treatment-effect homogeneity holds (that is, unless treatment effects are the same across cohorts in every relative period, including baseline years) (de Chaisemartin and D'Haultfoeuille 2020; Callaway and Sant'Anna 2021; Goodman-Bacon 2021; Sun and Abraham 2021). We did not necessarily expect the assumption of treatment-effects homogeneity to hold in the PCF setting because we expected that CPC+ participants might not be affected by PCF in the same way as other intervention practices, and nearly 60 percent of Cohort 2 practices were CPC+ participants compared with 0 percent in Cohort 1.

Based on the concerns identified in the literature, we implemented the regression-based method introduced by Sun and Abraham (2021). This method produces average treatment effects that are robust to contamination from treatment-effect heterogeneity in a setting with staggered intervention start dates. Applied to the PCF Model, the Sun and Abraham method works as follows:

1. **Estimate cohort-specific average treatment effects for each year relative to the PCF start date.** Assuming parallel outcome trends between PCF and comparison practices if not for the model and no anticipatory treatment effects, the coefficients on the three-way interactions in Equation 1, $\hat{\delta}_{c,\tau}$, represent consistent estimates for the cohort-specific average treatment effect in each relative year, conditional on covariates.
2. **Calculate cohort shares in each relative year.** The cohort shares are equivalent to the (weighted) shares of assigned beneficiaries in Cohort 1 PCF practices and Cohort 2 PCF practices relative to the total number of assigned beneficiaries to PCF practices in the same relative year. For example, if, in relative year t, there were one million beneficiaries assigned to Cohort 1 PCF practices and two million beneficiaries assigned to Cohort 2 PCF practices, the cohort shares for relative year t would equal one-third for Cohort 1 and two-thirds for Cohort 2.
3. **Estimate the overall (combined) treatment effect in each relative year by combining cohort-specific estimates from Step 1 within each relative year, using cohort shares in Step 2 as weights.** Aggregating the coefficients $\hat{\delta}_{c,\tau}$ yields a consistent estimator of the average treatment effect for each relative year.

We also produced estimates of the average cumulative effect across the first and second relative years by taking the two-year average between the individual-year estimates. We included only the first and second relative years in this calculation because these are years in which the individual-year estimates are measured across both Cohort 1 and Cohort 2 practices.

Accounting for non-independence

An important consideration for the regression models was how to account for non-independence of observations. For example, we expected correlations between the same practice observation over time. We selected a model with practice-level fixed effects and practice-level cluster-robust standard errors based on testing conducted as part of the evaluation of CPC+. The testing showed this specification had excellent performance in terms of the mean squared error of the difference-in-differences point estimate and the coverage of the confidence interval around this estimate; in other words, it accurately reflected the uncertainty of the impact estimate (Peikes et al. 2020).

Interpretation

We used regression output to calculate *p*-values for statistical inference and used two-tailed tests with $p < 0.10$ as the threshold of statistical significance. To minimize the probability of mistaking noise for signal when examining impacts, we combined evidence from *p*-values with evidence from the hybrid frequentist–Bayesian analysis, subgroup analyses, related outcomes, sensitivity tests, and the implementation analysis to reinforce or discount the interpretation of observed results.

C. Regression controls

The regression models for most outcomes controlled for (1) practice-level averages of beneficiary characteristics, (2) practice characteristics, (3) practice fixed effects, and (4) calendar-year fixed effects. We describe controls (1) and (2) in more detail below.

Practice-level averages of beneficiary characteristics

We included control variables measured at the beneficiary level and then rolled up to practice-level averages for the analysis of Medicare claims-based outcomes. Examples of these control variables include demographics (such as proportion of beneficiaries in age and sex categories), original reason for Medicare entitlement, dual eligibility status, and HCC scores. For comprehensive risk adjustment, the regressions also controlled for the proportion of assigned beneficiaries with select chronic conditions (individual HCCs) that were prevalent in our sample (collapsing categories when appropriate).

For the performance years, we defined the beneficiary-level control variables at the start of PCF (January 1, 2021, for Cohort 1 and January 1, 2022, for Cohort 2). For observations in the baseline years, we measured beneficiary-level control variables at the start of the first baseline year (January 1, 2019, for Cohort 1 and January 1, 2020, for Cohort 2). For all controls, we included interactions between the individual variable and each performance year in the second year (or the second baseline year for the baseline-period observations). Because we used a difference-in-differences model, we did not control for Medicare service use or expenditures during the baseline years as is common in a cross-sectional analysis. These baseline outcomes were the dependent variable for the baseline observations in our model and, therefore, cannot be viewed as independent of the error term.

Practice characteristics

Exhibit A.2.4.2 shows the practice characteristics we included for the analysis of Medicare claims-based outcomes. Similar to the controls for practice-level averages of beneficiary characteristics, most of the controls for practice characteristics were measured at the start of the baseline and intervention periods (except for urbanicity, Pandemic Vulnerability Index, and Social Vulnerability Index, which were all measured only once). We did not incorporate additional changes over time in observed practice characteristics among our control variables because the intervention could affect practice characteristics. To further adjust for confounding on observable control variables (and to avoid collinearity with the practice fixed effects), we interacted each practice characteristic with time (Zeldow and Hatfield 2021).

Exhibit A.2.4.2. Practice characteristics included in the analysis of Medicare claims-based outcomes

Domain	Variables
Health system affiliation	Indicator for practice affiliation with a health system (that is, a larger health care delivery organization that includes a hospital) based on data from OneKey
Independent	Indicator for whether the practice is independent (that is, is not affiliated with any larger parent organization) based on data from OneKey
Practice size	Categorical variable for practice size, defined by quartiles of number of NPIs at a practice in OneKey based on distribution among PCF practices
Multispecialty	Indicator for whether practice is a multispecialty practice (including specialties other than primary care) based on data from OneKey
Any participation in CPC+	Indicator for whether PCF practice was ever a CPC+ participant, or, if it is a comparison practice, whether it is matched to a CPC+ participant
Participated in the MSSP during baseline years	Indicator for whether practice participated in the MSSP (any track) based on data from the CMS Master Data Management system
Experience with another advanced APM during baseline years	Categorical measure of participation (zero, low, and high) based on the distribution of PCF provider participation across the following models: Next Generation ACO; BPCI Advanced; Tracks 2, 3, E, or Enhanced of MSSP, and non-MSSP CPC+
Urbanicity	Categorical variable for whether practice site is in rural, suburban, or urban area based on data from 2020–2021 Area Health Resource File
Pandemic Vulnerability Index	County-level COVID-19 PVI measured in 2020 and produced by the National Institute of Environment Health Sciences

ACO = accountable care organization; APM = alternative payment model; BPCI = Bundled Payments for Care Improvement; CMS = Centers for Medicare & Medicaid Services; CPC+ = Comprehensive Primary Care Plus; MSSP = Medicare Shared Savings Program; NPI = National Provider Identifier; PCF = Primary Care First; PVI = Pandemic Vulnerability Index.

Additional control variables for discharge-level outcomes

We constructed our analytic sample for proportion of inpatient discharges with unplanned 30-day readmission, proportion of inpatient discharges with unplanned 30-day acute care, PAC expenditures, and proportion of inpatient discharges, emergency department (ED) visits, or observation stays with follow-up billable service within seven days from discharge-level observations. Therefore, the regression models for these outcomes included additional control variables (each interacted with relative year). The models for proportion of inpatient discharges with unplanned 30 day readmission, proportion of inpatient discharges with unplanned 30-day acute care, and PAC expenditures include (1) proportion of discharges with indicators for 31 conditions identified in inpatient episodes of care during the 12 months before the index admission as well as those present at admission[27] and (2) the proportion of index charges with a principal diagnosis or procedure associated with the index discharge best classified as medicine, surgery, cardiorespiratory or cardiovascular, or neurology. For proportion of inpatient discharges, ED visits, or observation stays with follow-up billable service within seven days, we separately controlled for the proportion of qualifying discharges from inpatient settings versus ED settings.

D. Weighting

We weighted the observations in the regression models for two purposes: to ensure that practices with a larger number of assigned beneficiaries contributed more to our estimation than practices with fewer assigned beneficiaries and to make the PCF and comparison groups more comparable. We achieved these goals through an *enrollment weight* and a *matching weight*, respectively. For each practice-year observation, the enrollment weight equaled the total number of days in the year that assigned beneficiaries were eligible for the analytic population. Beneficiaries were eligible in any month that they were alive and enrolled in Medicare FFS (enrolled in both Part A and Part B and not in a Medicare Advantage plan) with Medicare as the primary payer. The matching weight equaled 1 for all observations in the intervention group. For observations in the comparison group, the matching weight equaled 1 divided by the number of comparison practices in the matched set. For example, for a PCF practice matched to three comparison practices, the observations from those comparison practices received a matching weight of 1/3.

The final weight we used for frequentist analysis was the product of the enrollment weight and the matching weight. For regressions on *discharge-level* measures, the final weight was the product of the matching weight and the total number of discharges within a practice-year observation. We rescaled the final weight so that the sum of the final weight among comparison practices equaled the sum of the final weight of the PCF practices in the same region, year, and cohort to align with the approach used to assess balance between the PCF and comparison group.

[27] The 31 condition categories for the Medicare analysis included a range of diagnoses or risk factors, such as severe infection, metastatic cancer/acute leukemia, diabetes mellitus, end-stage liver disease, drug and alcohol disorders, congestive heart failure, chronic obstructive pulmonary disease, ulcers, cardiorespiratory failure or cardiorespiratory shock, acute renal failure, transplants, hip fracture/dislocation, and more. Our approach was based on reviewing standard models in the literature for risk-adjusting the likelihood of readmission.

E. Subgroup analyses

The impacts of PCF could differ for different types of practices and different types of beneficiaries. Therefore, for selected outcomes, we estimated the effects of PCF by subgroups based on characteristics defined at baseline.

For subgroup analyses assessing PCF's impacts on different practice types, we included in the regression models' interactions of variables denoting practice subgroup membership with (1) the indicator for PCF versus comparison status, (2) indicators for years relative to the intervention start, and (3) the PCF indicator interacted with year indicators. The rest of the estimation process followed the Sun and Abraham procedure discussed earlier.

Exhibit A.2.4.3 shows the practice-level subgroups for which we estimated differential effects and our rationale for including each subgroup. Because there is likely to be substantial correlation among practice characteristics (such as between Medicare Shared Savings Program participation and hospital-based system affiliation), we might not unmask the real drivers of impacts when testing for differential effects for each characteristic separately. Therefore, we included interactions with subgroup indicators for *all* practice subgroup characteristics in a single regression model to disentangle the characteristics that influence PCF's impacts.

Exhibit A.2.4.3. Practice subgroups

Subgroup definitions	Rationale for inclusion
Whether practice participated in CPC+ before PCF	CPC+ participants comprised many practices in PCF and had substantial prior transformation experience that they might have brought to PCF, potentially leading to smaller but more immediate impacts.
Whether practice participated in the Medicare Shared Savings Program at the start of PCF	Participants in the Medicare Shared Savings Program had prior experience in value-based models that they might have brought to PCF, potentially resulting in smaller but more immediate impacts on outcomes.
Whether practice was affiliated with a health system at the start of PCF	According to implementation findings, PCF is often implemented at the organization level for many practices, and this could affect practice change activities; practices that are affiliated with a hospital-based health system, in particular, are likely to face different incentives to reduce hospitalizations than independent practices or practices affiliated with other types of organizations.
Whether practice is a multispecialty practice (including specialties other than primary care) at the start of PCF	Practices that provide only primary care may have more incentive to respond to PCF than multispecialty practices because PCF revenue likely accounts for a larger share of total revenue at primary care practices. This could potentially lead to differential impacts by multispecialty status.

CPC+ = Comprehensive Primary Care Plus; PCF = Primary Care First.

Exhibit A.2.4.4 shows the beneficiary-level subgroups for which we estimated differential effects and our rationale for including each subgroup. Unlike our models of practice subgroups, our analyses by beneficiary subgroups did not include interactions with all subgroup categories in a single regression because the purpose of the beneficiary-subgroup analysis differs from that of the practice-subgroup analysis. The practice-subgroup analysis attempts to disentangle characteristics that drive PCF impacts (that is, netting out the influence of other characteristics that affect impacts), and the beneficiary-subgroup analysis attempts (1) to identify which types of beneficiaries benefit most from PCF and (2) to

highlight any disparities in PCF's impacts. To that end, we estimated a separate regression for each beneficiary subgroup of interest—in effect, estimating the impact of PCF among that subgroup overall, even if part of the differential impact could have been explained statistically by differential impacts associated with another overlapping characteristic. The regression models followed our main regression specification by including interactions of variables denoting subgroup membership with (1) the indicator for PCF versus comparison status, (2) indicators for years relative to the intervention start, and (3) the PCF indicator interacted with year indicators. The models also controlled for practice-level averages of beneficiary characteristics measured for all beneficiaries assigned to the practice and, separately, practice-level averages of beneficiary characteristics measured only for beneficiaries in the relevant subgroup.

Exhibit A.2.4.4. Beneficiary-level subgroups

Subgroup definitions	Rationale for inclusion
Beneficiaries with behavioral health conditions (measured at the start of PCF)	PCF practices are integrating behavioral health services, so we may expect to see changes in outcomes sooner for beneficiaries with behavioral health conditions than for beneficiaries without these conditions.
Medicare FFS-Medicaid dually eligible beneficiaries versus non-dually eligible beneficiaries (measured at the start of PCF)	More than 10 percent of beneficiaries assigned to PCF practices are dually eligible, and it is possible that PCF impacts differ by Medicare FFS-Medicaid dual eligibility status given systematic differences in health and socioeconomic status by dual eligibility. These results shed light on whether PCF is ultimately leading to improvement in areas of health equity.

FFS = fee for service; PCF = Primary Care First.

F. Testing for parallel outcome trends

Testing for parallel outcome trends

When producing impact estimates for each outcome and subgroup (described previously), we tested for the possibility of PCF–comparison differences in baseline outcome trends. In general, parallel outcome trends between intervention and comparison groups during the baseline period *and* during the intervention period in the absence of the model is necessary to interpret estimates from difference-in-differences models as unbiased (that is, interpreting effects because of the model and not other factors). Although it is impossible to know whether PCF and comparison outcome trends during the intervention period are parallel in the absence of PCF, we tested for differences in outcome trends during the baseline years and assessed implications of the results for our impact estimates. Our parallel trends test proceeded in two steps:

- **Step 1:** We used our difference-in-differences regression model (Equation 1) to assess whether PCF–comparison group trends differ between the first and second years of the baseline period. For a given outcome, we considered trends to have passed the test if the estimated difference between the PCF and comparison groups in baseline trends (Baseline Year 1 to Baseline Year 2) was not statistically significant at the 90 percent confidence level ($p > 0.1$). That is, we assumed baseline trends are parallel if we do not find statistically significant evidence of non-parallel trends. Because power to detect divergent trends among subgroups is worse compared with the full population due to smaller sample size, we use a narrower confidence interval (80 percent) than the more conventional 90-percent interval to determine pass/fail for subgroup–outcome combinations. Using

a narrower confidence interval for subgroups strengthens the test by helping to identify true trend differences that are not statistically detectable at more conventional levels of significance, but which could meaningfully alter conclusions about impacts of the model during later performance years. Finally, we assumed—for any given outcome—that we failed the parallel trends test for all subgroups if we failed the test for the full population. For all outcomes and subgroup-outcome combinations that failed the parallel trends test, we proceeded to the next step.

- **Step 2:** We assessed whether accounting for the estimated trend difference in Step 1 meaningfully altered conclusions we would draw from the impact estimates. Specifically, we checked whether conclusions in terms of direction or statistical significance of the impact estimates changed (for example, moving from statistically significant to non-significant) after accounting for trend differences projected into the intervention. In general, it was unlikely to observe differences that are statistically significant at the 80 percent level but also small enough not to alter our conclusions about model impacts meaningfully. We expect this to occur only if PCF has very large true impacts. This means, in most cases, we were able to determine pass/fail in Step 2 by comparing the magnitude of the baseline trend difference with the annual impact estimates for a given outcome. For instance, suppose we observe a statistically significant reduction in a service use outcome of one visit per 1,000 beneficiaries per year in performance year 3 but also a significant baseline trend difference between PCF and comparison practices of two visits per 1,000 beneficiaries per year. This would cause us to fail the parallel trends test because we could not distinguish whether the impact estimate in performance year 3 is because of the model or a result of existing trend differences (which would equal six visits per 1,000 beneficiaries per year by performance year 3 assuming the trend persists during the intervention). For cases in which determining pass/fail from comparing the magnitude of the baseline trend difference with the impact estimates was less clear (such as moving from marginally significant to marginally insignificant), we followed recommendations in Bilinski and Hatfield (2019) and assessed how the impact estimates compared with estimates generated from a difference-in-differences model that adjusts for linear baseline trend differences.

We did not include impact estimates for outcomes or subgroup–outcome combinations that failed our test of baseline trends in the main text of the annual report because we cannot interpret the results as impacts because of PCF. Instead, we show these results in Appendix B.7.

A.2.5. Claims-based measures used in impacts analysis

In this section, we detail the measures in this report that are based on Medicare claims and enrollment information. There are four main categories of measures: (1) beneficiary characteristics and health status, (2) primary outcomes (that is, expenditures and service utilization), (3) secondary outcomes (that is, potentially avoidable utilization), and (4) leading indicators. We generally report service utilization measures as the annualized rate per 1,000 beneficiaries or the fraction of beneficiaries receiving the service and expenditures as PBPM. The latter is the expenditures for the months a beneficiary was eligible for Medicare FFS during the year divided by the number of months the beneficiary was eligible for Medicare FFS.

A. Beneficiaries' characteristics and health status

Beneficiaries' demographics (age and sex), original reason for Medicare eligibility (age, disability, or ESRD), and current reason for Medicare eligibility are based on information in the Medicare enrollment database. We calculated beneficiaries' age as of January 1, 2021, for Cohort 1 and January 1, 2022, for Cohort 2.

Dual-eligibility status, Part D enrollment, and Part D low-income subsidy eligibility come from information obtained from the Master Beneficiary Summary File from December 2020 for Cohort 1 and December 2021 for Cohort 2. We flagged a beneficiary as dually eligible for Medicare and Medicaid if they had full or partial dual-eligibility status during the month.

Hierarchical Condition Category (HCC) scores

We calculated HCC scores using CMS' HCC 2021 score software and algorithm based on information from Medicare claims and enrollment data from baseline years, and we adapted CMS' algorithm for the purpose of the impact analysis. Specifically, we used the following approach:

1. To calculate the HCC score, we used a 12-month lookback for Medicare claims to obtain diagnosis information. For example, to calculate the 2021 HCC score, we used Medicare claims in 2020.
2. The HCC algorithm also uses information on demographics, reason for Medicare eligibility, new enrollee status, dual-eligibility status, long-term nursing home care, kidney transplant, and dialysis status. To calculate and assign HCC scores for any year, we used information on these attributes from the prior year. For example, to calculate the 2021 HCC score, we used the following beneficiary information:
   - Demographics from 2020
   - Medicare eligibility (eligible because of age or disability) from 2020
   - New enrollee status from 2020 (we flagged a beneficiary with fewer than five months of Medicare FFS enrollment during the year as a new enrollee)
   - Dual-eligibility status (full, partial, or nondual) during the any of the last three months of 2020
   - ESRD status during the last three months of 2020
   - Long-term institutionalization status during a 120-day period ending on December 31, 2020
   - The number of months since a kidney transplant, looking back from January 1, 2021
   - Whether the transplant was successful or the beneficiary was on dialysis as of the end of 2020

3. The HCC algorithm estimates the following separate models reflecting different levels of health status: (1) ESRD (further differentiating by dialysis status and time since functioning kidney transplant), (2) long-term institutionalization, (3) community (further differentiating by dual status and reason for Medicare entitlement: age versus disability), and (4) new enrollee. These models include different covariates and interaction terms and therefore lead to multiple values of the HCC scores for each beneficiary. We assign the beneficiary the score from the model reflecting the highest level of morbidity, following CMS' approach. For example, a beneficiary who has ESRD and is institutionalized would be assigned the score generated from the ESRD model. As part of this step, we multiply HCC scores for beneficiaries (1) with ESRD and on maintenance dialysis or (2) with a functioning kidney transplant by a CMS-published scaling factor that reflects the higher average medical costs of these two beneficiary groups compared with the average Medicare FFS population.
4. Finally, we normalize the HCC scores by dividing each individual HCC score calculated in step 3 by the mean of calculated HCC scores for all treatment and matched comparison beneficiaries in that year and PCF cohort. The normalization factor compensates for changes in coding practice and population demographics between different years of the baseline period by centering the average HCC score at 1.0 in each year for our population of treatment and comparison beneficiaries.

We derive the number of HCC categories and measures of chronic conditions, except for measures of hyperlipidemia and hypertension, from the individual variables the HCC software generates as part of the construction of the HCC score.

Measures of hyperlipidemia and hypertension are based on the Chronic Condition Algorithm. The HCC algorithm does not include individual measures for these conditions, but we include them in our evaluation because of the prevalence of these conditions in the Medicare population. The Chronic Condition Algorithm looks for (1) at least one qualifying diagnosis code on inpatient, skilled nursing facility, or home health claims or (2) at least two claims in the Hospital Outpatient or Carrier files with a qualifying diagnosis (Chronic Conditions Warehouse 2024).

B. Primary outcomes

Total Medicare Part A and B expenditures

This measure reflects Medicare expenditures for services covered by Part A and Part B and includes Medicare payments for inpatient, outpatient, and physician and non-physician services as well as skilled nursing facilities, home health, hospice services, and durable medical equipment services. Medicare Part A and B expenditures also include Quality Payment Program (QPP) payments and exclude third-party and beneficiary liability payments. We do not include Part D expenditures because Medicare makes prospective payments to Part D prescription drug plans that are not directly related to each individual prescription filled by a beneficiary. Here, we detail the other components included in our total expenditure measure.

From 2019 to 2023, QPP payments included claims-based adjustments for the MIPS that are negative or positive adjustments to physician fees, CAH claims, and advanced alternative payment model (APM) incentive payments based on performance two years prior. The MIPS adjustments are included in the payment amount in the 2019–2023 Medicare claims for performance in 2017, 2018, 2019, 2020, and

2021, respectively. APM incentive payments are NPI-level payments paid directly to eligible practitioners. We use an NPI-level payment file we received from CMS and a list of NPIs affiliated with each practice. We also include FFS equivalents for amounts that would have been paid to practices if they were not receiving alternative prospective or capitated payments, in the form of Comprehensive Primary Care Payments (CPCPs) or CPC+ practices and ACO payments.

Our goal is to estimate impacts for Medicare expenditures for FFS beneficiaries, so we do not include enhanced payments from other (non-Medicare) payers in our calculations. Enhanced payments are made *in addition to traditional payments for services and the QPP payments described in the previous paragraph*. Medicare enhanced payments include CMS' PBPs, which are monthly per-beneficiary payments paid directly to practices for Medicare FFS beneficiaries. PBAs are also applied beginning in the second performance year; they are quarterly positive or negative adjustments applied directly to the practices. Shortage area bonuses were also added for applicable practices in 2022. Starting in performance year 2, 101 practices left and enrolled in Accountable Care Organizations Realizing Equity, Access, and Community Health (ACO REACH). We continue to follow these practices, so we incorporate FFS equivalents that would have been paid to practices if they were not receiving ACO REACH model payments into our total expenditure calculations.

Lastly, we calculated the shared savings payments (SSPs) that their ACO earned for the SSP practices. There were three steps for adjusting Medicare expenditures for SSP ACO payments. First, we identified the beneficiaries in our sample that were part of an SSP ACO (as determined by the beneficiary level participation data available through Master Data Management [MDM]). Next, we divided the total SSPs earned by their SSP ACO during the reporting period by the total number of Medicare FFS eligible beneficiary-months in that ACO during the period to get a PBPM amount. Lastly, we applied this PBPM amount to the months when beneficiaries were eligible and attributed to a PCF practice. For example, if an ACO received $500,000 in shared savings and had 50,000 Medicare FFS beneficiary months associated with it for that year (for example, 5,000 beneficiaries with an average of 10 months of Medicare FFS coverage leading to 50,000 beneficiary months), then we first calculated the PBPM amount of shared savings as $10 PBPM. If only 500 of those beneficiaries in the ACO were also attributed to a PCF or comparison practice, then, for each of those 500 beneficiaries in our analysis sample, we added $10 PBPM to their claims-based PBPM Medicare expenditures amount for that year for the months when they were eligible and attributed to that practice.

Acute hospitalizations

This measure includes short-stay acute inpatient and CAH facility stays. Transfers between facilities count as a single admission. Multiple claims representing transfers between hospitals are combined into a single record so that they count as one hospitalization. We categorized an inpatient stay as a short acute inpatient hospital stay with the third to sixth digits of the provider number equal to 0001 to 0899. If the third and fourth digits of the provider number are equal to 13, then it is a CAH stay.

C. Secondary outcomes

Inpatient expenditures

This measure is a subset of total Medicare expenditures. It includes Part A payments for acute and non-acute inpatient services. Acute inpatient care includes short-stay acute hospital admissions and admissions to CAHs (more than 90 percent of the inpatient claims fall into this category). Non-acute hospitalizations are primarily at psychiatric and rehabilitation hospitals, but can occur at long-term care hospitals and other settings.

Post-acute care (PAC) expenditures

This measure is the total cost of PAC, which is care delivered after an acute hospitalization. We define PAC expenditures as the expenditures associated with care delivered during a PAC episode, a sequence of post-acute stays for which each stay is separated from previous stays by no more than seven days.[28] We sum the Medicare payments for each PAC stay to identify the total expenditure amount for a PAC episode.

A PAC episode begins with discharge from an index inpatient hospitalization, which we identify using the same methodology as for unplanned readmissions. We exclude some acute stays from our sample of index stays if any of the following are true:

- The beneficiary does not retain Part A Medicare FFS eligibility for the full follow-up period.
- The beneficiary dies within the index stay.
- The beneficiary left against medical advice.
- The stay length exceeded one year.
- The stay was for rehabilitation.
- The stay was for primary psychiatric diagnoses.
- The stay was for medical treatment of cancer or occurred at a prospective payment system-exempt cancer hospital.

Stays that do not meet exclusion criteria are retained and considered index inpatient hospitalizations for a PAC episode when they meet one of the following criteria: (1) within seven days of the index hospitalization discharge, a beneficiary is admitted to an inpatient rehabilitation facility or long-term care hospital, or (2) if the index hospitalization is no less than three days long, a beneficiary is admitted to a skilled nursing facility no more than 30 days after the discharge date or receives home health care services no more than 14 days after the discharge date. Exhibit A.2.5.1 provides additional details of PAC stay definitions and claims included in each category of stay. Stays are specific to each PAC type.

[28] We base our definition of a PAC episode on the one Urban Institute uses in its report to the Medicare Payment Advisory Commission available at https://www.medpac.gov/wp-content/uploads/import_data/scrape_files/docs/default-source/contractor-reports/sept2018_pac_sequence_of_care_w_cov_contractor_sec.pdf.

Exhibit A.2.5.1. Definitions of PAC stays and claims included

Claims type	Claims included	Stay definition
IRF	Provider number values from the inpatient file: **1.** 3025 to 3099 in the third to sixth digit; or **2.** R or T in the third position	Separate IRF stays were created if there is a hospitalization or PAC stay of greater than three days or the beneficiary returned to a different IRF facility
Home health	All claims from home health file	60 consecutive days are considered a single home health stay even if an intervening hospital or institutional stay occurs within the 60-day episode
LTCH	Provider number values from the inpatient file equal 20 to 22 in the third and fourth digit	Separate stays are created if the patient returned to the same LTCH following a stay in: **1.** An acute hospital for at least 10 days, **2.** An IRF for at least 28 days, or **3.** An SNF for at least 46 days
SNF	All claims from the SNF file and the following provider number values from the inpatient file: **1.** 5000 to 6499 in the third to sixth digit; or **2.** U, W, Y, or Z in the third position	Any discharges and later admissions to an SNF resulted in a separate SNF stay, regardless of any care the beneficiary received between the two SNF claims

IRF = inpatient rehabilitation facility; LTCH = long-term care hospital; PAC = post-acute care; SNF = skilled nursing facility.

Medical admissions

We identified acute medical admissions (that is, non-surgical acute hospitalizations), from the Diagnosis Related Groups (DRG) variable on inpatient claims using details on the list of Medicare Severity Diagnosis Related Groups (MS-DRGs) from Table 5 on the Inpatient Prospective Payment System Final Rule page for each year from 2018 to 2023. Specifically, we used the variable MS-DRG Type, which indicates whether the admission was a surgical or a medical MS-DRG. Acute surgical hospitalizations have the MS-DRG type called SURG in the year, and acute medical hospitalizations have the MS-DRG type called MED in the year.

Outpatient ED visits (including observations stays)

We identify outpatient ED visits in the outpatient department file using revenue center line items equal to 045X or 0981 (emergency room care), 0762 (treatment or observation room), or 0760 (treatment or observation room—general classification). We counted a visit as an observation stay if it was longer than eight hours and had a corresponding HCPCS code of G0378 (hospital observation services per hour). If the procedure code on the line item of the ED claim was equal to 70000 to 79999 or 80000 to 89999, we excluded it; we did so to exclude claims in which only radiological or pathology/laboratory services were provided. The next step was to identify ED visits or observations stays that led to an inpatient admission (that is, those visits that occurred within a day of an inpatient admission or during the inpatient stay) and excluded these from our outpatient ED count. We then capped the number of ED visits to one per day.

Primary-care-substitutable ED visits

Primary-care-substitutable ED visits are a subset of outpatient ED visits and observation stays, which we identify in the outpatient file using revenue center codes 045X or 0981 (emergency room care), or 0760 or 0762 (treatment or observation room). We exclude claims with only laboratory or imaging services by removing all claims lines in which HCPCS procedure codes equaled 70000 to 79999 or 80000 to 89999. We further exclude claims leading to an inpatient admission.

We then identify a subset of these outpatient ED visits as potentially primary care substitutable using the New York University Emergency Department Algorithm (Billings et al. 2000) updated with the patch developed by Johnston et al. (2017). This algorithm assigns probabilities for each ED visit falling in one of four categories based on the primary diagnosis code from the claim: (1) nonemergent, (2) emergent but treatable in a primary care setting, (3) emergent with ED care required but preventable or avoidable if appropriate ambulatory care had been received, and (4) emergent with ED care required and not preventable or avoidable. We then define an ED visit as primary care substitutable if the sum of the probabilities of the first two categories (that is, a nonemergent ED visit or an emergent ED visit treatable in a primary care setting) exceeds 0.5. If a beneficiary had multiple ED visits on a given service date, we count only the first claim in the file.

Proportion of inpatient discharges with unplanned 30-day readmissions

We calculate unplanned readmissions as the proportion of eligible acute inpatient discharges (index discharge) that were followed by an unplanned hospitalization within 30 days of the discharge. Our definition of this measure is based on the Yale readmission measure developed by the Yale New Haven Health Services Corporation/Center for Outcomes Research & Evaluation (YNHHSC/CORE 2023) that is used in the Hospital Readmission Reduction Program under Section 3025 of the Affordable Care Act (CMS 2023). An unplanned readmission is any acute hospitalization that does not continue care. Examples of planned admissions include recurring admissions for chemotherapy and planned admission for transplant surgery. For an index discharge to qualify for the readmission measure, the beneficiary must (1) be enrolled in Medicare FFS Part A and not enrolled in Medicare Advantage, (2) be enrolled in Medicare FFS Part A during the month following discharge, (3) be alive at discharge, and (4) not be discharged against medical advice. In addition, certain inpatient stays are excluded from the universe of index discharges, including discharges with lengths of stay longer than one year; stays at cancer hospitals exempt from the prospective payment system; and stays for psychiatric conditions, rehabilitation, cancer, or COVID-19.

Readmissions after eligible acute inpatient discharges exclude planned readmissions. All qualifying hospital discharges with an unplanned readmission within 30 days are identified as an unplanned readmission. Therefore, the measure provides an estimate of the proportion of acute hospital discharges with an unplanned readmission within 30 days.

Proportion of inpatient discharges with unplanned 30-day acute care

This measure examines index acute care hospital discharges that were followed by an unplanned acute care hospitalization or ED visit (including observation stays) within 30 days. The purpose of this measure is to capture additional unplanned acute care use beyond the 30-day unplanned readmission measure.

We start with the set of index hospitalizations used to calculate the 30-day unplanned readmission measure for each measurement year. This is the denominator for the measure. Then, we identify ED discharges (including observation stays) that started within 30 days of the discharge date of the index hospitalization. Because the unplanned readmission measure excludes COVID-19 stays from being an index admission and readmission, we aligned the ED visits and observations stays with this methodology and excluded them if they included diagnosis code U071. If the index hospitalization had an unplanned hospital readmission, an ED visit, or an observation stay within 30 days following the index discharge date, we flag the index hospitalization as being followed by unplanned acute care use within 30 days.

D. Leading indicators

Practice revenue for primary care visits by attributed beneficiaries

We approximate this measure using the fraction of revenue for a PCF or comparison practice obtained through primary care services for beneficiaries in their assigned treatment group (that is, revenue to a PCF practice from primary care services for beneficiaries assigned to any PCF practice and revenue to a matched comparison practice from primary care services for beneficiaries assigned to any comparison practice). This allows us to assess whether and to what extent PCF practice revenue changes during the intervention by capturing both price changes under the model and changes in the billable primary-care services provided as care delivery shifts toward non-billable services. We estimate this revenue for a practice from claims-based payments for primary care services in ambulatory settings to beneficiaries assigned to the practice's treatment group and the portion of QPP payments the practice received that are attributable to primary care services to beneficiaries assigned to their treatment group. In addition, for PCF practices, we also include model payments to the practice: PCF FVFs, PBPs, and PBAs.

We first identify ambulatory primary care visits by beneficiaries at practices in their assigned treatment group in carrier claims as described above in this subsection (A.2.5.D). We calculate payments for these services, which include the following:

- FFS payments for services
- FVFs (PCF practices only)
- MIPS adjustments, which are included in the payment amount in the 2019–2023 Medicare claims for performance in 2017, 2018, 2019, 2020, and 2021, respectively
- FFS equivalents for amounts that would have been paid if the practice were not receiving alternative prospective or capitated payments, in the form of CPCPs for CPC+ practices and ACO payments

For calculating claims-based payments, we exclude beneficiary-quarters when beneficiaries are attributed to a practice outside of their assigned treatment group.

We then calculate the portion of a practice's advanced APM incentive payments, (NPI-level payments paid directly to eligible practitioners) that can be attributed to primary care services for beneficiaries in their assigned treatment group. We approximate this as (i) a practice's qualifying NPIs' total APM bonus payment in a given year multiplied by (ii) revenue in the year for primary care services by qualifying NPIs for beneficiaries assigned to the practice treatment group and divided by (iii) total Part B revenue for the APM-qualifying NPIs during that same payment year. We receive total APM bonus payments as NPI-level files from CMS each year. We calculate primary care visit revenue for qualifying NPIs for beneficiaries assigned to the practice treatment group using line-level payments for primary care visits by beneficiaries at practices in their assigned treatment group (identified as described in the measure above). We calculate total Part B revenue for the APM-qualifying NPIs as the sum of line-level payments in carrier claims for a given performing NPI.

PBPs to a PCF practice are based on beneficiaries attributed to the practice for prospective payments. We incorporate a fraction of PBPs into the final measure, corresponding to payments for beneficiaries that are both attributed for payment to a given practice and assigned for the evaluation to the same practice in the same quarter. We calculate this adjusted PBP for a given quarter as (i) the total PBP multiplied by (ii) the count of beneficiaries that are both attributed to the practice for payment and assigned to that practice for the evaluation in that quarter and divided by (iii) the count of all beneficiaries attributed to the practice for payment in that quarter. We do not consider recoupment for this measure. We add total PBAs to the final measure without adjustment.

Ambulatory primary care visits

We classify an encounter as a primary care visit in an ambulatory setting if it meets the inclusion criteria in one of three scenarios:

1. Carrier file claims are identified as ambulatory visits in non-institutional settings if they have an ambulatory procedure code in an ambulatory setting listed in Exhibit A.2.5.2. Ambulatory visits include procedure codes for professional claims, including E&M visits, preventive visits, care transition or coordination services, and in-office preventive services, screening, and counseling. Certain services qualify only if they have a non-inpatient place of service to limit to services in ambulatory settings only (primarily, newly added behavioral health services). Exhibit A.2.5.2 identifies procedure codes subject to these additional criteria with an asterisk. The following place of service codes are used to exclude visits:

   - 21 (Inpatient Hospital))
   - 51 (Inpatient Psychiatric Facility)
   - 55 (Residential Substance Abuse Treatment Facility)
   - 56 (Psychiatric Residential Treatment Center)
   - 61 (Comprehensive Inpatient Rehabilitation Facility)

   In addition, the performing provider must have a primary care taxonomy code that is in Exhibit A.2.5.3, or, if the NPPES taxonomy code is missing for the provider that appears in the Part B claim line file or if the performing provider field is missing in the Part B claim line, we use the CMS specialty code in the Part B claim line (Exhibit A.2.5.4).

2. The Hospital Outpatient Department file is used to identify ambulatory visits in an FQHC or RHC. These facilities are identified through a combination of the facility type and type of service variables (FAC_TYPE=7 and TYPESRVC=1, 3, or 7). Ambulatory visits have revenue center codes for FQHCs or RHCs (0519, 0521, 0522, 0527, or 0528), or HCPCS codes (G0071, G0466, G0467, G0468, G0402, G0438, G0439, or G0511, or G2025). Ambulatory services provided by primary care providers are identified at the claim-line level using the primary care taxonomy codes from Exhibit A.2.5.3. (If the rendering provider is missing in the outpatient hospital claim-line file, we use the attending operating and other provider fields.)
3. Ambulatory visits in a CAH are also identified using the Hospital Outpatient Department file. CAH claims are defined through a combination of the provider field (last four digits of claim-level field PROVIDER =1300-1399), facility type (FAC_TYPE=8), and type of service (TYPESRVC=5). The claim must have a revenue code of 096x, 097x, or 098x and a CPT/HCPCS code in Exhibit A.2.2.2 or G0463. Ambulatory visits provided by primary care providers are identified at the claim-line level using the primary care taxonomy codes from Exhibit A.2.5.3. (If the rendering provider is missing in the outpatient hospital claim-line file, we use the attending operating and other provider fields.)

Exhibit A.2.5.2. Ambulatory care codes

HCPCS code	Description
96160	Patient-focused health risk assessment
96161	Caregiver health risk assessment
98966–98968	Telephone assessment and management service provided by a qualified nonphysician
98969	Online assessment for evaluation and management (deleted in 2020 and replaced with 98970–98972)
98970–98972	Online digital assessment (new in 2020)
98980–98981	Remote therapeutic monitoring treatment management services (new in 2022)
99091	Remote Physiologic Patient Monitoring
99421–99423	Online digital E&M services - physicians or other qualified health professionals
99441–99443	Telephone E&M
99444	Online E&M (deleted in 2020 and replaced with 99421–99423)
99453–99454	Chronic Care Remote Patient Monitoring Codes
99457	Remote physiologic monitoring treatment management services
99474	Home blood pressure monitoring support (new in 2020)
98975–98977	Remote therapeutic monitoring services. Code 98975 represents the initial setup and patient education for the equipment. Codes 98976 (respiratory system) and 98977 (musculoskeletal system) represent the device supply w/ scheduled recording and/or programmed alert transmission for a 30-day period (new in 2022)
99201	Office or Other OP visit (99201 deleted in 2021)
99202–99205	Office or Other OP visit
99211–99215	Office or other OP visit.
99324–99328	Domiciliary or Rest Home
99334–99337	Domiciliary or Rest Home
99339–99340	Domiciliary, Rest Home, or Home Care Plan Oversight.

HCPCS code	Description
99341–99345	Home visit
99347–99350	Home visit
G0320–G0321	Home health services furnished using synchronous telemedicine (new in 2021)
99424–99427	Principal care management services (new in 2022)
99429	Unlisted preventive medicine service
G0023–G0024	Principal Illness Navigation Services (new in 2024)
99483	Cognitive assessment
99484	General Behavioral Health Integration Care Management
99487	Complex CCM Services
99490–99491	CCM services. This code range is not related to additional time.
99437	Each additional 30 minutes of physician or other qualified healthcare professional time per calendar month, beyond the first 30 minutes. (new in 2022)
99492	Psychiatric Collaborative Care Management
99493	PCCM - First 60 minutes in a subsequent month
99494	PCCM - Each additional 30 minutes in a calendar month
99495–99496 [a]	Transitional care management. Code range defines different discharge dates.
99497 [a]	Advanced directive counseling and discussion
G0076– G0087	Care management home visit
G0101	Cervical or vaginal cancer screening; pelvic and clinical breast examination
G0102	Prostate cancer screening; digital rectal examination (DRE)
G0108	Diabetes outpatient self-management training services, individual, per 30 minutes
G0109	Diabetes outpatient self-management training services, group session (2 or more), per 30 minutes
G0296	Visit to determine lung cancer screening eligibility
G0402	Welcome to Medicare visit
G0438–G0439	Annual wellness visit.
G0442	Annual alcohol misuse screening, 15 minutes
G0444	Annual depression screening
G0502–G0504	Psychiatric collaborative care management Other (deleted in 2018 and replaced with 99492–99494)
G0506	CCM service: Comprehensive assessment and care planning for patients needing chronic care
G0507	CCM service: Care management services for behavioral health conditions (Deleted in 2018 and replaced with 99484)
G2010	Remote evaluation of recorded video and/or images submitted by an established patient
G2012	Virtual check-in by a physician or other qualified health care professional who can report E&M services
G2061–G2063	Qualified nonphysician healthcare professional online assessment and management service, for an established patient
G2064	Principal care management service at least 30 minutes – physician or other qualified health care professional

HCPCS code	Description
G2065	Principal care management service at least 30 minutes – clinical staff time directed by a physician or other qualified health care professional
G2214	Psychiatric Collaborative Care Management (new in 2021)
G2250	Remote assessment of recorded video and/ or images submitted by an established patient (new in 2021)
G2251	Brief communication technology-based service, e.g., virtual check-in, by a qualified health care professional who cannot report E&M services (new in 2021)
G2252	Brief communication technology-based service, e.g., virtual check-in, by a physician or other qualified health care professional who can report E&M services (new in 2021)
G3002–G3003	Chronic Pain Management (new in 2023)
G9978–G9986	Remote in-home visit for the E&M of a patient (BPCI) (new in 2019)
G9987	Bundled payments (BPCI advanced) model home visit for patient assessment (new in 2019)
Q0091	Screening Papanicolaou smear; obtaining, preparing and conveyance of cervical or vaginal smear to lab
G9886–G9887	Behavioral Counseling For Diabetes Prevention, In-Person, Group or distance learning (new in 2024)

[a] Additional POS eligibility criteria required

BPCI = Bundled Payments for Care Improvement; CCM = chronic care management; DRE = Digital Rectal Examination; E&M = evaluation and management; HCPCS = Healthcare Common Procedure Coding System; OP = outpatient; PCCM = Psychiatric Collaborative Care Management; POS = place of service.

Exhibit A.2.5.3. Primary care taxonomy codes from the National Plan and Provider Enumeration System

Provider taxonomy code	Specialty
207Q00000X	**Family Medicine**
207QA0505X	**Adult Medicine**
207QG0300X	**Geriatric Medicine**
207QH0002X	**Hospice and Palliative Medicine**
208D00000X	**General Practice**
207R00000X	**Internal Medicine**
207RG0300X	• Geriatric Medicine
207RH0002X	• Hospice and Palliative Medicine
364S00000X	**Clinical Nurse Specialist**
364SA2100X	• Acute Care
364SA2200X	• Adult Health
364SC2300X	• Chronic Care
364SC1501X	• Community Health/Public Health
364SF0001X	• Family Health
364SG0600X	• Gerontology
364SH1100X	• Holistic

Provider taxonomy code	Specialty
364SW0102X	• Women's Health
363L00000X	**Nurse Practitioner**
363LA2100X	• Acute Care
363LA2200X	• Adult Health
363LC1500X	• Community Health
363LF0000X	• Family
363LG0600X	• Gerontology
363LP2300X	• Primary Care
363LW0102X	• Women's Health
363A00000X	**Physician Assistant**
363AM0700X	• Medical

Exhibit A.2.5.4. Primary care specialty codes from claims

CMS specialty code	Specialty
01	General practice
08	Family practice
11	Internal medicine
17	Hospice and palliative care
38	Geriatric medicine
50	Nurse practitioner
89	Certified clinical nurse specialist
97	Physician assistant
99[a]	Unknown physician specialty

[a] In the National Plan and Provider Enumeration System, undefined specialties are defined as GPs because the Medicare Provider Type indicates that the provider/supplier is a physician and they linked this to the most generic Allopathic & Osteopathic Physicians classification. Using undefined specialty on the line follows that same logic.

CMS = Centers for Medicare & Medicaid Services; GP = general practitioner.

Ambulatory primary care visits by beneficiaries at practices in their assigned treatment group

This measure identifies ambulatory primary care services received by beneficiaries at practices in their assigned treatment group (that is, services received by beneficiaries assigned to a PCF practice at all PCF practices and services received by beneficiaries assigned to a matched comparison practice at all comparison practices). We start with carrier claims identified for primary care services in ambulatory settings (described above in this subsection). We do not include primary care services in outpatient claims from FQHCs and CAHs because these facilities are not included in the analytic sample as treatment or comparison practices. We then compare the performing NPI and TIN on the claim line against the TIN–NPI combinations in our practice–provider rosters derived from OneKey data to determine whether the service was performed at a PCF practice, a matched comparison practice, or neither (Appendix A.2.1). We sum primary care visits for each beneficiary at practices in their assigned treatment group (PCF, matched comparison, or neither) to obtain the final measure. In the final analytic

sample for this outcome, we exclude beneficiary-quarters when beneficiaries were attributed to a practice outside their assigned treatment group. For example, we exclude quarters when a beneficiary was assigned to a PCF practice for the entire intervention or baseline period but was attributed to a matched comparison group in that quarter.

AWVs

Using carrier claims and FQHC, RHC, and CAH claims from the outpatient file, we create an indicator for whether a beneficiary received an AWV during a given year. AWVs are identified using the following HCPCS codes:

- G0438 and G0439 for carrier and FQHC/RHC/CAH outpatient claims
- G0468 for FQHC claims only

Behavioral health visits to behavioral health specialists in an ambulatory setting

We classify an encounter as a behavioral health visit in an ambulatory setting in one of three scenarios:

1. Carrier file claims are identified as behavioral health visits in non-institutional settings if they have an ambulatory procedure code in an ambulatory setting listed in Exhibit A.2.5.5. Certain services qualify only if they have a non-inpatient place of service (same list as above) to limit to services in ambulatory settings only (primarily, newly added behavioral health services). Exhibit A.2.5.5 identifies procedure codes subject to these additional criteria with an asterisk. In addition, the performing provider must have a behavioral health taxonomy code that is in Exhibit A.2.5.6, or if the NPPES taxonomy code is missing for the provider that appears in the Part B claim line file or if the performing provider field is missing in the Part B claim line, we use the CMS specialty code in the Part B claim line (If HCFASPCL = 13, 14, 26, 27, 62, 68, 79, 80, 86, or C0, they are a behavioral health specialist).
2. The Hospital Outpatient Department file is used to identify behavioral health visits in an FQHC or RHC. These facilities are identified through a combination of the facility type and type of service variables (FAC_TYPE=7 and TYPESRVC=1, 3, or 7). FQHC and RHC claims must have revenue center codes 0519, 0521, 0522, 0527, 0528, or 0900, or HCPCS code G0512, G0469, or G0470, or any of the HCPCS codes in Exhibit A.2.5.5 on any one of the claim lines. Behavioral health services provided by a behavioral health specialists are identified at the claim-line level using the taxonomy codes from Exhibit A.2.5.6. (If the rendering provider is missing in the outpatient hospital claim-line file, we use the attending operating and other provider fields.)
3. Behavioral health visits in a CAH are also identified using the Hospital Outpatient Department file. CAH claims are defined through a combination of the provider field (last four digits of claim level field PROVIDER =1300-1399), facility type (FAC_TYPE=8), and type of service (TYPESRVC=5). The claim must have a revenue code of 0961 or 0984 and a CPT/HCPCS code in Exhibit A.2.5.5 or G0463. Behavioral health visits provided by behavioral health providers are identified at the claim-line level using the taxonomy codes from Exhibit A.2.5.6. (If the rendering provider is missing in the outpatient hospital claim-line file, we use the attending operating and other provider fields.)

Exhibit A.2.5.5. CPT and HCPCS codes to identify behavioral health visits in ambulatory settings

CPT/HCPCS codes	Description
90832–90839, 90845–90849, 90853[a]	Psychotherapy
0364T, 0365T	Adaptive behavior treatment by protocol, administered by technician
90791–90792[a]	Psychiatric diagnostic interview examination
90865[a]	Narcosynthesis for psychiatric diagnostic and/or therapeutic purposes
90880[a]	Medical hypnotherapy
90899[a]	Unlisted psychiatric service or procedure
96105[a]	Assessment of Aphasia and Cognitive Performance Testing
90870[a]	Electroconvulsive therapy
96116[a]	Neurobehavioral status exam
96125[a]	Standardized cognitive performance testing
96127[a]	Brief emotional/behavioral assessment (e.g., depression inventory, attention-deficit/hyperactivity disorder scale)
96130[a]	Psychological testing evaluation services by physician or other qualified health care professional
96132[a]	Neuropsychological testing evaluation services by physician or other qualified health care professional
96156[a]	Health behavior assessment or re-assessment – new in 2020
96158, 96164, 96167, 96170[a]	Health and behavior intervention
97129[a]	Therapeutic interventions that focus on cognitive function
G2076[a]	Intake activities, including a physician assessment, - opioid treatment program
96136, 96138, 96146[a]	Psychological or neuropsychological test administration
96150–96155[a]	Health and behavior assessment
97151–97152[a]	Behavior Identification Supporting Assessment
97153–97158[a]	Adaptive Behavior Treatment
94408–94409, G0396–G0397	Alcohol and/or substance (other than tobacco) abuse structured screening, and brief intervention services
G0409	Social work and psychological services, directly relating to and/or furthering the patient's rehabilitation goals
G0443	Brief face-to-face behavioral counseling for alcohol misuse
G0445	High intensity behavioral counseling to prevent sexually transmitted infection
G0446	Face-to-face intensive behavioral therapy for cardiovascular disease
G0447, G0473	Face-to-face behavioral counseling for obesity
99406–99407	Smoking and tobacco use cessation counseling visit
99484	Care management services for behavioral health conditions
99492–99494	Behavioral health care manager activities
G0502–G0504	Psychiatric collaborative care management
0360T	Observational behavioral follow-up assessment

CPT/HCPCS codes	Description
0702T, 0703T	Remote therapeutic monitoring of a standardized online digital cognitive behavioral therapy program
G2011	Alcohol and/or substance abuse structured assessment and brief intervention
G2086–G2088	Office-based treatment for opioid use disorder
96202[a]	Mlt fam grp bhv train 1st 60 (new in 2024)
G0323	Care management services for behavioral health conditions, at least 20 minutes of clinical psychologist or clinical social worker time, per calendar month (new in 2023)
G0017[a]	Crisis psychotherapy 60m (new in 2024)
G0019[a]	Comm health intg svs to address Social Determinants Of Health 60mn (new in 2024)
G0136[a]	Administration Of A Standardized, Evidence-Based Social Determinants Of Health Risk Assessment Tool (new in 2024)
G0140, G0146	Principal Illness Services related to behavioral health (new in 2024)
G0137	Intensive outpatient services; minimum of nine services over a 7-contiguous day period (new in 2024)

[a] Additional POS eligibility criteria required

CPT = Current Procedural Terminology; HCPCS = Healthcare Common Procedure Coding System; POS = place of service.

Exhibit A.2.5.6. NPPES behavioral health specialist taxonomy codes

Provider taxonomy code	Description
	Nurse Practitioner
363LP0808X	Psychiatric/Mental Health
102L00000X	**Psychoanalyst**
103T00000X	**Psychologist**
103TA0400X	Addiction (Substance Use Disorder)
103TA0700X	Adult Development & Aging
103TB0200X	Cognitive & Behavioral
103TC1900X	Counseling
103TE1000X	Educational
103TE1100X	Exercise & Sports
103TF0000X	Family
103TF0200X	Forensic
103TH0004X	Health
103TH0100X	Health Service
103TM1700X	Men & Masculinity
103TM1800X	Mental Retardation & Developmental Disabilities
103TP0016X	Prescribing (Medical)
103TP0814X	Psychoanalysis
103TP2700X	Psychotherapy
103TP2701X	Group Psychotherapy
103TR0400X	Rehabilitation

Provider taxonomy code	Description
103TW0100X	Women
103TC0700X	Clinical
173F00000X	Sleep Specialist, PhD
103G00000X	**Clinical Neuropsychologist**
	Therapist
106H00000X	Marriage & Family Therapist
102X00000X	Poetry Therapist
222Q00000X	Developmental Therapist
225A00000X	Music Therapist
225800000X	Recreation Therapist
225600000X	Dance Therapist
221700000X	Art Therapist
225700000X	Massage Therapist
226000000X	Recreation Therapist
101Y00000X	**Counselor**
101YM0800X	Mental Health
101YA0400X	Substance Use Disorder/Addiction
225C00000X	Rehabilitation Counselor
101YP1600X	Pastoral
101YP2500X	Professional
101YS0200X	School
	Clinical Nurse Specialist
364SN0800X	Neuroscience
364SP0808X	Psychiatric/Mental Health
364SP0809X	Psychiatric/Mental Health, Adult
364SP0811X	Psychiatric/Mental Health, Chronically Ill
364SP0812X	Psychiatric/Mental Health, Community
364SP0813X	Psychiatric/Mental Health, Geropsychiatric
	Registered Nurse
163WP0808X	Psychiatric/Mental Health
163WP0809X	Psychiatric/Mental Health, Adult
163WA0400X	Addiction (Substance Use Disorder)
163WP0000X	Pain Management
	Occupational Therapist
225XN1300X	Neurorehabilitation
225XM0800X	Mental Health Specialization
	Internal Medicine
207RA0401X	Addiction Medicine
	Family Medicine

Provider taxonomy code	Description
207QS1201X	Sleep Medicine Specialization
207QA0401X	Addition Medicine
	Psychiatry & Neurology
2084N0600X	Clinical Neurophysiology
2084N0400X	Neurology
2084N0402X	Neurology with Special Qualifications in Child Neurology
207T00000X	Neurological Surgery
2084N0008X	Neuromuscular Medicine
2084P0005X	Neurodevelopmental Disabilities
2084P0015X	Psychosomatic Medicine
2084P2900X	Pain Medicine
2084S0010X	Sports Medicine
2084S0012X	Sleep Medicine
2084V0102X	Vascular Neurology
2084B0040X	Behavioral Neurology & Neuropsychiatry Specialty
2084A2900X	Neurocritical Care
2084B0002X	Bariatric Medicine
2084P0301X	Brain Injury Medicine
2084F0202X	Forensic Psychiatry
2084H0002X	Hospice and Palliative Medicine
2084P0800X	Psychiatry
2084P0802X	Addiction Psychiatry
2084P0805X	Geriatric Psychiatry
2084B0040X	Behavioral Neurology & Neuropsychiatry Specialty
2084D0003X	Diagnostic Neuroimaging
2084A0401X	Addition Medicine
	Preventative Medicine
2083A0300X	Addiction Medicine
	Social Worker
1041C0700X	Clinical
1041S0200X	School
103T00000X	**Psychologist**
103TS0200X	School

Source: NPPES.

NPPES = National Plan and Provider Enumeration System.

Observation stays

We define observation stays as ED visits that do not result in an inpatient stay, with eight or more billed hours of hospital observation services. We start from our overall measure of ED visits and observation stays, described in the Primary-care-substitutable ED visit measure. We then identify a subset of these visits as observation stays if they have eight or more revenue center units with a HCPCS procedure code of G0378 (hospital observation services per hour).

Telehealth use

We identified a subset of ambulatory visits as non-face-to-face using three selection criteria:

- Visit procedure codes such as telephone and online E&M, telephone and online assessment and management, chronic care remote patient monitoring, and virtual check-ins
- Visits with a modifier value of 95, GT, GQ, G0, or FR indicating a telehealth visit or 93 or FQ (audio only)
- Visits identified on the carrier file that have the place of service equal to 02 (telehealth provided other than in a patient's home) or 10 (telehealth provided in a patient's home)

Urgent care visits

We identify urgent care center (UCC) visits from carrier claims with a place of service code of 20 and from claim lines in the outpatient file with a revenue code of 516 or 526. If there are multiple UCC visits with the same date of service, we count only the first to appear in the file.

Days in hospice for beneficiaries receiving hospice care

This measure assesses the number of days a beneficiary spent in hospice care in a given year. To identify days in hospice care, we first sort hospice claims by beneficiary identification number, from date, and through date. We then combine claims with overlapping dates of service into a single hospice span. Then, we calculate the days in each span by calculating the difference between the through date and the from date on the span and adding one. Finally, we sum the days in the span over the analysis year. We do not observe claims in the hospice file that span the first or last day of any given calendar year. We include denied claims in hospice span creation to comprehensively account for services received by beneficiaries.

Low-value services (primary care adjacent)

We adapt an existing low-value services measure (Schwartz et al. 2014, 2019) and classify a subset of low-value services as primary care adjacent when they are commonly performed, ordered, or referred by primary care physicians and therefore more influenced by primary care physicians' decisions. The original measure identifies 31 low-value services that provide little to no benefit to patients, can cause patient harm or result in unnecessary costs, and can be reasonably detected in Medicare claims. We use a four-item measure that includes only the low-value services with the highest proportion of services categorized as primary care adjacent (see Exhibit A.2.5.7).

Beneficiaries are included in the measure if they have been continuously enrolled in Medicare Part A and B FFS and had Medicare as their primary payer for the measurement year and previous year, and are alive at the end of the analysis period. We search carrier and outpatient files for claims with relevant CPT or HCPCS codes to identify beneficiaries who meet denominator criteria and received a primary care–adjacent low-value service within the measurement year. We then calculate the number of primary care–adjacent low-value services each beneficiary received in each year.

Exhibit A.2.5.7. Primary care–adjacent low-value services

Numerator description	Denominator description
Prostate-specific antigen (PSA) testing	Men over age 75
Sigmoidoscopy, colonoscopy, barium enema or blood occult test for colon cancer screening	Patients over age 85
Total or free triiodothyronine (T3) level testing	Patients with hypothyroidism diagnosis
1,25-Dihydroxyyvitamin D testing	Patients with no hypercalcemia diagnosis in the past 30 days and no history of secondary hyperparathyroidism, conditions related to non-PTH mediated hypercalcemia, or chronic kidney disease (CKD)

PTH = Parathyroid hormone,

Proportion of eligible beneficiaries who received a transitional care management–billable service

We identified transitional care management services from claim lines in the carrier and outpatient files with an HCPCS code of 99495 or 99496 (Transitional care management services with moderate or high medical decision complexity, respectively).

Proportion of inpatient discharges, ED visits, or observation stays with follow-up billable service within seven days

We use this measure to identify acute hospitalizations, ED visits, or observation stays followed by an E&M visit with a primary care provider or specialist within seven days after discharge. We exclude hospitalizations, ED visits, or observation stays that ended with a patient's death or discharge against medical advice; occurred for cancer treatment, psychiatric conditions, or rehabilitation, because these procedures are often specific to unique treatment facilities that are not comparable with acute care hospitals; or were terminated in a transfer to another institutional provider. We also exclude hospitalizations lasting longer than one year. We then define discharges as having follow-up care if the beneficiary had a primary care or specialist E&M visit in any setting up to seven days after the discharge date. We exclude visits with behavioral health specialists from our definition of follow-up care.

Proportion of eligible beneficiaries who adhere to medications prescribed for multiple chronic conditions

This measure[29] estimates the degree of medication adherence for beneficiaries with chronic conditions by determining whether the beneficiary had prescription coverage for at least 75 percent of their chronic condition medications at least 80 percent of eligible days in the year. We limit the denominator for this measure to beneficiaries age 18 or older with continuous Medicare FFS enrollment for Part A, B, and D for the entire year. Beneficiaries must also have at least one dispensing event in the Part D file for an eligible medication in at least three distinct diagnostic categories (Exhibit A.2.5.8).

We first separately determine the proportion of days covered (PDC) for 29 target medication classes under seven diagnostic categories using specifications and value sets from the Pharmacy Quality Alliance (PQA) for PDC in 2023. Beneficiaries are excluded from the denominator of specific medication classes if they (1) have ESRD, (2) received hospice care in the year, (3) filled a prescription for insulin, (4) filled a prescription for sacubitril or valsartan (Entresto), or (5) were hospitalized for a psychiatric condition in the year.

Exhibit A.2.5.8. Diagnostic categories, medication classes, and exclusion criteria

Diagnostic category	Medication class	Exclusions
Diabetes	• Biguanides • Sulfonylureas • Thiazolidinediones • DPP-4 inhibitors • Meglitinides • SGLT2 Inhibitors • GLP-1 Receptor Agonists • Alpha-Glucosidase inhibitors	• ESRD • Hospice care • Prescription for insulin
Hypertension	• ACE Inhibitor • Direct Renin Inhibitor • Angiotensin II Receptor Blocks (ARB) • Beta-blockers • Calcium channel blockers • Alpha-Beta Blockers • Selective aldosterone receptive antagonists	• ESRD • Hospice care • Prescription for sacubitril/valsartan
Hyperlipidemia	• Antihyperlipidemics (including statins) • Antihyperlipidemics – bile acid sequestrants	• ESRD • Hospice care
Asthma	• Inhaled Corticosteroids • Leukotriene Inhibitors	• Hospice care

[29] Modified from the measure described by Farley et al. (2019).

Diagnostic category	Medication class	Exclusions
Depression	• Other Antidepressants • Serotonin-norepinephrine reuptake inhibitors (SNRIs) • Monoamine Oxidase Inhibitors (MAOIs) • Selective Serotonin Reuptake Inhibitors (SSRIs)	• Psychiatric hospitalization
Other mental health condition	• Antipsychotic – first and second generation • Antimanic agents • Antiparkinson's agents • Epilepsy medications	• Psychiatric hospitalization

ACE = Angiotensin-converting enzyme; ESRD = end-stage renal disease.

We then calculate the number of eligible days for each diagnostic category as the number of days from the first dispensing event to the end of the measurement year. We also calculate the number of days' supply for medications in each diagnostic category from all the dispensing events identified in the Part D prescription drug event data during the measurement year. We allow different medication classes from the same diagnostic category to count toward the number of days' supply for that category. If two or more prescriptions overlap and cover the same calendar days, we count these days toward the number of days' supply for that category only once. Finally, we divide the number of days' supply by the number of eligible days to determine the proportion of days covered. If the PDC is greater than 0.80 for at least three diagnostic categories, the beneficiary is considered medication-adherent for multiple chronic conditions.

Proportion of elderly beneficiaries experiencing high-risk medication use

This measure is based on the 2022 specifications of the Healthcare Effectiveness Data and Information Set (HEDIS®) High Risk Medications in the Elderly measure developed and maintained by the National Committee for Quality Assurance (NCQA).[30] We restrict the denominator to beneficiaries who were age 65 or older at the end of the measurement year and continuously enrolled in Medicare Part A, B, and D for the entire year. We also exclude beneficiaries who used hospice services at any time in the measurement year. We identify prescriptions filled for three classes of drugs in the Part D prescription drug event data: (1) high-risk medications with any dose or duration, (2) high-risk medications crossing a specified threshold for days' supply, and (3) high-risk medications crossing an average daily dose threshold (listed in Exhibit A.2.5.9). We classify beneficiaries as having high-risk medication use if they filled two or more prescriptions for medications with a high-risk designation in the same class within the measurement year.

[30] Full copyright, disclaimer, and use provisions related to the NCQA measures are available at https://www.cms.gov/priorities/innovation/about/notices-disclaimers.

Exhibit A.2.5.9. High-risk medication drug classes

Medication classes
High-risk medications at any dose or duration
Anticholinergics, first-generation antihistamines
Anticholinergics, anti-Parkinson agents
Antispasmodics
Antithrombotics
Cardiovascular, alpha agonists, central
Cardiovascular, other
Central nervous system, antidepressants
Central nervous system, barbiturates
Central nervous system, vasodilators
Central nervous system, other
Endocrine system, estrogens with or without progestins; includes only oral and topical patch products
Endocrine system, sulfonylureas, long-duration
Endocrine system, other
Nonbenzodiazepine hypnotics
Pain medications, skeletal muscle relaxants
Pain medications, other
High-risk medications if exceeding days' supply threshold
Anti-infectives, other
High-risk medications if exceeding average daily dose threshold
Reserpine
Digoxin
Doxepin/Doxepin hydrochloride

A.2.6. Details of the hybrid frequentist–Bayesian methodological approach

A. Motivation

We supplemented the main impact estimates described in a previous section of this appendix with Bayesian impact estimates. We used a Bayesian approach to estimate impacts on primary and secondary outcomes for the PCF population overall and for select subgroups, as we describe in more detail in the following sections.

Bayesian models offer two main advantages over the frequentist models we used for the main impact analysis. First, unlike frequentist analysis, Bayesian analysis enables us to draw probabilistic conclusions through statements such as, "There is a greater than 99 percent chance that PCF increased Medicare expenditures." The *p*-value from a frequentist analysis, by contrast, represents the probability that an estimate as extreme as the one observed could have arisen by chance, if the null hypothesis were true—a statement that is hard to express in plain language and often does not align with the research question of interest. Second, Bayesian analysis enables us to borrow strength across related subgroups

(that is, learn about a single subgroup from patterns across subgroups), which heightens the precision of impact estimates by subgroup.

The advantages of Bayesian methodology typically come at high computational cost; Bayesian models require much more computational effort and time to estimate than frequentist models do. For PCF, we refined a hybrid frequentist–Bayesian methodology, hereafter called the hybrid Bayesian approach, designed to reduce computation time by building directly on the impact estimates from the primary frequentist analysis. We supplement the main impact estimates described above with Bayesian impact estimates

B. Hybrid Bayesian methodology

Following Lipman et al. (2022), we used a two-stage modeling strategy that paired a frequentist difference-in-differences regression with a Bayesian meta-regression. In the first stage, we fit a frequentist difference-in-differences regression to practice-level data, as described in Section A.2.4. This regression analysis adjusted for covariates, applied matching and observability weights, used cluster-robust standard errors and, via seemingly unrelated regression (Zellner and Huang 1962), estimated the error covariance between different impact estimates. In the second stage, we fit a Bayesian meta-regression to the subgroup-specific impact estimates and their estimated variance-covariance matrix separately by outcome. This meta-regression explored variation in impacts between cohorts, across subgroups, and over time.

Compared with the approach of fitting a completely separate Bayesian impact regression, as Mathematica has done for past evaluations, building on frequentist impact estimates substantially improves alignment between the Bayesian and frequentist results while increasing efficiency. Because Bayesian models are so computationally intensive and mathematically distinct from frequentist models, it is typically not feasible for a Bayesian approach to mirror the primary frequentist approach exactly.[31] Even with a modified regression specification, Bayesian models take longer to run than frequentist models and, consequently, are more difficult to refine. Constructing Bayesian models atop the foundations laid by the frequentist approach leads to a more consistent message across methods and a more efficient process.

By adjusting the frequentist impact estimates using a Bayesian meta-regression, we gain the advantages of the Bayesian framework. Namely, we can borrow strength across subgroups to improve the precision and plausibility of the impact estimates and simultaneously adjust for multiple comparisons across subgroups (Gelman et al. 2012). Because frequentist approaches consider each subgroup in isolation, they often produce extreme and highly uncertain estimates. The Bayesian approach of borrowing strength and considering all subgroups simultaneously allows for more precision without overinterpreting noise in the data. The built-in multiple comparison adjustment also avoids a common double-bind in frequentist analyses, when failing to account for multiple comparisons could lead researchers to identify spurious impacts but correcting for multiple comparisons using traditional strategies could lead researchers to fail to identify true impacts.

[31] For example, frequentist regressions often use cluster-robust standard errors, which are not compatible with a Bayesian approach.

Data. We estimated hybrid Bayesian models for the two primary evaluation outcomes, Medicare expenditures and acute hospitalizations, and for the seven secondary evaluation outcomes (Exhibit A.2.6.1).[32] Further, for select outcomes, we estimated impacts for the overall sample and for the beneficiary-level and practice-level subgroups listed in Exhibit A.2.6.1. We estimated impacts for each cohort for each available performance year (that is, performance years 1, 2, and 3 for Cohort 1 and performance years 1 and 2 for Cohort 2).

Exhibit A.2.6.1. Outcomes and subgroups included in the hybrid Bayesian models

Outcomes	Subgroups
Primary outcomes • Total Medicare Part A and B expenditures • Acute hospitalizations **Secondary outcomes** • Outpatient ED visits (including observation stays) • Inpatient expenditures • Medical admissions • Post-acute care expenditures • Proportion of inpatient discharges with unplanned 30-day acute care • Proportion of inpatient discharges with unplanned 30-day readmissions • Primary-care-substitutable ED visits	**Beneficiary subgroups**[a] • Beneficiaries with behavioral health conditions (yes, no, other) • Medicare FFS-Medicaid dually eligible beneficiaries **Practice subgroups** • Practices affiliated with a health system • Practices with prior participation in CPC+ • Practices that participated in the Medicare Shared Savings Program at the start of PCF • Multispecialty practices

[a] Impact estimates in the "other" subgroups were estimated and incorporated into the hybrid Bayesian model to improve model fit but were not reported because impacts on these subgroups would be imprecise or difficult to interpret.

CPC+ = Comprehensive Primary Care Plus; ED = emergency department; FFS = fee for service; PCF = Primary Care First.

The input data for the hybrid Bayesian meta-regression model were impact estimates and the corresponding variance-covariance matrix for each outcome. We converted all of these inputs to the percentage impact scale to make them comparable across outcomes and with prior evidence. We rescaled the data by dividing the impact estimate by the estimated counterfactual (that is, the overall average outcome mean in the PCF group in the performance period minus the impact estimate). Impact estimates represented all available combinations of the outcomes, cohorts, subgroups, and performance years listed in the previous paragraph.

Modeling approach. The hybrid Bayesian model took the form of a meta-regression, in which the response variable was the set of impact estimates from the frequentist difference-in-differences regression and the predictor variables represented dimensions along which the impact estimates vary: the cohort, subgroup, and performance year. We fit separate meta-regressions for each outcome to guard against anticonservative standard errors, which would result from summarizing across outcomes

[32] We did not estimate hybrid Bayesian models for leading indicators because the evaluation's logic model does not establish hypotheses for how PCF should affect these indicators; without such hypotheses, it is difficult to calculate and interpret probability statements describing model impacts.

in a single meta-regression without appropriately accounting for both error and signal correlations among them.[33]

For each outcome, we fit a separate meta-regression taking the following form:

$$y_g \sim MVN\left(\theta_g,\ V\right)$$

In this model, y_g represents the frequentist impact estimate for a certain combination g of subgroup, cohort, and performance year for the outcome of focus. We assume the frequentist impact estimates have a multivariate normal (MVN) distribution centered on a vector of true underlying effects θ_g, with error covariance matrix V estimated as part of the frequentist regression analysis. We model the true underlying effects θ_g as a sum of an overall effect α and offsets representing the contributions to the effect of each cohort (θ^{Cohort}), performance year (θ^{Year}), and subgroup ($\theta^{Subgroup}$):

$$\theta_g = \alpha + \theta^{Cohort}_{c[g]} + \theta^{Year}_{t[g]} + W_g \cdot \theta^{Subgroup} + W_g \cdot \theta^{SubgroupYr}_{t[g]} + W_g \cdot \theta^{SubgroupChrt}_{c[g]} + \theta^{CohortYr}_{t[g],c[g]} + \theta^{Finding}_g + \omega^{Diverge}_g$$

In addition to the main effects of cohort, performance year, and subgroup, we also modeled the pairwise interactions between these factors. We included a finding-level random effect, $\theta^{Finding}_g$, which captures any variation in true effects at the level of the cohort-subgroup-year impact estimate, thereby implicitly incorporating higher-level interactions. We assume $\theta^{Finding}_g$ is normally distributed with variance σ^2_θ.

When estimating the relationship between each subgroup's impact estimate and the overall impact estimate, we accounted for sample overlap across subgroups. To do this, we relied on a matrix of weights W that describes the composition of each subgroup in terms of the other subgroups (for example, the proportion of system-affiliated CPC+ participant practices). This approach extends Lipman et al. (2022) by streamlining the set of frequentist impact estimates required as input while capturing correlations across subgroups and ensuring our impact estimates are coherent across subgroups and the overall sample.

Finally, $\omega^{Diverge}_g$ incorporates additional uncertainty in impact estimates where outcome trends between the PCF and comparison sample might have diverged before the intervention. Because a divergence in baseline trends signals a possible violation of the assumptions of our frequentist difference-in-

[33] Error correlation between outcomes arises from sample overlap (that is, because we use the same sample of beneficiaries to estimate impacts on both Medicare expenditures and acute hospitalizations). We can account for this type of correlation through the variance-covariance matrix V in the model. Signal correlation, by contrast, represents the conceptual overlap between two outcomes: the extent to which they represent different dimensions of the same underlying construct. For example, we might think of Medicare expenditures and acute hospitalizations as reflecting a latent patient health outcome. To the extent that a pair of outcomes is correlated in this way, treating them as distinct observations in our meta-regression will lead us to overstate the precision of our estimates and reach overconfident conclusions. In simulation, we found that candidate models that incorporated multiple outcomes and attempted to model signal correlations across them tended to produce slightly less accurate probability statements than those estimating a separate meta-regression for each outcome. For this reason, we do not attempt to fit a single meta-regression across outcomes.

differences regression approach, we assessed differences in outcome trends between PCF and comparison practices during the baseline years (Section A.2.4). For outcomes or subgroup-outcome combinations that failed those baseline trends assessments, we do not report either frequentist or hybrid Bayesian impact estimates in the main text of this report. To retain as much information as possible in the meta-regression, however, we used all impact estimates to fit the hybrid Bayesian models, even those for subgroup and outcome combinations that failed our parallel trends assessment, as we described in Section A.2.4. To acknowledge our lower confidence in impact estimates that fail the parallel trends assessment, we include the term $\omega_g^{Diverge}$, adding uncertainty proportional to the observed difference in baseline slopes; the larger the difference in baseline slopes, the greater the uncertainty. Specifically, we assume this term follows a multivariate normal distribution with mean 0 and a variance-covariance matrix that incorporates two components. First, the variance of each $\omega_g^{Diverge}$ term equals $\tau^2 + d_g^2$, where d_g represents the estimated divergence between PCF and comparison practices for each outcome and subgroup from the parallel trends assessments, and τ represents the standard deviation across d_g. Second, this variance-covariance matrix incorporates a correlation structure identical to the correlation structure of V, encoding our understanding that overlap in the samples used to compute different estimates induces correlation. In this way, $\omega_g^{Diverge}$ adds variance to the model proportional to the magnitude of the trend difference without directly contributing to the mean.

To promote model stability, we imposed sum-to-zero constraints on some pairs of parameters (for example, the main effects of each cohort and performance year). These constraints ensure cohort- or performance year-specific impact estimates average to the overall impact estimate, strengthening the logical coherence of the parameter estimates.

Prior distributions. In the Bayesian paradigm, we must also provide prior distributions that describe the likely distributions of each model parameter. When possible, we followed the best practice in the literature of grounding our prior distributions in real-world evidence. To that end, we conducted a literature review of evaluations of health care policy interventions similar to PCF (Exhibit A.2.6.2) and estimated a meta-regression that synthesizes their findings. As in our main analysis, we conducted the meta-analysis on the percentage impact scale to facilitate comparisons across studies and outcomes.

Exhibit A.2.6.2. Health policy interventions included in the PCF literature review

Intervention name
Comprehensive Primary Care Plus (both tracks)
Comprehensive Primary Care initiative
Multi-Payer Advanced Primary Care Demonstration
Medicare Shared Savings Program
Federally Qualified Health Center Advanced Primary Care Practice Demonstration
ACO Investment Model
Advance Payment ACO Model
Medicare Advantage Value-Based Insurance Design
Million Hearts Cardiovascular Disease Risk Reduction Model

Intervention name
Next Generation ACO Model
Vermont All-Payer ACO Model
Health Care Innovation Awards—Round 1 (selected awardees)
Health Care Innovation Awards—Round 2 (selected awardees)

We used the findings of the meta-regression to inform the priors for several parameters in our analysis of PCF data. First, we used the meta-regression to inform the prior distribution of the overall intercept term, denoted α. Because the PCF impact analysis is outcome specific, we used the evidence base meta-regression to derive a different prior distribution for each outcome, reflecting the impacts observed on that outcome in past interventions that are similar to PCF.

When an outcome analyzed for PCF appeared in the meta-regression, we used information about the average impact for this outcome to develop a prior for the intercept term in that regression (Exhibit A.2.6.3). The PCF impact analysis, however, includes many more outcomes than we could include in our evidence base. In these cases, we first relied on the average impact estimated for outcomes in the same domain—one of expenditures, hospitalizations, ED visits, or readmissions—and increased the prior's standard deviation to reflect variation across the effects of specific outcomes within a domain.

Second, we used the meta-regression to inform prior distributions that describe the amount of variation we expect to see across impacts for cohorts, performance years, and subgroups for a single outcome. These parameters are the crux of the Bayesian models, determining how much strength to borrow. For this reason, it is especially important to draw on evidence from the literature to stabilize our estimates and maximize the usefulness of the Bayesian approach.

Exhibit A.2.6.3. Prior distributions used in the hybrid Bayesian analysis

Model parameter	Location[a]	Scale[b]
Intercept terms (normally distributed)		
Acute hospitalizations	-0.003	0.053
Medicare Part A and B expenditures	0.015	0.054
Inpatient expenditures	-0.001	0.053
Post-acute care expenditures	-0.002	0.053
Days at home for patients with complex chronic conditions	-0.005	0.054
Medical admissions	-0.002	0.054
Outpatient ED visits	-0.008	0.053
Primary-care-substitutable ED visits	-0.005	0.054
Proportion of inpatient discharges with unplanned 30-day acute care	-0.004	0.054
Proportion of inpatient discharges with unplanned 30-day readmission	-0.004	0.053

Model parameter	Location[a]	Scale[b]
Variance components (Gamma-distributed)		
Variation across impacts by cohort, performance year, and subgroup	5.2066	0.0055

Note: All prior distributions are on the scale of percentage impacts, so, for example, the prior mean of -0.003 for acute hospitalizations represents an expected decrease of 0.3 percent. The standard deviations of roughly 5 percent indicate that 95 percent of interventions are expected to have impacts within +/- 10 percent.

[a] For intercept terms, the location parameter is the mean of the distribution; for the variance component, it is the shape of the distribution.

[b] For intercept terms, the scale parameter is the standard deviation of the distribution; for the variance component, it is the scale of the distribution.

ED = emergency department.

Model fit. In general, a complex Bayesian model such as the one implemented in the hybrid Bayesian approach does not have a solution that can be calculated exactly from an equation. Instead, we simulated from the model using a class of techniques known as Markov chain Monte Carlo (MCMC), using a recently developed probabilistic programming language called Stan (Stan Development Team 2023). We ran the simulation for 4,000 iterations for each outcome. Even with many iterations under the most current techniques, MCMC provides an approximation of the solution, so it is important to evaluate the simulation's accuracy and stability. To accomplish this, we checked two common diagnostics. The first of these is the Gelman-Rubin statistic (Gelman and Rubin 1992), which assesses whether the model has converged. The second is the effective sample size (Geyer 1992), which reflects the degree of uncertainty in our parameter estimates that arises from the simulation. In our analysis, all diagnostics indicated that models had converged and had sufficient effective sample size.

To gauge model fit, we performed posterior predictive checks (Gelman et al. 1996). These checks exploit the notion that a well-fit Bayesian model should describe the process that generated the input data; thus, samples drawn from the posterior, the probability distribution implied by the model, should align with the input data. We took samples from our model and compared the distribution of the samples with the distribution of the frequentist impact estimates we used as inputs. We found that data sets generated from our models aligned well with descriptive statistics—minimum, mean, maximum, and standard deviation—of the input data, by cohort and performance year.

Calculating impact estimates. From the hybrid Bayesian model, we obtained an estimate of PCF's impact on each outcome in each subgroup, cohort, and performance year. Mirroring the frequentist approach, we applied cohort-share weights to aggregate estimates across cohorts in the first and second performance years; estimates in the third performance year reflect Cohort 1 data only.

Interpreting and communicating results

In the results supplement (Appendix B.7), we present posterior means and standard errors for PCF's impact on the primary and secondary outcomes in the first three performance years, for the overall sample and subgroups of interest in this report. In addition, in Chapter 5, for each outcome, we present the probability of a favorable impact in the overall sample in each performance year (that is, the probability that PCF led to a reduction in outcomes in that year).

A.2.7. Sensitivity analyses to the effects of PCF

Here, we describe analyses testing the sensitivity of our frequentist and Bayesian estimates of PCF's effects. In each test, we examine how results change after altering an important choice we made specifying our estimation method. In general, the choices we examine with these tests had credible alternatives, and the tests are meant to safeguard against any of these choices being the sole reason we reach a conclusion about model effects. The complete results for all sensitivity tests are in Appendix B.6.

We implemented these tests in the analyses of our two main outcomes, total Medicare Part A and B expenditures and acute hospitalizations, for our overall estimates. We organize our tests by whether they apply to our frequentist method (Section A.2.7.1) or our hybrid frequentist–Bayesian method (Section A.2.7.2). Refer to Appendix A.2.4 and A.2.6 respectively for discussions of those methods. If sensitivity analyses showed clearly contrary results to our other analyses, we would interpret those results in light of the methodological choices to which they are sensitive. We have used the same p-value criteria and conducted the same testing for parallel outcome trends for the sensitivity tests as we did for the frequentist analysis described in Appendix A.2.4.

A. Frequentist sensitivity analyses

We performed eight sensitivity tests for our frequentist regression models.

Adjust for practice closure

Practice closure during the model could lead to differential patterns of beneficiary attribution between intervention and comparison practices. Practice closures affect attribution because, after a practice closes, the practice can no longer provide attribution-qualifying primary care visits. For this sensitivity test, we dropped a matched set (that is, a PCF practice and its matched comparisons) after one or more practices in the matched set closed to help maintain similar patterns of beneficiary attribution between intervention and comparison practices. If results from this test differ meaningfully from the main ITT estimates, that would indicate practice closure is occurring between PCF and comparison practices in such a way that is leading to important differences in ongoing beneficiary attribution and outcomes.

Alter the data source for identifying PCF practitioners

We assessed whether impact results differed based on the source of practitioner identifiers used to attribute beneficiaries to PCF practices. Specifically, we defined the intervention group using Medicare beneficiaries attributed and assigned (see Appendix A.2.1) according to CMS' list of PCF-participating NPI-TINs rather than NPIs from OneKey and inferred TINs from the Medicare claims data. Beneficiaries at the comparison practices were still attributed using OneKey NPIs and inferred TINs, and the logic to assign beneficiaries to practices did not change. The degree to which these results differ from our main ITT estimates helps us gauge the importance of differences between the evaluation's attributed population (based on OneKey data) and CMS' payment-attributed population for estimating the effects of PCF.

Remove beneficiaries who stopped receiving care from PCF practices during PCF

Beneficiaries in the intervention group who stop receiving care from PCF practices (that is, are no longer attributed to them) during the baseline or intervention periods could influence our main ITT estimates. Removing these beneficiaries from the analytic population could influence estimates because (1) the impacts of PCF wane (or grow) with time since last (or first) attribution or (2) the still-attributed population differs from the full assigned population in terms of demographic or health characteristics that affect model impacts. In this sensitivity test, we remove non-attributed beneficiaries from our analysis for the intervention and comparison groups. We do this instead of following an ITT definition of the beneficiary sample in which, once they are attributed, beneficiaries stay in the analytic population for all subsequent years in the period (baseline or intervention) that they remain Medicare FFS beneficiaries with Medicare as the primary payer.

Remove baseline period observations for beneficiaries who did not ultimately receive care from a PCF practice or comparison practice during PCF

Changes in sample composition between the baseline and intervention periods may occur differently for PCF and comparison practices. For example, after entering PCF, some practices could have stopped treating certain populations they believed increased their risk of adverse model outcomes. For this sensitivity test, we limited the analytic population to include only beneficiaries assigned to a PCF or comparison practice at some point during the intervention period. The intervention period observations were the same as the intervention period observations used for the main analysis, but the baseline period observations dropped beneficiaries that (1) were assigned to PCF or comparison practices during the baseline period and not the intervention period, or (2) switched intervention arm or cohort between the baseline and intervention periods. If results of this test differed meaningfully from the main ITT estimates, it would indicate that changes in the types of patients that PCF and comparison practices served between the baseline and intervention periods influenced our impact estimates.

Remove beneficiaries who were added to the analytic population over time

Differences could occur between PCF and comparison practices in the number and type of beneficiaries added to the assigned population over time because different types of beneficiaries could be attracted to receive care at PCF versus comparison practices. For this test, we limited the analytic population to include only beneficiaries attributed in the first quarter of the baseline period and those attributed in the first quarter of the intervention period, removing any beneficiaries who joined the analytic population in later quarters of the baseline or intervention periods. This restriction eliminates any differences in how beneficiaries entered the analytic sample between PCF and comparison practices.

Remove PCF practices that could not be found in OneKey

About 10 percent of the participating PCF practices could not be found in our OneKey data source for identifying PCF practitioners. For these, we used PCF application data and practitioner rosters directly from the practices to attribute beneficiaries and define practice characteristics (see Appendix A.2.1). To assess whether this data substitution influenced our results, we analyzed effects after dropping these practices and their matched comparison practices.

Trim beneficiaries' Medicare Part A and B expenditures

Medicare expenditures, one of our primary outcomes, is a skewed outcome (as opposed to normally distributed), with some beneficiaries having much higher than average expenditures. We examined whether these beneficiaries have a large influence on our impact estimates, either because the effects of PCF are heterogenous by level of Medicare expenditures or because extreme values in the expenditures distribution are heavily influencing our linear regression models.

Alter the level of clustering

There is some uncertainty about the appropriate level of clustering for estimating the effects of PCF. To cluster at the same level that CMS assessed eligibility for PCF participation, the main estimation approach clusters by individual practices in our data. Some PCF practices, however, are part of larger health provider organizations, and we are aware from our interview findings that some organizations made PCF participation decisions as a unit. For this sensitivity test, we therefore clustered by TIN and examined whether results differ meaningfully when clustering by TIN instead of practice site.

B. Hybrid frequentist–Bayesian sensitivity analyses

We performed two sensitivity tests for our Hybrid frequentist–Bayesian models.

Assume PCF had no expected effect on average

For the main hybrid frequentist–Bayesian analysis, we rely on information from the literature of past program evaluations to set prior distributions, which represent the expected average effect and range of likely effects for each outcome. Drawing on the literature for the average effect of each outcome means that, in the absence of countervailing evidence from PCF data, the hybrid frequentist–Bayesian model expects that PCF is likely to perform similarly to past interventions.

For this sensitivity test, we instead zero-center the prior distribution. Zero-centering the prior distributions (that is, assuming the average effect of past interventions—and therefore the expected effect of PCF—was zero) enables us to assess how much the evidence from past studies influences our results relative to evidence from PCF. For example, if we found that zero-centering the prior distributions led to less favorable results than the main specification, we would conclude that evidence of favorable effects from past studies had influenced the main results.

Increase and decrease the range of expected effects of PCF

In addition to determining the average effect for each outcome, the evidence-based prior distributions we used in the hybrid frequentist–Bayesian approach determine the expected range of likely effects for each outcome. In two sensitivity tests, we (1) strengthened these prior distributions by dividing the range of likely effects in half and then (2) weakened them by multiplying the range of likely effects by two. These tests help us gauge how sensitive our results are to the evidence from past studies. For example, if weakening the prior distributions meaningfully changed the results, we would conclude that the evidence from PCF data is not strong relative to the evidence from past studies included in our prior distributions.

A.2.8. Details of the PBA analysis

A. Motivation

CMS incentivizes practices participating in PCF to provide high-quality care by positively adjusting model payments (PBP and FVF) or by negatively adjusting model payments in case of low performance with the PBA. For the PBA to effectively incentivize practices to achieve better beneficiary outcomes, bonus payments would ideally reward true improvements in practice performance and not merely reward luck or practices that already performed highly before PCF. The goal of the PBA analysis presented in Chapter 6 is to assess whether PBA payments align with true practice performance—captured by estimated model impacts—on acute hospitalizations.

We analyze the relationship between measures of practice performance and PBA using regression analyses and graphs. We describe both components (PBA in payments and estimated practice performance) in more detail in the next two subsections. In brief, we used PBA payments based on practices' performance during 2023 and developed a method that combines a Bayesian approach with machine learning to estimate practice-specific impacts on total Medicare expenditures and acute hospital use. Our approach to estimate practice performance yielded a plausible range rather than a single value, so we assessed how this range related to the observed PBA payments. We describe the details in the last subsection of this appendix. We present the findings from this analysis in Chapter 6.

B. Calculating PBA

We express PBAs as percentages applied to both PBP and FVF, ranging from -10 to +50 percent. (See Chapter 1 for an overview of the PBA and other PCF payment components.) For practices in risk groups 1 and 2, which we consider in this analysis, the PBA depends on attributed beneficiaries' acute hospital use. Only practices that exceed the Quality Gateway qualify for a positive PBA. Beginning in the third performance year, practices not exceeding the Quality Gateway receive a PBA of –10 percent. Otherwise, CMS compares practices acute hospital use with a national benchmark. Practices below the 50th percentile of this benchmark receive a PBA of –10 percent if they are below the 25th percentile of practices in their peer region and 0 percent otherwise. Practices above the 50th percentile of the benchmark and below the 25th percentile of practices in their peer region receive a PBA of –10 percent. Practices above the 50th percentile of the benchmark and above the 25th percentile of practices in their peer region receive a PBA between 0 and 34 percent depending on where they are in the percentile of practices in their peer region. In addition to these adjustments, practices can earn a Continuous Improvement bonus of 3.5 to 16 percent. The possible values of the overall PBA percentage are –10, –6.5, 0, 3.5, 6.5, 10, 13, 20, 27, 30, 34, 40, and 50 percent. (See Chapter 5 and especially the flowchart in Figure 5-1 of the PCF Payment and Attribution Methodology [Center for Medicare & Medicaid Innovation 2023]).

For this analysis, we focus on the PBA that practices received in quarter 2 2024. This PBA is determined by practice performance during the four quarters of 2023. We consider this PBA because we estimate annual practice-specific impacts for 2023.

C. Using aggregate Bayesian Causal Forest methodology to estimate practice performance

Background

Mathematica has developed aggregate Bayesian Causal Forests (aBCF) as an extension of Bayesian Causal Forests (BCF) (Hahn et al. 2020). aBCF shares with the hybrid frequentist–Bayesian approach we used for the PCF impact estimation the benefits of being able to make probabilistic statements (such as "there is a greater than 80 percent probability that PCF reduced Medicare expenditures by at least $2 PBPM"), as well as the benefits of borrowing strength, allowing for better estimation of effects for small subgroups.

aBCF offers benefits beyond the hybrid frequentist–Bayesian approach. First, it uses a flexible non-parametric estimation approach to account for confounding (as well as for estimating effect heterogeneity) rather than the traditional linear parametric model used in the frequentist approach. This flexibility allows the model to estimate nonlinear relationships and covariate interactions without the need to specify these terms in advance. Second, this flexibility allows us to estimate practice-specific impacts, which are necessary for the PBA analysis.

Similar to more conventional parametric Bayesian models, aBCF is computationally intensive. A key innovation of aBCF over its predecessors, however, is that it can use aggregate practice-level data rather than individual beneficiary-level data, thus reducing the computational burden.

Data

We used the same analytic sample from the main impact analysis to estimate the aBCF model for one of our primary evaluation outcomes, acute hospitalizations, separately by cohort. Because aBCF is not compatible with longitudinal data, we pre-processed the practice-year-level analytic data set to have one observation per practice, where the outcome of interest is the change in acute hospitalizations since baseline. This measure was constructed by taking the acute hospitalization rate in the most recent calendar year (2023, corresponding to performance year 3 for Cohort 1 and performance year 2 for Cohort 2) and subtracting the acute hospitalization rate during the baseline period (2019–2020 for Cohort 1 and 2020–2021 for Cohort 2, excluding the first two quarters of 2020 for both cohorts, as in the main impact analysis).

Modeling approach

aBCF simultaneously estimates the relationship between covariates and counterfactual outcomes (confounding) and the relationships between covariates and the treatment effect (effect modification). Specifically, aBCF estimates a model of the form

$$(1) \qquad \Delta y_j = \mu\left(X_j^c, \hat{\pi}_j\right) + z_j \tau\left(X_j^m\right) + u_j + \varepsilon_j$$

This model decomposes Δy_j, the change in the outcome variable y for practice j between baseline and follow-up, into each practice's counterfactual expectation μ_j, a practice-specific treatment effect τ (applicable only to PCF practices, those with $z_j = 1$), a practice idiosyncratic effect u_j, and an error term ε_j. Both μ and τ are functions of relevant covariates; μ is fit using covariates X_j^c that are

possible confounders and an estimated propensity score $\hat{\pi}_j$, while τ is fit using covariates X_j^m, which are possible effect modifiers.

μ and τ are fit using Bayesian additive regression trees (Chipman et al. 2010), the flexible non-parametric tree models from which BCF derives many of its advantages. Bayesian additive regression trees couple the strong predictive performance of tree models, which naturally incorporate nonlinear relationships and interactions, with Bayesian priors that limit these models' tendency to overfit the data (Hill et al. 2020).

Importantly, aBCF allows us to use different covariates as potential confounders (X_j^c, used to fit μ) versus potential effect modifiers (X_j^m, used to fit τ). It is common in causal inference for confounding and effect modification to reflect different covariates (Hernán and Robins 2020), and, in our case, X_j^m is a strict subset of X_j^c. Both X_j^c and X_j^m include covariates measured at the start of the baseline period, including regional covariates such as the social vulnerability index, practice covariates such as the number of primary care providers, and practice averages of beneficiary characteristics such as the share of beneficiaries who were dually eligible. X_j^c also includes three additional groups of covariates: (1) a series of state indicators; (2) the changes in practice characteristics between the start of the baseline period and the start of the intervention period; (3) changes in the practice averages of beneficiary characteristics between the start of the baseline period and the most recent performance year, reflecting changes in the beneficiary mix that the practice served. For the calculation of the change in averages of time-variant beneficiary characteristics, such as HCC score, we average among all beneficiaries assigned in 2023, using each beneficiary's score as measured at the beginning of the intervention period. We take this approach to avoid introducing endogeneity if, for example, PCF affected HCC scores during the intervention period.

As a Bayesian model, aBCF does not have an exact mathematical solution in the same way, for example, regression models using ordinary least squares do. Instead, aBCF relies on a technique called Markov chain Monte Carlo, in which we draw individual samples from the posterior distribution of each parameter. This means that aBCF doesn't yield a single point estimate for each parameter. Instead, we have thousands of samples, or draws, from the empirical posterior distribution for them.

We fit the model using inverse variance weights proportional to the precision with which the outcome is measured. Because our outcome is the *change* in the acute hospitalization rate, we need weights that reflect not just the total number of beneficiaries in the baseline and intervention periods but also the number of beneficiaries who are present in both periods because these beneficiaries' presence induces a covariance between baseline and intervention rates. We fit aBCF separately by cohort; because the practice samples are disjointed between the two cohorts, we do not need to account for any error correlation between the separate estimates.

Prior distributions

Bayesian models like aBCF use statistical distributions, called prior distributions, that are combined with the observed data to create final estimates during the process of fitting the model. A prior distribution

represents the values that, before considering the observed data, are supported as plausible values. Combining observed data with these distributions strengthens the resulting estimates by providing additional information, which increases precision and reins in implausible values.

The Bayesian priors used by aBCF for the structure of the trees that comprise μ and τ are the defaults recommended by Hahn et al. (2020). These priors are more permissive (in other words, less skeptical of larger magnitude covariate relationships) for the trees used to calculate μ, and the priors for the trees used for calculating τ are much less permissive. Hahn et al. prefer a more-permissive prior for μ because we are concerned with accounting for any confounding (modeled via μ) and worry about regularization-induced confounding, and a less-permissive prior might allow some true confounding relationship to persist. That is not a concern for τ, for which we want to appropriately shrink treatment effect estimates (which are generally much smaller than covariate-outcome relationships) and do not want to overfit the data.

The prior distribution for the variance of the error term ε_j is likewise left at the default recommended by Hahn et al., and, for the idiosyncratic residual term u_j we set the prior on its standard deviation σ_u to $2/3$ of the standard deviation of Δy across practices; this prior provides guardrails to the model, with the expectation that idiosyncratic variation is lower than total variation, but with plenty of room for the model to determine exactly how much lower. Based on an analysis of simulated data, we have not found that aBCF estimates are sensitive to the prior used for σ_u.

D. Estimating the relationship between practice-specific impacts and PBA

We now describe how we use the components discussed in the previous two sections (PBA percentages and components of practice-specific impacts from aBCF) to estimate how practice performance and PBAs are related. We consider practice-specific impacts on the acute hospitalization rate per 1,000 beneficiaries as a measure of a practice's performance. For the practices in risk groups 1 and 2 that we consider for this analysis, acute hospital use determines their PBA.[34]

Estimating the aBCF model in equation (1) yields four objects for each practice:

1. The practice's impact estimate $\hat{\tau}_j$ (that is, the effect of PCF that is explained by effect modifiers X_j^m)
2. An estimate of the practice's counterfactual outcome $\hat{\mu}_j$ that represents the expected outcome for each practice if it had not participated in PCF, based on its confounders X_j^c

[34] Acute hospital use and the acute hospitalization rate are different measures. Acute hospital use, the measure used for the PBA calculation, is a risk-adjusted measure defined as a ratio of the observed number of inpatient stays to the expected number of inpatient stays (Center for Medicare & Medicaid Innovation 2023, Section 5.1.1). The acute hospitalization rate is the number of inpatient stays per 1,000 beneficiaries per year measured using Medicare claims data (see Appendix A.2.5).

3. The idiosyncratic part of a practice's counterfactual outcome $\hat{u}_j$ that is not explained by covariates[35]

4. The practice's residual $\hat{\delta}_j$ (that is, the difference between the observed outcome y_j and the sum of $\hat{\tau}_j$, $\hat{\mu}_j$, and $\hat{u}_j$)

We did not obtain a direct estimate of practice-specific impacts (that is, the component of the practices' idiosyncratic performance caused by PCF) because the aBCF model does not allow us to identify from the data the part of an idiosyncratic practice-specific impact that covariates do not explain. This part is different from $\hat{\tau}_j$, which is explained by covariates, and from $\hat{u}_j$, which is the idiosyncratic part of a practice's counterfactual outcome. Ideally, we would want to estimate the total impact consisting of $\hat{\tau}_j$ and an idiosyncratic component directly, but we can only bound it by $I_j^1 = \hat{\tau}_j$ and $I_j^2 = \hat{\tau}_j + \hat{u}_j$. We assume that the true practice-specific impact lies in the range $\left[I_j^1, I_j^2\right]$ or $\left[I_j^2, I_j^1\right]$.[36] In our analysis, we estimate the relationship between PBAs and both of these bounds.

To assess the relationship between practice-specific impacts and PBAs, we first create horizontal box-and-whisker plots of the bounds on practice-specific impacts, I_j^1 and I_j^2, for each PBA percentage. These plots show how the distribution of impacts (median, 25th and 75th percentiles, and lower and upper adjacent values)[37] varies between possible values of the PBA percentage (-10, -6.5, 0, 3.5, 6.5, 10, 13, 20, 27, 30, 34, 40, and 50 percent). If a higher PBA rewards better performance, on average, we expect that the distribution of impacts shifts to the left for higher PBAs because a negative impact is desirable for the acute hospitalization rate outcome.

We then use the estimated aBCF components to estimate linear regression models and formally assess the relationship between practice-specific impacts on acute hospitalization rates and PBA percentages. Specifically, we estimate:

$$(2) \qquad PBA\%_j = \beta_0 + \beta_1 I_j^1 + \beta_2 \hat{\mu}_j + \beta_3 \hat{u} + \beta_4 \hat{\delta}_j + \eta_j$$

$$(3) \qquad PBA\%_j = \gamma_0 + \gamma_1 I_j^2 + \gamma_2 \hat{\mu}_j + \gamma_3 \hat{\delta}_j + \eta_j$$

The independent variables in these two regressions are the bounds on practice-specific impacts I_j^1 and I_j^2 and other components of practice performance as defined above. The parameters of interest are β_1

[35] This term represents the extent to which a practice would perform better or worse than expected based on covariates in the absence of PCF.

[36] Both $\hat{\tau}_j$ and $\hat{u}_j$ can be positive or negative, so both cases $I_j^2 > I_j^1$ and $I_j^2 < I_j^1$ are possible. In our data, 41 percent of practices have positive $\hat{\tau}_j$ and $\hat{u}_j$, 9 percent have negative $\hat{\tau}_j$ and $\hat{u}_j$, 43 percent have a positive $\hat{\tau}_j$ and a negative $\hat{u}_j$, and 7 percent have a negative $\hat{\tau}_j$ and a positive $\hat{u}_j$.

[37] The lower and upper adjacent values are defined as $x_{[25]} - \frac{3}{2}\left(x_{[75]} - x_{[25]}\right)$ and $x_{[75]} + \frac{3}{2}\left(x_{[75]} - x_{[25]}\right)$, respectively, where $x_{[25]}$ and $x_{[75]}$ are the 25th and 75th percentiles.

and γ_1, which represent the relationship between a practice's PBA percentage and the lower or upper bound of the practice-specific impact. Negative and statistically significant estimates of β_1 and γ_1 indicate that PBAs and practice performance align. Because the desired direction of the impact on the two outcomes is negative, a negative slope is indicative of properly working incentives. We estimate regressions (2) and (3) separately for practices in both PCF cohorts and risk groups 1 and 2. We weight each observation by the number of assigned beneficiaries in each practice and calculate heteroskedasticity-robust standard errors.

A.2.9. Accounting for participation in other CMS initiatives

PCF is occurring at the same time as other CMS initiatives with similar goals to improve the quality and value of care. PCF practices can participate in some, but not all, of these initiatives. Therefore, we expect comparison practices to participate in some initiatives—such as ACO REACH—at higher rates than PCF practices.

Higher participation rates for comparison practices does not necessarily bias our impact estimates because we assume the comparison practices' experience in current Medicare programs will represent the accurate counterfactual for PCF practices had PCF not existed. Still, many CMS initiatives—such as Innovation Center models and demonstrations—are not a part of current Medicare payment policy, and many are not expected to continue beyond their test periods. We therefore do not consider them part of the relevant counterfactual for the evaluation of PCF. That is, if temporary initiatives and PCF are both effective at improving outcomes, we might find no effects of PCF because our comparison group contains more practices that benefit from the other initiatives. The diluted impact estimates might not be relevant when CMS decides whether to expand PCF after the competing initiatives have ended.

Given this concern, we tracked PCF and comparison group participation in a select set of CMS initiatives, including permanent programs and temporary models and demonstrations, to quantify how participation for PCF and comparison practices has evolved starting from the baseline period to the most recent performance year, and whether participation in other initiatives differed between PCF and comparison practices over the same period. In Exhibit A.2.9.1, we list the specific initiatives we analyzed, the data sources, each initiative's implementation period, and whether PCF practices could participate in these initiatives while active in the PCF Model during the periods we study. (PCF practices that withdrew from the model were generally eligible to participate in any CMS initiative, even those prohibited for active PCF participants.)

Exhibit A.2.9.1. Initiatives for which we tracked PCF and comparison practices' participation

Data source	CMS initiative	Implementation period	Open to PCF practices?	Open to comparison practices?
CMS Master Data Management system	Independence at Home Demonstration	Started June 2012; ended December 2023	Yes	Yes
	Medicare Shared Savings Program (Tracks 1-3, Track 1+, Tracks A-E, Track Enhanced)	Started January 2012	Yes	Yes

Data source	CMS initiative	Implementation period	Open to PCF practices?	Open to comparison practices?
	Comprehensive ESRD Care Model	Started October 1, 2015; ended March 31, 2021	No	Yes
	Next Generation ACO Model	Started January 2016; ended December 2021	No	Yes
	Global and Professional Direct Contracting	Started April 1, 2021; ended December 31, 2022 (continuing thereafter as ACO REACH)	No	Yes
	ACO REACH model	Started January 1, 2023; ends December 31, 2026	No	Yes
	Value in Opioid Use Disorder Treatment Demonstration Program	Started April 1, 2021; ends December 31, 2024	No	Yes
CMS	Accountable Health Communities	Started May 1 2017; ended April 2023	Yes	Yes
Non-claims-based payment files	Million Hearts Cardiovascular Disease Risk Reduction Model	Started January 2017; ended December 2021	Yes	Yes
	BPCI Advanced[a]	Started October 1, 2018; ends December 31, 2025	Yes	Yes
	Oncology Care Model	Started July 1, 2016; ended June 30, 2022	Yes	Yes
	Comprehensive Care for Joint Replacement Model	Started April 1, 2016; ends December 31, 2024 (extended for three additional performance years)	Yes	Yes

[a] At the time of analysis, participation data was available only through 2022 for the BPCI Advanced Model. Therefore, participation rates are not available for performance year 3 for Cohort 1 and performance year 2 for Cohort 2.

ACO = Accountable Care Organization; REACH = Realizing Equity, Access, and Community Health; BPCI = Bundled Payments for Care Improvement; CMS = Centers for Medicare & Medicaid Services; PCF = Primary Care First.

To analyze trends in participation over time, we calculated the proportion of assigned beneficiaries in each group (PCF versus comparison) that were aligned to each initiative during baseline and performance years and calculated the percentage point difference between the two groups each year. Following our approach for estimating PCF impacts (Appendix A.2.4), our analysis used the ITT analytic population of beneficiaries assigned to PCF and matched comparison practices. We chose to measure participation in CMS initiatives at the beneficiary level for several reasons. First, this approach aligns with our beneficiary-level interpretation of model impacts because the extent to which practices' participation in other initiatives might influence PCF impacts would likely depend on the number of beneficiaries affected by such participation. Second, reporting participation at the beneficiary level helps keep interpretation of results consistent across initiatives.

Methods for tracking initiatives reporting data to the CMS MDM system. We tracked participation information for five initiatives using the CMS MDM, which report data at the NPI-TIN level. (The one exception is the Medicare Shared Savings Program, which reports data only at the TIN level.) We first linked NPI-TIN records from the MDM to our practice NPI rosters that include assigned TINs (see Appendix A.2.1 for more information on how we constructed practice rosters). For the Medicare Shared Savings Program, we linked TIN-level MDM information to all NPIs in practices that shared the same TIN. We then aggregated the NPI-TIN data to the practice level and created practice-level participation flags, counting the entire practice as participating in an initiative if, in a given year, any NPI at the practice participated in the initiative during the same year. Our process considered all assigned beneficiaries at the practice aligned to an initiative if the practice was flagged as participating.

Methods for tracking initiatives reporting data at the beneficiary level. The remainder of the initiatives we tracked reported data at the beneficiary level. These include (1) Accountable Health Communities data that CMS provided directly to the evaluation team, which reported the list of beneficiaries who were attributed to organizations participating in the model each year, and (2) initiatives reporting data to the CMS non-claims-based payment files, which includes beneficiaries who had at least one non-claims payment for a covered service in the year. We first linked beneficiaries in our analytic population (assigned to PCF or matched comparison practices) to beneficiary identifiers in the Accountable Health Communities and non-claims-based payment files. Using these linked data, we created beneficiary-level participation flags each year. We then aggregated the beneficiary-level flags to the practice level to create a proportion measure of beneficiaries aligned to an initiative each year.

After we constructed practice-level participation measures for all initiatives, we calculated the percentage of beneficiaries aligned to each initiative at the group level (PCF and comparison), starting with the first baseline year (2019 for Cohort 1; 2020 for Cohort 2) through 2023. To align with our approach for estimating impacts (Appendix A.2.4), we incorporated the matching weight in our group-level participation measure for the comparison group. We also calculated the percentage point difference in the proportion of beneficiaries aligned to each initiative between the groups each year.

Appendix B. Supplemental results

B.1. Payment findings

In this section, we summarize Primary Care First (PCF) Model payments that practices received in 2023. These payments, collectively referred to as the total primary care payment, include the population-based payments (PBPs) and the flat visit fees (FVFs), as well as the payment accuracy adjustment (PAA; a downward adjustment on the PBP) and the performance-based adjustment (PBA), which might increase or decrease the PBP and FVF or have no affect. We first review the services included in the PCF Model payments components and then summarize payments for each of these components. We conclude with a summary of payments for withdrawn practices, a focus of Chapter 2.

A. Services included in PCF Model payment components

The professional PBP is meant to partially replace fee-for-service (FFS) revenue from specific primary care services provided to a practice's attributed beneficiary population. Practices whose patients have, on average, more complex conditions and are assigned to a higher risk group receive a higher PBP to compensate for the more resource-intensive care these patients require. When practices bill for a qualifying evaluation and management (E&M) code, they may receive an FVF of $40.82. Exhibit B.1.1 lists the services and related Healthcare Common Procedures Coding System (HCPCS) codes included in the calculations of the professional PBP, FVF, and PAA.

Exhibit B.1.1. Services included in the PCF professional population-based payment, flat visit fee, and payment accuracy adjustment for attributed Medicare beneficiaries

	Professional PBP	FVF	PAA
Office/outpatient visit E&M	99202–99205, 99211-99215	99202–99205, 99211–99215	99202–99205, 99211–99215
Prolonged E&M	99354, 99355, 99415, 99416, G2212*	99415, 99416	Not included
Transitional care management services	99495, 99496	99495, 99496	99495, 99496
Home care/domiciliary care E&M	99324–99328, 99334-99337, 99341–99345, 99347–99350	99341, 99342, 99344, 99345, 99347– 99350	99324–99328, 99334–99337, 99341–99345, 99347–99350
Home care/domiciliary care plan oversight	99339, 99340**	Not included	99339, 99340**
Advance care planning	99497, 99498***	99497, 99498***	99497
Welcome to Medicare and Annual Wellness Visits	G0402, G0438, G0439	G0402, G0438, G0439	G0402, G0438, G0439
Chronic care management services[a]	99487, 99489*-99491, 99439	Not included	99487, 99490, 99491

Source: Mathematica's summary of Primary Care First: Payment and Attribution Methodologies PY 2023, Version April 2023, Center for Medicare & Medicaid Innovation.

* Included in PBP, not FVF nor PAA.

** Included in PBP and PAA, not FVF

*** Included in PBP and FVF, not PAA.

[a] Services can contribute to the PAA if they are billed by a primary care practitioner except for chronic care management services, which counts toward the PAA if billed by any Medicare practitioner.

E&M = evaluation and management; FVF = flat visit fee; HCPCS = Healthcare Common Procedures Coding System; PAA = payment accuracy adjustment; PBP = population-based payment; PCF = Primary Care First.

B. Summary of PBPs received in 2023

PCF practices received an average of $207,311 in PBPs in 2023 (Exhibit B.1.2). On average, PBPs were 19 percent higher for Cohort 2 practices than for Cohort 1 practices in 2022 because Cohort 2 practices tended to have a higher average number of attributed beneficiaries, and the PAA only applied to their quarter 3 and 4 payments. Higher risk group practices tended to receive higher PBPs than lower risk group practices because the PBP increases for each risk group.

Exhibit B.1.2. Annual PBP by risk group and cohort in 2023

Risk group	Cohort	Average PBP per practice	Median PBP per practice	Average PBP per beneficiary	Median PBP per beneficiary	Average PBP per PCF practitioner	Median PBP per PCF practitioner	Number of practices
1	1	$157,612	$114,112	$220	$218	$31,742	$25,260	490
1	2	$207,028	$150,146	$281	$277	$38,576	$33,015	1,744
1	all	$196,189	$142,297	$268	$269	$37,077	$31,524	2,234
2	1	$225,666	$158,602	$361	$353	$51,860	$31,785	64
2	2	$237,175	$177,073	$451	$446	$60,440	$42,966	134
2	all	$233,455	$174,566	$422	$427	$57,667	$37,975	198
3/4	1	$590,560	$582,002	$1,338	$1,239	$139,190	$52,202	20
3/4	2	$651,942	$462,648	$1,148	$1,117	$123,492	$70,389	27
3/4	all	$625,822	$519,874	$1,229	$1,121	$130,172	$59,741	47
all	1	$180,285	$122,805	$275	$228	$37,729	$26,508	574
all	2	$215,454	$153,460	$305	$281	$41,318	$33,674	1,905
all	all	$207,311	$146,953	$298	$275	$40,487	$32,218	2,479

Source: Mathematica's analysis of 2023 PCF payment data to Cohort 1 and Cohort 2 practices.

Notes: We restricted to practices that were active as of the end of 2023 (N = 2,479).

PBP = population-based payment; PCF = Primary Care First.

C. Summary of PAAs in 2023

The average PAA for all practices in 2023 was $51,214 (Exhibit B.1.3). The average PAA was significantly higher for Cohort 1 practices than Cohort 2 practices because the PAA was in effect for the full calendar year, and Cohort 2 practices only experienced this adjustment for two of the four quarters in 2023.

Exhibit B.1.3. Annual PAA by risk group and cohort in 2023

Risk group	Cohort	Average PAA per practice	Median PAA per practice	Average PAA per beneficiary	Median PAA per beneficiary	Average PAA per provider	Median PAA per provider	Number of practices
1	1	$82,666	$55,228	$113	$106	$16,214	$12,232	490
1	2	$38,415	$28,129	$53	$50	$6,999	$5,903	1,744
1	All	$48,121	$31,758	$67	$56	$9,020	$6,628	2,234
2	1	$98,437	$64,170	$170	$176	$21,667	$15,789	64
2	2	$46,619	$29,930	$85	$79	$9,571	$7,937	134
2	All	$63,368	$35,970	$113	$96	$13,481	$9,183	198
3 and 4	1	$172,013	$82,470	$334	$316	$26,775	$12,690	20
3 and 4	2	$128,583	$58,180	$233	$177	$17,245	$10,495	27
3 and 4	All	$147,064	$74,231	$276	$256	$21,300	$10,495	47
All	1	$87,538	$57,614	$127	$111	$17,190	$12,548	574
All	2	$40,270	$28,497	$58	$52	$7,325	$6,017	1,905
All	All	$51,214	$32,508	$74	$58	$9,609	$6,867	2,479

Source: Mathematica's analysis of 2023 PCF payment data to Cohort 1 and Cohort 2 practices.

Notes: We restricted to practices that were active as of the end of 2023 (N = 2,479). The annual PAA for a practice is calculated by summing up the total PAA across 2023 (in quarters in which the PAA was applied). The PAA went into effect in quarter 3 2022 for Cohort 1 and quarter 3 2023 for Cohort 2.

PAA = payment accuracy adjustment; PCF = Primary Care First.

D. Summary of FVFs received in 2023

CMS designed the FVF structure to encourage continued face-to-face visits between clinicians and patients even when PCF practices receive most payment prospectively. After it calculates the deductible and coinsurance, CMS sets the Medicare payment amount for FVF-qualifying services provided to attributed beneficiaries to the national FVF rate of $40.82 and applies a geographic adjustment to account for regional cost differences. In keeping with CMS' intent, most practices reported no change in the length or number of E&M visits.

In 2023, CMS paid Cohort 1 and 2 practices an average of $71,825 in FVFs (Exhibit B.1.4). Average per-beneficiary FVF payments were lowest for practices in risk group 1, and practices in risk groups 2, 3, and 4 had successively higher average FVF payments, likely reflecting the additional billed services required of the higher acuity patients among risk groups 3 and 4's attributed patients who seek more E&M services on average.

Exhibit B.1.4. Annual FVF by risk group, cohort

Risk group	Cohort	Average FVF per practice	Median FVF per practice	Average FVF visits per beneficiary	Median FVF visits per beneficiary	Average FVF per provider	Median FVF per provider	Number of practices
1	1	$68,273	$50,635	2.4	2.3	$13,602	$11,404	490
1	2	$72,440	$52,731	2.5	2.4	$13,580	$11,475	1,744
1	all	$71,526	$52,066	2.4	2.4	$13,585	$11,458	2,234
2	1	$78,486	$50,002	3.1	2.6	$17,623	$10,161	64
2	2	$60,856	$44,834	3	2.7	$16,792	$10,773	134
2	all	$66,554	$46,184	3	2.7	$17,060	$10,626	198
3 and 4	1	$108,523	$87,182	5.9	5.2	$24,105	$11,418	20
3 and 4	2	$108,076	$79,708	4.9	4.1	$22,633	$9,665	27
3 and 4	all	$108,266	$84,098	5.3	4.1	$23,260	$10,234	47
All	1	$70,814	$51,358	2.6	2.4	$14,416	$11,135	574
All	2	$72,130	$52,394	2.5	2.4	$13,934	$11,446	1,905
All	all	$71,825	$52,097	2.5	2.4	$14,046	$11,425	2,479

Source: Mathematica's analysis of 2023 PCF payment data to Cohort 1 and Cohort 2 practices.

Notes: We restricted to practices that were active as of the end of 2023 (N = 2,479). The annual FVF for a practice is calculated by summing up the total FVF across 2023.

FVF = flat visit fee; PCF = Primary Care First.

E. Summary of PAAs in 2023

On average, PCF practices received a PBA of $15,156 in 2023 representing a roughly 7 percent increase to their PBPs and FVFs, which is applied after the PAA is applied to the PBP (Exhibit B.1.5). Cohort 2 practices received marginally higher PBPs in 2023, likely because of the PBA payment design, which becomes less generous in the third performance year. In fact, the proportion of practices receiving a very high (40 to 50 percent), high (20 to 40 percent), or moderate (0 to 20 percent) positive PBA percentage adjustment in quarter (Q) 2 declined substantially by Q3 (Exhibit B.1.6). From Q2 to Q3, the proportion of Cohort 1 practices that had a negative PBA increased substantially but remained relatively stable for Cohort 2 practices. By the second half of 2023, when the quality gateway was applied to the PBA, around two-thirds of practices received a neutral or negative PBA percentage adjustment. For all practices, the average PBA percentage declined throughout 2023, with the biggest drop occurring between Q2 and Q3 (the average PBA percentage stabilized at around 3 to 4 percent) (Exhibit B.1.7).

Exhibit B.1.5. PBA by risk group, cohort

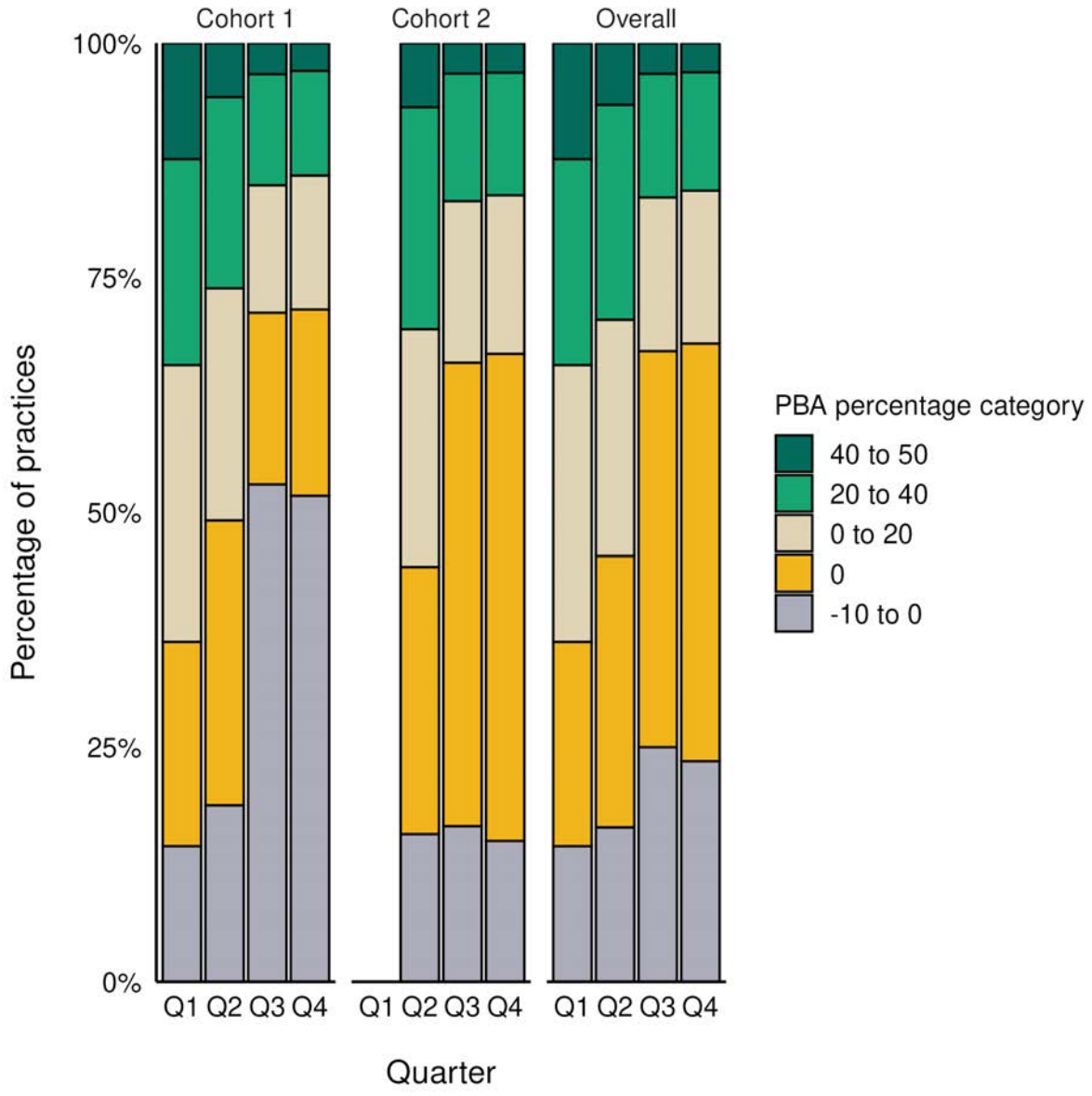
Risk group	Cohort	Average PBA per practice	Median PBA per practice	Average PBA percentage per practice	Median PBA percentage per practice	Number of practices
1	1	$10,984	$2,602	5%	2%	490
1	2	$14,203	$5,023	7%	4%	1,744
1	all	$13,497	$4,770	7%	4%	2,234
2	1	$27,791	$7,904	7%	4%	64
2	2	$20,051	$6,542	8%	5%	134
2	all	$22,553	$7,109	8%	5%	198
3/4	1	$58,303	$36,143	11%	4%	20
3/4	2	$66,215	$27,590	12%	11%	27
3/4	all	$62,848	$28,348	11%	7%	47
all	1	$14,507	$3,904	6%	3%	574
all	2	$15,351	$5,121	7%	4%	1,905
all	all	$15,156	$4,934	7%	4%	2,479

Source: Mathematica's analysis of 2023 PCF payment data to Cohort 1 and Cohort 2 practices.

Notes: We restricted to practices that were active as of the end of 2023 (N = 2,479). The PBA is the raw adjustment earned by the practice in 2023, and the PBA percentage was calculated by dividing the annual PBA by the annual population-based payment (before adjustments) plus the annual geographic adjustment amount and minus the annual PAA. The PBA went into effect in quarter 2 2022 for Cohort 1 and quarter 2 2023 for Cohort 2.

PAA = payment accuracy adjustment; PBA = performance-based adjustment; PCF = Primary Care First.

Exhibit B.1.6. Quarter-to-quarter variation in PBA (Cohort 1 and 2)

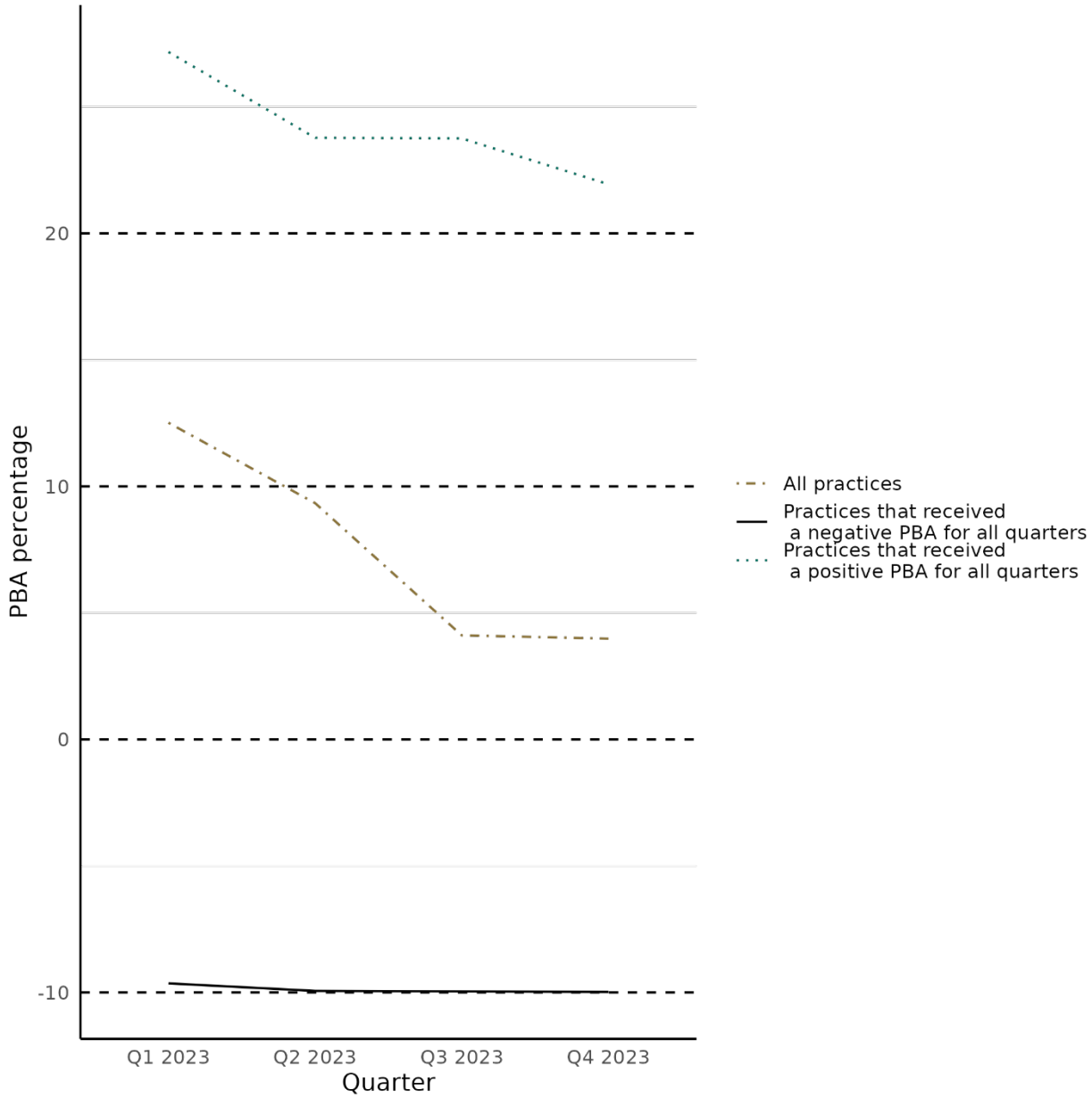


Source: Mathematica's analysis of 2023 PCF payment data to Cohort 1 and Cohort 2 practices.

Notes: We restricted to practices that were active as of the end of 2023 (N = 2,479). The PBA is the raw adjustment earned by the practice in 2023, and the PBA percentage was calculated by dividing the annual PBA by the annual population-based payment (before adjustments) plus the annual geographic adjustment amount and minus the annual PAA. The PBA went into effect in quarter 2 2022 for Cohort 1 and quarter 2 2023 for Cohort 2, which is why there is no bar for Cohort 2 in quarter 1 2023 (the Cohort 1 bar and Overall bar for quarter 1 2023 are identical).

PAA = payment accuracy adjustment; PBA = performance-based adjustment; PCF = Primary Care First.

Exhibit B.1.7. Distribution of PBA results over time



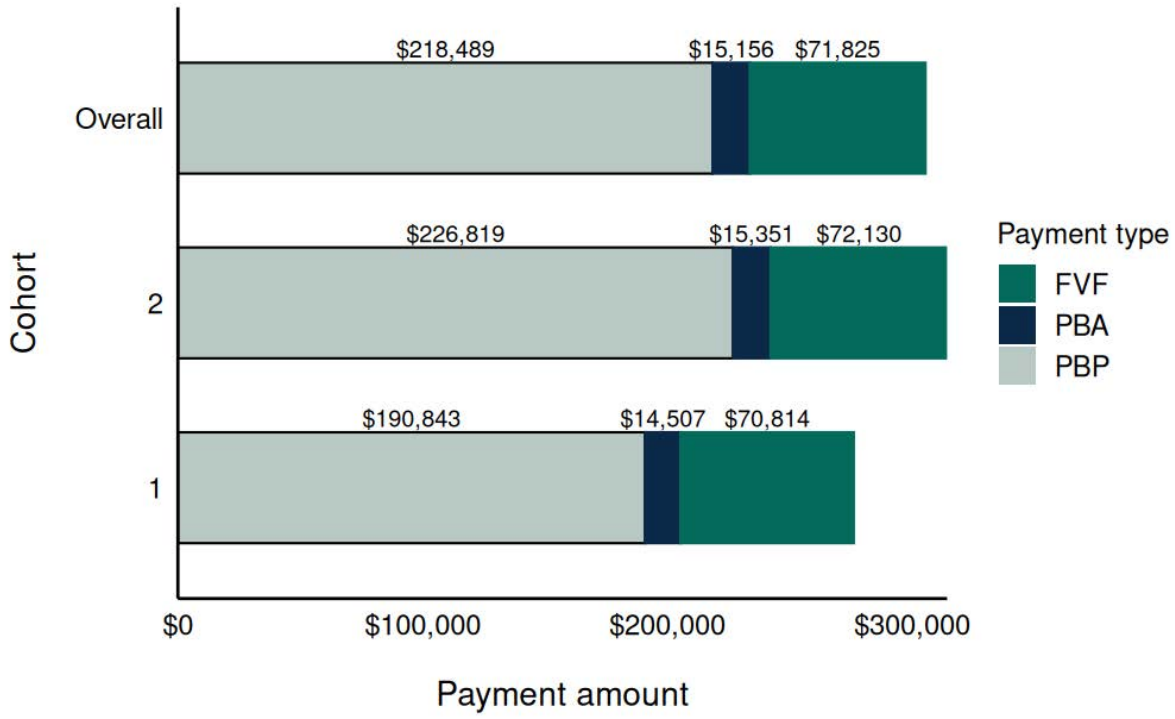
Source: Mathematica's analysis of 2023 PCF payment data to Cohort 1 and Cohort 2 practices.

Notes: We restricted to practices that were active as of the end of 2023 (N = 2,479). There were 577 practices that received a negative PBA for all quarters (the red line sample), and there were 1,691 practices that received a positive PBA for all quarters (the green line sample). The PBA is the raw adjustment earned by the practice in 2023, while the PBA percentage was calculated by dividing the annual PBA by the annual population-based payment (before adjustments) plus the annual geographic adjustment amount and minus the annual PAA. The PBA went into effect in quarter 2 2022 for Cohort 1 and quarter 2 2023 for Cohort 2.

PAA = payment accuracy adjustment; PBA = performance-based adjustment; PCF = Primary Care First.

On average, total PCF payments were about 13 percent higher for Cohort 2 practices than for Cohort 1 in 2023 because of a higher average number of attributed beneficiaries and because the PAA had not been applied to Cohort 2 practice payments until Q3 of 2023 (Exhibit B.1.8). In addition, because of the changes to the PBA methodology that take effect in performance year 3, Cohort 1 practices earned less through the PBA on average in 2023 compared with previous performance years.

Exhibit B.1.8. PBP, FVF, and PBA breakdown by cohort in 2023



Source: Mathematica's analysis of 2023 PCF payment data to Cohort 1 and Cohort 2 practices.

Notes: We restricted to practices that were active as of the end of 2023 (N = 2,479).

FVF = flat visit fee; PBA = performance-based adjustment; PBP = population-based payment; PCF = Primary Care First.

F. Analysis of payments for withdrawn practices in 2023

Practices that withdrew in 2023 had average PBP, PAA, and PBA payments that were similar to those practices that remained in the model (Exhibit B.1.9).

Exhibit B.1.9. Comparison of payments for withdrawn and remaining practices in 2023

	Remained in the model			Voluntarily withdrew from the model		
Cohort	1	2	Overall	1	2	Overall
Average PAA percentage	33%	31%	32%	29%	33%	32%
Median PAA percentage	31%	30%	30%	27%	30%	29%
Average PAA	$89,693	$40,896	$52,373	$77,371	$37,293	$45,581
Median PAA	$59,798	$28,899	$33,223	$44,166	$27,061	$29,438
Average PBP PBPM	$22.69	$25.45	$24.80	$25.60	$25.57	$25.57
Median PBP PBPM	$18.93	$23.44	$22.89	$19.43	$23.27	$22.93
Average PBA percentage	6%	7%	7%	7%	6%	6%
Median PBA percentage	3%	4%	4%	3%	3%	3%
Number of practices	505	1,642	2,147	61	234	295

Source: Mathematica's analysis of 2023 PCF payment data to PCF practices (including those that withdrew).

Notes: The annual PAA for a practice is calculated by summing up the total PAA across 2023 (in quarters in which the PAA was applied). The PAA rate was calculated by dividing the annual PAA by the sum of the annual PBP. Similarly, the annual PBA for a practice is calculated by summing up the total PBA across 2023 (in quarters in which the PBA was applied). The PBA rate was calculated by dividing the annual PBA by the annual PBP (before adjustments) plus the annual GAA and minus the annual PAA. Our sample of withdrawn practices exclude practices that have a missing attrition status, withdrew involuntarily, or withdrew before the last day in 2023 (practices that withdrew before the last day of the year do not have adequate payment data to make comparisons with active practices).

GAA = geographic adjustment amount; PAA = payment accuracy adjustment; PBA = performance-based adjustment; PBP = population-based payments; PBPM = per beneficiary per month; PCF = Primary Care First.

Compared with practices that withdrew in 2022, practices that withdrew in 2023 had a much lower average PBP per beneficiary. Cohort 1 practices that withdrew in 2022 had a higher average (33 percent) and median (29 percent) PAA percentage compared with Cohort 1 practices that withdrew in 2023 (29 percent and 27 percent, respectively) (B.1.10).

Exhibit B.1.10. Comparison of withdrawn practices in 2023 with withdrawn practices in 2022

Year of withdrawal	2022		2023		2022	2023
Cohort	1	2	1	2	overall	overall
Average PBP PBPM	$31.46	$30.79	$25.60	$25.58	$30.99	$25.58
Median PBP PBPM	$25.90	$26.49	$19.43	$23.31	$26.44	$22.93
Average PBA percentage	5%	n.a.	7%	6%	5% (Cohort 1)	6%
Median PBA percentage	1%	n.a.	3%	3%	1% (Cohort 1)	3%
Average PAA percentage	33%	n.a.	29%	33%	33% (Cohort 1)	32%
Median PAA percentage	29%	n.a.	27%	30%	29% (Cohort 1)	29%
Number of practices	57	139	61	235	196	296

Source: Mathematica's analysis of 2022 and 2023 PCF payment data to PCF practices (including those that withdrew).

Notes: The PBA went into effect in quarter 2 2022 for Cohort 1 and quarter 2 2023 for Cohort 2, and the PAA went into effect in quarter 3 2022 for Cohort 1 and quarter 3 2023 for Cohort 2. The annual PAA for a practice is calculated by summing up the total PAA across 2023 (in quarters in which the PAA was applied). The PAA rate was calculated by dividing the annual PAA by the sum of the annual PBP and annual geographic adjustment amount. Similarly, the annual PBP for a practice is calculated by summing up the total PBA across 2023 (in quarters in which the PBA was applied). The PBA rate was calculated by dividing the annual PBA by the annual PBP (before adjustments) plus the annual geographic adjustment amount and minus the annual PAA.

n.a. = not applicable; PAA = payment accuracy adjustment; PBA = performance-based adjustment; PBP = population-based payments; PBPM = per beneficiary per month; PCF = Primary Care First.

B.2. PCF Model Practice Survey results

Exhibit B.2.1. Percentage of practices reporting that PCF goals motivated care delivery changes

Reported care delivery change	Percentage of practices						
	Made change (motivated by PCF goals)			Made change (not at all motivated by PCF goals)	Did not report making a change		
	Change motivated solely or mostly by PCF goals	Change motivated in part by PCF goals	Total: Change motivated solely, mostly, or in part by PCF goals		Practice reported no change	Don't know or missing response	Total: Reported no change, don't know, or missing
Access and continuity							
Expanded patients' access to primary care practitioners via billable care (for example, extending office hours or offering home visits)	1%	25%	26%	13%	58%	3%	61%
Expanded patients' access to primary care practitioners via non-billable care (for example, communication via a patient portal or email)	1%	30%	31%	12%	54%	3%	57%
Increased likelihood that patients see their usual primary care practitioner and not another primary care practitioner for face-to-face visits	1%	16%	17%	6%	75%	2%	77%
Care management							
Improved or expanded long-term, proactive, relationship-based care management, provided by a care manager to patients who would most benefit from additional support (sometimes called longitudinal care management)	8%	37%	45%	12%	40%	2%	42%
Improved or expanded short-term care management, often for patients discharged from the hospital or ED (sometimes called episodic or transitional care management)	7%	39%	46%	10%	41%	3%	44%

Reported care delivery change	Percentage of practices						
	Made change (motivated by PCF goals)			Made change (not at all motivated by PCF goals)	Did not report making a change		
	Change motivated solely or mostly by PCF goals	Change motivated in part by PCF goals	Total: Change motivated solely, mostly, or in part by PCF goals		Practice reported no change	Don't know or missing response	Total: Reported no change, don't know, or missing
Enhanced outreach to, or care for, high-risk patients or patients with specific conditions or complex care needs, outside of long-term (longitudinal) or short-term (episodic) care management	7%	36%	43%	9%	46%	2%	48%
Behavioral health and health-related social needs							
Integrated (or improved integration of) behavioral health into primary care services	3%	27%	30%	11%	57%	3%	60%
Increased screening for patients' health-related social needs	4%	35%	39%	16%	41%	3%	44%
Enhanced capabilities for connecting patients to community resources that can meet their health-related social needs	2%	40%	42%	15%	39%	3%	42%
Comprehensiveness and coordination							
Refined or enhanced the provision of comprehensive medication management for high-risk patients; this includes action plans, individualized therapy goals, a planned follow-up strategy, and a full medication review	1%	30%	31%	8%	58%	4%	62%
Improved coordination with specialists (including collaborative care agreements or e-consults)	1%	20%	21%	15%	61%	3%	64%
Expanded the types of conditions treated or medical services provided at the practice site to reduce referrals to specialty care (for example, conditions such as poorly controlled diabetes or services such as point-of-care ultrasound)	1%	22%	23%	8%	66%	3%	69%

Reported care delivery change	Percentage of practices						
	Made change (motivated by PCF goals)			Made change (not at all motivated by PCF goals)	Did not report making a change		
	Change motivated solely or mostly by PCF goals	Change motivated in part by PCF goals	Total: Change motivated solely, mostly, or in part by PCF goals		Practice reported no change	Don't know or missing response	Total: Reported no change, don't know, or missing
Planned care and population health							
Increased use of data to improve care delivery or identify care gaps (such as data from your EHR or from CMS or other payers)	3%	50%	53%	11%	31%	4%	35%
Increased the frequency of, or began conducting, regular structured team meetings to improve team-based care or promote practice change	2%	32%	34%	12%	51%	3%	54%
Patient and caregiver engagement							
Implemented or improved any process for patients and caregivers to provide feedback that informs practice improvement (such as surveys or a PFAC)	7%	25%	32%	7%	58%	3%	61%
Health IT							
Enhanced health IT capabilities	2%	32%	34%	18%	45%	3%	48%
Staffing							
Increased the number of primary care practitioners on staff	1%	19%	20%	16%	61%	2%	63%

Source: Mathematica's analysis of PCF Practice Survey data (2023).

Notes: Total N = 1,155 (both cohorts). Some rows might not sum to 100 because of rounding.

CMS = Centers for Medicare & Medicaid Services; ED = emergency department; EHR = electronic health record; IT = information technology; PCF = Primary Care First; PFAC = Patient and Family Advisory Council.

Exhibit B.2.2. Percentage of practices reporting that PCF payments supported care delivery changes

Reported care delivery change	Percentage of practices						
	Made change (funded by PCF payments)			Made change (not at all motivated by PCF payments)	Did not report making a change		
	Change funded solely or mostly by PCF payments	Change funded in part by PCF payments	Total: Change funded solely, mostly, or in part by PCF payment		Practice reported no change	Don't know or missing response	Total: Reported no change, don't know or missing
Access and continuity							
Expanded patients' access to primary care practitioners via billable care (for example, extending office hours or offering home visits)	1%	7%	8%	21%	58%	12%	70%
Expanded patients' access to primary care practitioners via non-billable care (for example, communication via a patient portal or email)	0%	8%	8%	23%	54%	15%	69%
Increased likelihood that patients see their usual primary care practitioner and not another primary care practitioner for face-to-face visits	0%	7%	7%	10%	75%	8%	83%
Care management							
Improved or expanded long-term, proactive, relationship-based care management, provided by a care manager to patients who would most benefit from additional support (sometimes called longitudinal care management)	8%	28%	36%	12%	40%	10%	50%
Improved or expanded short-term care management, often for patients discharged from the hospital or ED (sometimes called episodic or transitional care management)	9%	29%	38%	10%	41%	12%	53%
Enhanced outreach to, or care for, high-risk patients or patients with specific conditions or complex care needs, outside of long-term (longitudinal) or short-term (episodic) care management	6%	23%	29%	11%	46%	13%	59%

Reported care delivery change	Percentage of practices						
	Made change (funded by PCF payments)			Made change (not at all motivated by PCF payments)	Did not report making a change		
	Change funded solely or mostly by PCF payments	Change funded in part by PCF payments	Total: Change funded solely, mostly, or in part by PCF payment		Practice reported no change	Don't know or missing response	Total: Reported no change, don't know or missing
Behavioral health and health-related social needs							
Integrated (or improved integration of) behavioral health into primary care services	1%	20%	21%	14%	57%	8%	65%
Increased screening for patients' health-related social needs	3%	18%	21%	24%	41%	14%	55%
Enhanced capabilities for connecting patients to community resources that can meet their health-related social needs	3%	16%	19%	28%	39%	14%	53%
Comprehensiveness and coordination							
Refined or enhanced the provision of comprehensive medication management for high-risk patients; this includes action plans, individualized therapy goals, a planned follow-up strategy, and a full medication review	5%	13%	18%	14%	58%	11%	69%
Improved coordination with specialists (including collaborative care agreements or e-consults)	2%	11%	13%	15%	61%	11%	72%
Expanded the types of conditions treated or medical services provided at the practice site to reduce referrals to specialty care (for example, conditions such as poorly controlled diabetes, or services such as point-of-care ultrasound)	2%	10%	12%	12%	66%	10%	76%
Planned care and population health							
Increased use of data to improve care delivery or identify care gaps (such as data from your EHR or from CMS or other payers)	3%	20%	23%	31%	31%	15%	46%

Reported care delivery change	Percentage of practices						
	Made change (funded by PCF payments)			Made change (not at all motivated by PCF payments)	Did not report making a change		
	Change funded solely or mostly by PCF payments	Change funded in part by PCF payments	Total: Change funded solely, mostly, or in part by PCF payment		Practice reported no change	Don't know or missing response	Total: Reported no change, don't know or missing
Increased the frequency of, or began conducting, regular structured team meetings to improve team-based care or promote practice change	2%	14%	16%	20%	51%	13%	64%
Patient and caregiver engagement							
Implemented or improved any process for patients and caregivers to provide feedback to inform practice improvement (such as surveys or a PFAC)	2%	9%	11%	20%	58%	11%	69%
Health IT							
Enhanced health IT capabilities	2%	10%	12%	32%	45%	11%	56%
Staffing							
Increased the number of primary care practitioners on staff	0%	7%	7%	19%	61%	13%	74%

Source: Mathematica's analysis of PCF Practice Survey data (2023).

Notes: Total N = 1,155 (both cohorts). Some rows might not sum to 100 because of rounding.

CMS = Centers for Medicare & Medicaid Services; ED = emergency department; EHR = electronic health record; IT = information technology; PCF = Primary Care First; PFAC = Patient and Family Advisory Council.

B.3. Additional payer worksheet data

We fielded a worksheet to 15 PCF payer partners to complete in fall 2023 and received 15 responses. We did not field worksheets to payer partners that were not actively contracting with practices to provide PCF supports.

Exhibit B.3.1. Partnership details

Question	Response	Count	Percentage
For each of the following lines of business (LOBs), please indicate whether your organization offers the LOB or not, regardless of whether you include it in PCF.			
	Commercial: fully insured	11	73%
	Commercial: self-insured	12	80%
	Health Insurance Marketplace	11	73%
	Medicare Advantage	11	73%
	Medicaid FFS	3	20%
	Medicaid managed care	7	47%
For each LOB your organization offers, please indicate whether you include this LOB in PCF.			
	Commercial: fully insured	11	73%
	Commercial: self-insured	8	53%
	Health Insurance Marketplace	9	60%
	Medicare Advantage	5	33%
	Medicaid FFS	3	20%
	Medicaid Managed Care	4	27%
Has your organization established new contracts with practices specifically for PCF?			
	Yes, we have established new contracts specifically for PCF	3	20%
	No, we contract with PCF practices under an existing value-based program	11	73%
	Other	1	7%
Since you began participating in PCF, have you perceived a shift in primary care practices' abilities to take on capitated arrangements as a result of primary care transformation models, such as PCF, ACO REACH, or other efforts?			
	Primary care practices' abilities to take on capitated arrangements *improved*.	4	27%
	Primary care practices' abilities to take on capitated arrangements *remained the same*.	10	67%
	Primary care practices' abilities to take on capitated arrangements *got worse*.	0	0%
	Missing	1	7%

ACO REACH = Accountable Care Organization Realizing Equity, Access, and Community Health; FFS = fee for service; PCF = Primary Care First.

Exhibit B.3.2. Alternative payments

Question	Response	Count	Percentage
Does your organization offer any of the following alternative payment approaches for PCF practices?			
	Full primary care capitation (upfront payment for all primary care services except for key carve-outs)	3	20%
	Partial primary care capitation (upfront payment for a portion of FFS revenue)	5	33%
	Capitation for primary care episodes (upfront payment for primary care-specific episodes, such as urinary tract infection, low back pain)	0	0%
	No	7	47%
For the following categories, please indicate how many practices receive payments using an alternative payment approach (other than FFS). ***Please note: We asked payers to select all applicable options. For this reason, percentage totals in this section will not equal 100.***			
Practices your organization contracts with that are participating in CMS' PCF Model	None	0	0%
	Some	4	27%
	Most	0	0%
	All	4	27%
	Skipped	7	47%
Practices your organization contracts with that are NOT participating in CMS' PCF Model	None	1	7%
	Some	5	33%
	Most	2	13%
	All	0	0%
	Skipped	7	47%
Comparing your organization's alternative approach with the standard FFS approach, which payment model pays more in total payments to practices? ***Please note: We asked payers to select all applicable options. For this reason, percentage totals in this section will not equal 100.***			
	Our alternative payment model is calibrated to pay more to practices than usual FFS	6	40%
	Both models are calibrated to pay about the same amount to practices	1	7%
	Our alternative payment model is calibrated to pay less to practices than usual FFS	1	7%
	Skipped	7	47%

Question	Response	Count	Percentage
Select the factors your organization uses to risk-adjust payments made using an alternative payment approach. *Select all that apply.* ***Please note: We asked payers to select all applicable options. For this reason, percentage totals in this section will not equal 100.***			
	Health status	7	47%
	Patients' demographics	7	47%
	Patients' prior cost or service use	5	33%
	Health equity measures	0	0%
	We do not risk-adjust payments	0	0%
	Other	0	0%
Has your organization modified its alternative payment approach (other than FFS) as a result of your partnership in PCF in the past year?			
	Yes	1	7%
	No	8	53%
	Skipped	6	40%
Are any of the following barriers to offering alternative payments (other than FFS) to PCF practices still applicable in 2023? Select all that apply. ***Please note: We asked payers to select all applicable options. For this reason, percentage totals in this section will not equal 100.***			
	Concerns about practices' readiness to accept capitated payments	9	60%
	Concerns about practices' willingness to accept capitated payments	9	60%
	Concerns about your internal capabilities (such as ability to process or calculate capitated payments)	6	40%
	Too few PCF practices in region	5	33%
	Regulatory challenges	3	20%
	Other	0	0%

CMS = Centers for Medicare & Medicaid Services; FFS = fee for service; PCF = Primary Care First.

Exhibit B.3.3. Payments to reward performance

Question	Response	Count	Percentage
Do you make performance adjustments to any of your payments to PCF practices? *Select all that apply.* ***Please note: We asked payers to select all applicable options. For this reason, percentage totals in this section will not equal 100.***			
	Yes, to our alternative payment approach (other than FFS)	6	40%
	Yes, other	6	40%
	No	2	13%
	Skipped/missing	1	7%
Please indicate whether your organization uses the following payment structures to reward or penalize outcomes for PCF practices:			
	Prospective bonus payments for performance	2	13%
	Retrospective bonus payments for performance	9	60%
	Retrospective shared savings payments	6	40%
	Enhanced FFS payments, adjusted based on practice performance	2	13%
	Adjusted capitated payments based on practice performance	2	13%
	Performance-adjusted care management fee	2	13%
	Skipped	2	13%
For the following categories, please indicate how many practices are eligible for performance adjustments:			
Practices your organization contracts with that are participating in CMS' PCF Model	None	0	0%
	Some	3	20%
	Most	1	7%
	All	8	53%
	Skipped	3	20%
Practices your organization contracts with that are NOT participating in CMS' PCF Model	None	1	7%
	Some	4	27%
	Most	4	27%
	All	3	20%
	Skipped	3	20%

Question	Response	Count	Percentage
Please indicate which, if any, of the measures your organization uses to adjust payments in 2023. *Select all that apply.* *Please note: We asked payers to select all applicable options. For this reason, percentage totals in this section will not equal 100.*			
	Diabetes Hemoglobin A1c Poor Control	11	73%
	Colorectal Cancer Screening	11	73%
	Controlling High Blood Pressure	12	80%
	Advance Care Planning	2	13%
	Patient Experience of Care	6	40%
	Acute Hospital Utilization	10	67%
	Total Per Capital Cost	6	40%
	None of the above	0	0%
	Skipped	3	20%
Does your organization use other measures to adjust payments to practices in 2023?			
	Yes	11	73%
	No	1	7%
	Skipped	3	20%
Have you changed any measures you used to adjust for performance in 2023?			
	Yes	4	27%
	No	8	53%
	Skipped	3	20%

CMS = Centers for Medicare & Medicaid Services; FFS = fee for service; PCF = Primary Care First.

Exhibit B.3.4. Care management fees

Question	Response	Count	Percentage
Does your organization offer care management fees to PCF practices (separate from capitated payments)?			
	Yes	9	60%
	No	6	40%
Do you adjust your capitated payment amount to offset the cost of care management fees?			
	Yes	0	0%
	No	5	33%
	Skipped	10	67%

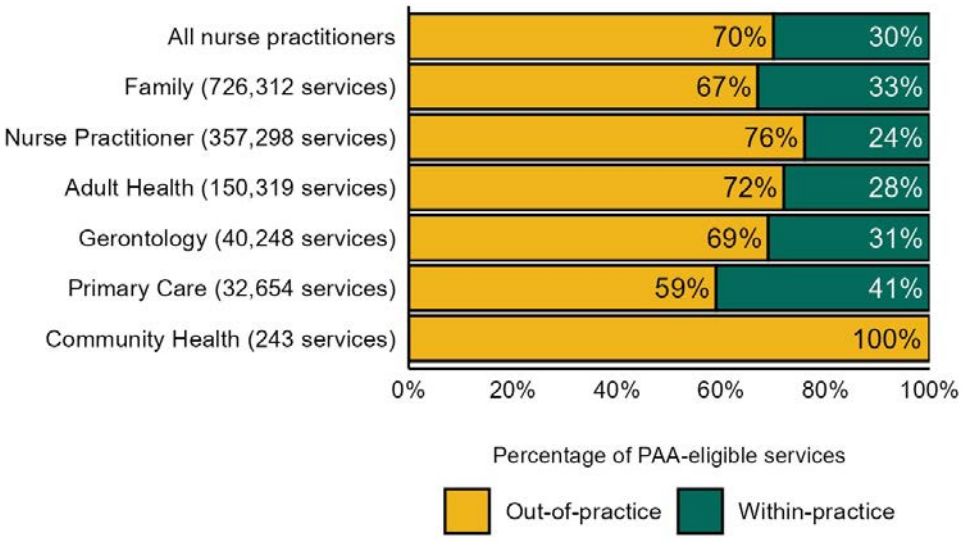
PCF = Primary Care First.

B.4. Additional PAA findings

A. PAA-qualifying services by nurse practitioner specialty designations

To identify primary care services eligible for the PAA, CMS uses practitioner taxonomy codes, or specialty designations, available in the National Plan and Provider Enumeration System (NPPES). CMS excludes services provided by nurse practitioners with certain taxonomy codes unlikely to be associated with primary care for Medicare FFS beneficiaries: "Acute Care" (363LA2100X) and "Women's Health" (363LW0102X) (see Appendix A.2.2 for more details). Exhibit B.4.1 shows the proportion of out-of-practice primary care services provided in 2022 by each nurse practitioner specialty designation eligible for inclusion in the PAA. Though "Nurse practitioner" and "Adult Health" specialty designations delivered the highest proportion of out-of-practice services, the proportion for all nurse practitioner specialties was substantially higher than the proportion of out-of-practice services delivered by physicians (21 percent, see Chapter 3, Exhibit 3.11).

Exhibit B.4.1. Out-of-practice versus within-practice PAA-eligible nurse practitioner services by specialty designation, 2022



Source: Mathematica's analysis of 2022 Medicare FFS claims data (N = 2,881 practices).
Note: Specialty designations are based on taxonomy codes available in the National Plan and Provider Enumeration System.
PAA = payment accuracy adjustment.

B. Variations in the calculation of the PAA

Exhibit B.4.2 compares the PAA calculated under the current PCF payment methodology with two variations, with each variation altering the PAA calculation logic based on concerns raised by PCF practices.

The first variation – excluding all nurse practitioners from the PAA calculation – pertains to practices' concerns that visits with NPs who provide specialty care might count as qualifying out-of-practice primary care services in the calculation of the PAA (see Appendix A.2.2 for more details). Excluding nurse practitioners is in line with the approach CMS uses for physician assistants. Because CMS is not able to accurately identify physician assistants using NPPES specialty designations, CMS excludes all services that physician assistants deliver from the PAA calculation. This approach assumes that primary care physician assistants provide the same proportion of their primary care services out of practice as physicians, nurse practitioners, and clinical nurse specialists included in the PAA. Excluding all nurse practitioners from the PAA calculation assumes that the proportion of out-of-practice primary care services provided by primary care physicians, who are most accurately identified by NPPES specialty designations, is representative of all practitioner types. Because of the substantially higher proportion of out-of-practice services delivered by nurse practitioners compared with physicians (see Exhibit 3.11), excluding all nurse practitioners from the PAA calculation reduces the average PAA from 36 percent to 27 percent. This finding of decreased PAA is consistent across all practice types except for risk group 3 and 4 practices, for which excluding nurse practitioners increases the average PAA from 37 percent to 43 percent. This suggests that nurse practitioners (with PAA-eligible taxonomy codes) are providing more within-practice care than out-of-practice care to beneficiaries attributed to risk group 3 and 4 practices.

The second variation – calculating the PAA at the organization level – pertains to concerns that practices affiliated with larger parent organizations are financially penalized by the PAA when they offer expanded access to care for their attributed beneficiaries within the organization (see Appendix A.2.2 for more details). The organization-level PAA considers all services conducted within the organization (defined by the Taxpayer Identification Number [TIN]) for PCF-attributed beneficiaries as within practice regardless of whether a practitioner on the beneficiary's attributed practice roster delivered the services. On average, the organization-level PAA (23 percent) was 13 percentage points lower than the PAA calculated under the current methodology. This finding suggests that a substantial portion of out-of-practice services counting against affiliated practices in the PAA are delivered within their larger parent organization. Using practices in hospital systems as an example, the organization-level PAA (23 percent) is 15 percentage points lower than the current PAA defined at the practice level (38 percent). This suggests that, on average, 39 percent (15 percent divided by 38 percent) of out-of-practice services are conducted within the hospital system organization.

Exhibit B.4.2. PAA variations by practice characteristics

	Number of practices	Current PAA Mean (SD)	*p*-value[a]	PAA excluding all NPs Mean (SD)	*p*-value[a]	Organization-level PAA[b] Mean (SD)	*p*-value[a]
Overall	2,881	0.36 (0.16)		0.27 (0.21)		0.23 (0.11)	
Practice affiliation			<0.01		<0.01		<0.01
Practice in hospital system	2,026	0.38 (0.15)		0.28 (0.20)		0.23 (0.11)	
Practice owned by other parent organization	377	0.37 (0.19)		0.30 (0.25)		0.26 (0.14)	
Independent practice	478	0.29 (0.16)		0.21 (0.20)		0.24 (0.12)[c]	
Specialty			<0.01		<0.01		0.69
Multispecialty	1,073	0.38 (0.15)		0.29 (0.20)		0.23 (0.12)	
Primary care	1,808	0.35 (0.17)		0.26 (0.22)		0.23 (0.11)	
Medicare Shared Savings Program participation?			<0.01		0.04		<0.01
No	1,358	0.35 (0.15)		0.26 (0.21)		0.22 (0.10)	
Yes	1,523	0.37 (0.17)		0.28 (0.22)		0.24 (0.12)	
CPC+ participation?			<0.01		<0.01		<0.01
No	1,620	0.38 (0.18)		0.30 (0.24)		0.24 (0.13)	
Yes	1,261	0.34 (0.14)		0.23 (0.16)		0.22 (0.09)	
Risk group			0.78		<0.01		0.41
Risk groups 1 and 2	2,824	0.36 (0.16)		0.27 (0.21)		0.23 (0.11)	
Risk groups 3 and 4	57	0.37 (0.24)		0.43 (0.33)		0.25 (0.20)	
Practice size (based on number of practitioners[d])			0.28		0.04		<0.01
Large	1,259	0.37 (0.14)		0.26 (0.17)		0.22 (0.10)	
Medium	1,052	0.36 (0.17)		0.27 (0.22)		0.24 (0.12)	
Small	570	0.35 (0.20)		0.29 (0.28)		0.25 (0.13)	

Source: Mathematica's analysis of 2022 Medicare FFS claims and OneKey data. Practice characteristics are defined as of the start of the intervention period (January 2021 for Cohort 1 practices and January 2022 for Cohort 2 practices).

[a] The *p*-value comes from the *t*-test for the equivalence of means.

[b] The organization is defined by TIN.

[c] The small decrease in the PAA between the current methodology and the organization-level PAA among independent practices may be caused by changes in affiliation over time (that is, independent practices at the start of PCF being acquired) or by non-primary care providers delivering PAA-eligible services.

[d] Practice size is based on the number of practitioners from any specialty: large (10 or more practitioners), medium (three to nine practitioners), and small (one or two practitioners).

CPC+ = Comprehensive Primary Care Plus; FFS = fee for service; NP = nurse practitioner; PAA = payment accuracy adjustment; SD = standard deviation; TIN = taxpayer identification number.

C. Additional analysis of organization-level payments under different PAA variations

As Appendix A.2.2 describes, we assessed whether organizations would get paid more for a PCF-attributed beneficiary to visit the practice they were attributed to than for the same beneficiary to visit another practice within the organization. We estimate that, on average, organizations were reimbursed $1.10 per beneficiary per month (PBPM) more for out-of-practice primary care visits within the organization than for primary care visits provided by the attributed practice. This is because, on average, the additional Medicare FFS reimbursement to the organization for out-of-practice services within the organization more than makes up for the lost FVF and the reduction to the PCF prospective PBP from the increased PAA (Exhibit B.4.3). Across all 429 distinct parent organizations (TINs) analyzed, 229 organizations (53 percent) received higher reimbursement under the current model payments than they would have if they retained all within-organization primary care in their PCF practice (on average, $3.04 PBPM more); 171 organizations (40 percent) would have received higher reimbursement if they retained all primary care within PCF practices (on average, $1.31 PBPM more); and 29 organizations (7 percent) received the same reimbursement across the two scenarios (meaning that their attributed PCF beneficiaries did not receive any eligible primary care services outside the PCF practice but within the organization).

Exhibit B.4.3. Primary care reimbursement analysis components

Reimbursement types	Mean PBPM reimbursement[a]		Average difference | (current – hypothetical)
	Reimbursement under current payment methodology[b]	Hypothetical reimbursement if primary care was retained by PCF practices[c]	
PAA-adjusted population-based payment	$20.32	$23.75	-$3.43
PCF flat visit fee + coinsurance	$13.73	$19.47	-$5.74
Medicare FFS[d]	$10.28	$0	$10.28
Total organizational reimbursement	**$44.32**	**$43.22**	**$1.10**

Source: Mathematica's analysis of 2022 Medicare FFS claims, OneKey, and practice application data (N = 2,276 non-independent practices corresponding to 429 TINs).

[a] Organizational reimbursement was calculated under two scenarios for all qualifying primary care services delivered to PCF-attributed beneficiaries within the organization (defined by the TIN).

[b] Each organization receives PCF payments with the PAA applied for within-practice services + regular Medicare FFS payments for out-of-practice services within the organization.

[c] Each organization receives PCF payments for all eligible primary care services performed within the organization, assuming these visits had occurred within the PCF practices (that is, with the organization-level PAA applied).

[d] This is paid according to the 2022 Medicare physician fee schedule.

FFS = fee for service; PAA = payment accuracy adjustment; PBPM = per beneficiary per month; PCF = Primary Care First; TIN = Taxpayer Identification Number.

B.5. PCF Practice Portal results

Exhibit B.5.1. Trajectories of change for care delivery activities reported in the first year of model participation compared with those reported in 2023

Reported care delivery change	Percentage of practices that reported each type of change trajectory									
	Continued making change in 2023 (was making changes to this activity in first year of PCF)			Started making change in 2023 (was not making changes to this activity in first year of PCF)			Stopped making change in 2023 (was making changes to this activity in first year of PCF)			No change either year
	Continued with a great deal of change	Continued with some change	Total: Continued with a great deal or some change	Started making a great deal of change	Started making some change	Total: Started making a great deal or some change	Stopped making change because change not needed	Stopped making change though change may be needed	Total: Stopped making changes regardless of need for change	
Access and continuity										
Increased patients' access to practitioners via billable care	3%	26%	29%	1%	26%	27%	7%	8%	15%	28%
Increased patients' access to practitioners via non-billable care	7%	27%	34%	4%	20%	24%	15%	4%	19%	22%
Scheduled longer appointments for more complex patients	4%	22%	27%	1%	15%	16%	8%	8%	17%	40%
Care management										
Improved or expanded care management processes to help patients manage medical conditions between visits	16%	39%	55%	2%	17%	19%	7%	9%	16%	10%
Improved or developed new processes to systematically follow up with patients after hospital discharge or ED visit	17%	36%	53%	5%	12%	17%	12%	6%	17%	13%

Reported care delivery change	Percentage of practices that reported each type of change trajectory									
	Continued making change in 2023 (was making changes to this activity in first year of PCF)			Started making change in 2023 (was not making changes to this activity in first year of PCF)			Stopped making change in 2023 (was making changes to this activity in first year of PCF)			
	Continued with a great deal of change	Continued with some change	Total: Continued with a great deal or some change	Started making a great deal of change	Started making some change	Total: Started making a great deal or some change	Stopped making change because change not needed	Stopped making change though change may be needed	Total: Stopped making changes regardless of need for change	No change either year
Developed or updated care plans for seriously ill and other complex, chronically ill patients	7%	35%	42%	2%	12%	14%	14%	9%	24%	20%
Improved or expanded ability to be notified when patients have a hospital discharge or ED visit	12%	27%	39%	3%	17%	20%	13%	4%	18%	23%
Patient and caregiver engagement and education										
Improved advance care planning	19%	56%	75%	1%	6%	7%	5%	7%	12%	5%
Educated patients and caregivers about alternatives to the ED	12%	50%	62%	2%	13%	15%	7%	5%	13%	10%
Initiated or increased contact with patients potentially at risk for hospitalizations or ED visits who have not had a recent contact with our practice	6%	38%	44%	1%	17%	18%	4%	13%	17%	21%
Implemented or improved a process for patients and caregivers to advise practice improvement (for example, patient surveys or a PFAC)	9%	26%	35%	1%	13%	14%	13%	12%	25%	25%

Reported care delivery change	Percentage of practices that reported each type of change trajectory									
	Continued making change in 2023 (was making changes to this activity in first year of PCF)			Started making change in 2023 (was not making changes to this activity in first year of PCF)			Stopped making change in 2023 (was making changes to this activity in first year of PCF)			
	Continued with a great deal of change	Continued with some change	Total: Continued with a great deal or some change	Started making a great deal of change	Started making some change	Total: Started making a great deal or some change	Stopped making change because change not needed	Stopped making change though change may be needed	Total: Stopped making changes regardless of need for change	No change either year
Comprehensiveness and coordination										
Increased screening for patients' social needs	22%	31%	54%	2%	15%	18%	9%	8%	17%	12%
Improved coordination with community resources to meet patients' social needs	17%	36%	53%	1%	12%	14%	6%	11%	17%	17%
Improved coordination with other providers (for example, home health agencies, pharmacists)	6%	42%	48%	1%	17%	18%	8%	4%	12%	23%
Improved coordination with specialists	5%	35%	40%	1%	20%	21%	7%	8%	15%	25%
Increased access to palliative care	3%	21%	24%	1%	19%	19%	7%	10%	16%	40%
Reduced use of lower-value tests or other services	2%	20%	22%	1%	15%	17%	7%	3%	11%	50%
Expanded the types of medical services provided at the practice site to reduce referrals to specialty care	2%	14%	16%	1%	20%	20%	8%	5%	13%	51%
Improved handoffs to new PCP when patients leave the practice	2%	12%	13%	1%	13%	14%	9%	4%	13%	60%

Reported care delivery change	Percentage of practices that reported each type of change trajectory									
	Continued making change in 2023 (was making changes to this activity in first year of PCF)			Started making change in 2023 (was not making changes to this activity in first year of PCF)			Stopped making change in 2023 (was making changes to this activity in first year of PCF)			
	Continued with a great deal of change	Continued with some change	Total: Continued with a great deal or some change	Started making a great deal of change	Started making some change	Total: Started making a great deal or some change	Stopped making change because change not needed	Stopped making change though change may be needed	Total: Stopped making changes regardless of need for change	No change either year
Planned care and population health										
Increased use of available data to improve care delivery	17%	49%	66%	5%	14%	18%	3%	5%	8%	7%

Source: Mathematica's longitudinal analysis of reported care delivery changes from PCF Practice Portal data collected at the end of practices' first year of participation in the PCF Model (2021 for Cohort 1 and 2022 for Cohort 2) and at the end of 2023 (practices' second year of participation for Cohort 2 and third year of participation for Cohort 1).

Notes: N = 2,472 practices. Percentages reflect the proportion of practices that continued, started, stopped, or did not make any change to each care delivery activity between practices' first year of participation and 2023. Some numbers in the columns marked "Total" might not be the exact sum of the two previous columns because of rounding.

ED = emergency department; PCF = Primary Care First; PCP = primary care provider; PFAC = Patient and Family Advisory Council.

B.6. Sensitivity tests conducted to test the robustness of our main findings for acute hospitalizations and Medicare Part A and B expenditures

A. Results of sensitivity tests for primary outcomes

We conducted a range of sensitivity analyses for the main difference-in-differences (frequentist) and hybrid frequentist–Bayesian impact estimates for our primary outcomes (acute hospitalizations and Medicare Part A and B expenditures). Details of the rationale and methodology for each sensitivity test appear in Appendix A.2.7. Results of the sensitivity tests, shown in Exhibits B.6.1 to B.6.4, align closely with the impact estimates from our main models reported in Chapter 5. Exhibit B.6.5 shows sample sizes for the frequentist sensitivity tests reported in Exhibits B.6.1 and B.6.2. The hybrid frequentist–Bayesian sensitivity tests, whose results are presented in Exhibits B.6.3 and B.6.4, are based on the same data as the main impact analysis.

Exhibit B.6.1. Comparison of main difference-in-differences results for acute hospitalizations (per 1,000 beneficiaries per year) with results from sensitivity analyses

Performance year	PCF mean (hospitalizations per 1,000 beneficiaries per year)	Comparison mean (hospitalizations per 1,000 beneficiaries per year)	Impact estimate (SE)	Percentage impact	*p*-value
Main difference-in-differences estimates					
Baseline years	249	248	n.a.	n.a.	n.a.
PY 1	239	238	<1 (1)	<0.1%	0.90
PY 2	249	247	1 (1)	0.4%	0.34
Average (PY 1 to PY 2)	244	243	<1 (<1)	0.2%	0.54
PY 3 (Cohort 1 only)	263	258	4 (2)	1.4%	0.12
Estimates from sensitivity tests to alter the sample composition					
Assess whether differences in practice closure between PCF and comparison practices biases impacts: Excludes practices that closed (and their matched comparisons, if applicable) between 2021 and 2023					
Baseline years	249	249	n.a.	n.a.	n.a.
PY 1	239	238	<1 (1)	0.2%	0.72
PY 2	249	247	1 (1)	0.4%	0.37
Average (PY 1 to PY 2)	244	243	<1 (1)	0.3%	0.47
PY 3 (Cohort 1 only	263	259	3 (2)	1.2%	0.20
Assess the influence of differences between the evaluation's attributed population and CMS' payment-attributed population: Attributes beneficiaries according to CMS' list of PCF participating NPI-TINs					
Baseline years	249	249	n.a.	n.a.	n.a.
PY 1	238	240	-3 (1)	-1.1%	0.06
PY 2	249	249	<-1 (1)a	-0.2%	0.63
Average (PY 1 to PY 2)	244	245	-2 (1)	-0.6%	0.15
PY 3 (Cohort 1 only	265	261	3 (3)	1.0%	0.33

Performance year	PCF mean (hospitalizations per 1,000 beneficiaries per year)	Comparison mean (hospitalizations per 1,000 beneficiaries per year)	Impact estimate (SE)	Percentage impact	*p*-value
Assess the influence of beneficiaries who stop receiving care from PCF practices during the baseline or intervention periods: Excludes beneficiaries who were not attributed in a given quarter					
Baseline years	244	243	n.a.	n.a.	n.a.
PY 1	236	235	<1 (1)	<0.1%	0.99
PY 2	241	239	<1 (1)	0.1%	0.81
Average (PY 1 to PY 2)	238	237	<1 (1)	<0.1%	0.88
PY 3 (Cohort 1 only	250	246	4 (2)	1.4%	0.15
Assess the influence of beneficiaries assigned to the intervention group in the baseline period who are no longer receiving care from PCF practices during the intervention: Excludes beneficiaries who were assigned only during the baseline period or switched intervention arm or cohort between baseline and intervention periods					
Baseline years	180	178	n.a.	n.a.	n.a.
PY 1	239	237	<-1 (1)a	-0.1%	0.81
PY 2	249	246	<1 (1)	0.3%	0.52
Average (PY 1 to PY 2)	244	242	<1 (<1)	<0.1%	0.82
PY 3 (Cohort 1 only)	263	258	3 (2)	1.2%	0.22
Assess the influence of differences in the number and types of beneficiaries attributed to the intervention and comparison groups over time: Includes only beneficiaries attributed during the first quarter of the baseline or intervention period					
Baseline years	252	252	n.a.	n.a.	n.a.
PY 1	239	239	<-1 (1)a	<-0.1%b	0.98
PY 2	254	254	<1 (1)	0.1%	0.78
Average (PY 1 to PY 2)	247	246	<1 (1)	<0.1%	0.88
PY 3 (Cohort 1 only)	274	269	5 (3)	1.9%	0.08
Assess whether results would be similar when using a single data source (OneKey) to define the entire study population: Excludes PCF practices that could not be found in OneKey data					
Baseline years	247	248	n.a.	n.a.	n.a.
PY 1	237	237	1 (1)	0.4%	0.37
PY 2	246	246	1 (1)	0.6%	0.23
Average (PY 1 to PY 2)	242	241	1 (1)	0.5%	0.23
PY 3 (Cohort 1 only)	260	258	3 (2)	1.3%	0.18
Estimates under alternative levels of clustering					
Account for uncertainty in the appropriate level of intervention assignment: Clusters standard errors at the TIN level					
Baseline years	249	248	n.a.	n.a.	n.a.
PY 1	239	238	<1 (1)	<0.1%	0.91
PY 2	249	247	1 (1)	0.4%	0.42
Average (PY 1 to PY 2)	244	243	<1 (1)	0.2%	0.59
PY 3 (Cohort 1 only)	263	258	4 (3)	1.4%	0.20

Source: Mathematica's analysis of Medicare claims data from January 2019 to December 2023.

Note: Impact estimates are based on a difference-in-differences model with a matched comparison group (see Appendix A.2.4 for methodological details). Percentage impacts are calculated by dividing the impact estimate by the estimated counterfactual, where the counterfactual is represented by the PCF mean outcome minus the impact estimate for the same performance year (that is, the mean outcome we calculate PCF practices would have experienced without the PCF Model). The percentage impacts we report may differ from those calculated using the PCF means and impact estimates in this exhibit because of rounding. For the PCF group, we show the actual unadjusted PCF means. For the comparison group, we show the actual unadjusted means for the baseline years and the adjusted mean in each performance year. We obtained the adjusted means for the comparison group by subtracting the regression-adjusted difference between the PCF and matched comparison groups in each year from the unadjusted PCF mean in that same year. Estimates for performance year 3 reflect the 2023 experience for Cohort 1 practices only.

[a] The impact estimate is between 0 and -1.

[b] The percentage impact is between 0 and -0.1 percent.

CMS = Centers for Medicare & Medicaid Services; FFS = fee for service; n.a. = not applicable; NPI = National Provider Identifier; PCF = Primary Care First; PY = performance year; SE = standard error; TIN = Taxpayer Identification Number.

Exhibit B.6.2. Comparison of main results for Medicare Part A and B expenditures ($ per beneficiary per month) with results from sensitivity analyses

Performance year	PCF mean ($ per beneficiary per month)	Comparison mean ($ per beneficiary per month)	Impact estimate (SE)	Percentage impact	*p*-value
Main difference-in-differences estimates					
Baseline years	$992	$986	n.a.	n.a.	n.a.
PY 1	$1,040	$1,016	$17 ($3)	1.7%	<0.01
PY 2	$1,118	$1,101	$10 ($4)	0.9%	<0.01
Average (PY 1 to PY 2)	$1,079	$1,059	$14 ($3)	1.3%	<0.01
PY 3 (Cohort 1 only)	$1,213	$1,193	$14 ($7)	1.2%	0.05
Estimates from sensitivity tests to alter the intervention effect parameter of interest					
Assess the extent to which PCF withdrawal dilutes model impacts: Estimate intervention effects for practices that continued participating in the model through 2023					
Baseline years	$992	$986	n.a.	n.a.	n.a.
PY 1	$1,040	$1,016	$17 ($3)	1.7%	<0.01
PY 2	$1,118	$1,101	$11 ($4)	1.0%	<0.01
Average (PY 1 to PY 2)	$1,079	$1,059	$14 ($3)	1.3%	<0.01
PY 3 (Cohort 1 only)	$1,213	$1,193	$17 ($9)	1.5%	0.05
Estimates from sensitivity tests to alter the sample composition					
Assess whether differences in practice closure between PCF and comparison practices biases impacts: Excludes practices that closed (and their matched comparisons, if applicable) between 2021 and 2023					
Baseline years	$992	$986	n.a.	n.a.	n.a.
PY 1	$1,039	$1,016	$18 ($3)	1.7%	<0.01
PY 2	$1,117	$1,101	$11 ($4)	1.0%	<0.01
Average (PY 1 to PY 2)	$1,078	$1,059	$14 ($3)	1.3%	<0.01
PY 3 (Cohort 1 only)	$1,212	$1,194	$12 ($7)	1.0%	0.08
Assess the influence of differences between the evaluation's attributed population and CMS' payment-attributed population: Attributes beneficiaries according to CMS' list of PCF participating NPI-TINs					
Baseline years	$992	$986	n.a.	n.a.	n.a.
PY 1	$1,045	$1,024	$16 ($4)	1.5%	<0.01
PY 2	$1,123	$1,107	$9 ($4)	0.8%	0.03
Average (PY 1 to PY 2)	$1,084	$1,065	$12 ($3)	1.2%	<0.01
PY 3 (Cohort 1 only)	$1,224	$1,208	$10 ($9)	0.9%	0.22

Performance year	PCF mean ($ per beneficiary per month)	Comparison mean ($ per beneficiary per month)	Impact estimate (SE)	Percentage impact	*p*-value
Assess the influence of beneficiaries who stop receiving care from PCF practices during the baseline or intervention periods: Excludes beneficiaries who were not attributed in a given quarter					
Baseline years	$967	$960	n.a.	n.a.	n.a.
PY 1	$1,027	$1,002	$18 ($3)	1.8%	<0.01
PY 2	$1,085	$1,067	$12 ($4)	1.1%	<0.01
Average (PY 1 to PY 2)	$1,056	$1,034	$15 ($3)	1.4%	<0.01
PY 3 (Cohort 1 only)	$1,165	$1,137	$21 ($8)	1.8%	<0.01
Assess the influence of beneficiaries assigned to the intervention group in the baseline period who are no longer receiving care from PCF practices during the intervention: Excludes beneficiaries who were assigned only during the baseline period or switched intervention arm or cohort between baseline and intervention periods					
Baseline years	$792	$782	n.a.	n.a.	n.a.
PY 1	$1,040	$1,012	$17 ($3)	1.7%	<0.01
PY 2	$1,118	$1,097	$11 ($4)	1.0%	<0.01
Average (PY 1 to PY 2)	$1,079	$1,055	$14 ($3)	1.3%	<0.01
PY 3 (Cohort 1 only)	$1,213	$1,194	$9 ($8)	0.7%	0.25
Assess the influence of differences in the number and types of beneficiaries attributed to the intervention and comparison groups over time: Includes only beneficiaries attributed during the first quarter of the baseline or intervention period					
Baseline years	$992	$985	n.a.	n.a.	n.a.
PY 1	$1,038	$1,015	$15 ($4)	1.5%	<0.01
PY 2	$1,135	$1,116	$11 ($4)	1.0%	<0.01
Average (PY 1 to PY 2)	$1,086	$1,065	$13 ($3)	1.2%	<0.01
PY 3 (Cohort 1 only)	$1,243	$1,212	$23 ($9)	1.9%	<0.01
Assess whether results would be similar when using a single data source (OneKey) to define the entire study population: Excludes PCF practices that could not be found in OneKey data					
Baseline years	$983	$983	n.a.	n.a.	n.a.
PY 1	$1,029	$1,011	$18 ($3)	1.8%	<0.01
PY 2	$1,106	$1,095	$12 ($4)	1.1%	<0.01
Average (PY 1 to PY 2)	$1,067	$1,053	$15 ($3)	1.4%	<0.01
PY 3 (Cohort 1 only)	$1,202	$1,187	$16 ($7)	1.4%	0.03
Estimates to account for the influence of outliers					
Assess the influence of beneficiaries with high costs on expenditure impact estimates: Trims beneficiaries' FFS expenditures at 98th percentile of the beneficiary distribution					
Baseline years	$902	$897	n.a.	n.a.	n.a.
PY 1	$955	$932	$18 ($2)	1.9%	<0.01
PY 2	$1,028	$1,011	$12 ($3)	1.2%	<0.01
Average (PY 1 to PY 2)	$992	$972	$15 ($2)	1.5%	<0.01
PY 3 (Cohort 1 only)	$1,112	$1,096	$11 ($5)	1.0%	0.04

Performance year	PCF mean ($ per beneficiary per month)	Comparison mean ($ per beneficiary per month)	Impact estimate (SE)	Percentage impact	*p*-value
Estimates under alternative levels of clustering					
Account for uncertainty in the appropriate level of intervention assignment: Clusters standard errors at the TIN level					
Baseline years	$992	$986	n.a.	n.a.	n.a.
PY 1	$1,040	$1,016	$17 ($3)	1.7%	<0.01
PY 2	$1,118	$1,101	$10 ($4)	0.9%	0.01
Average (PY 1 to PY 2)	$1,079	$1,059	$14 ($3)	1.3%	<0.01
PY 3 (Cohort 1 only)	$1,213	$1,193	$14 ($7)	1.2%	0.04

Source: Mathematica's analysis of Medicare claims data from January 2019 to December 2023.

Note: See footnote to Exhibit B.6.1.

CMS = Centers for Medicare & Medicaid Services; FFS = fee for service; n.a. = not applicable; NPI = National Provider Identifier; PCF = Primary Care First; PY = performance year; SE = standard error; TIN = Taxpayer Identification Number.

Exhibit B.6.3. Comparison of main hybrid frequentist–Bayesian impact estimates for acute hospitalizations (per 1,000 beneficiaries per year) with results from sensitivity analyses

Performance year	PCF mean (hospitalizations per 1,000 beneficiaries per year)	Impact estimate (SE) (hospitalizations per 1,000 beneficiaries per year)	Percentage impact	Probability the outcome decreased for PCF practices, relative to comparisons, by at least 1%
Main hybrid frequentist–Bayesian estimates				
PY 1	239	<1 (3)	0.2%	15%
PY 2	249	<-1 (3)a	-0.1%	22%
Average (PY 1 to PY 2)	244	<1 (3)	<0.1%	16%
PY 3 (Cohort 1 only)	263	2 (4)	0.7%	12%
Estimates assuming PCF most likely had no effect				
PY 1	239	<1 (3)	0.2%	15%
PY 2	249	<-1 (3)a	-0.1%	22%
Average (PY 1 to PY 2)	244	<1 (3)	<0.1%	16%
PY 3 (Cohort 1 only)	263	2 (4)	0.6%	13%
Estimates assuming less variability in the range of likely effects than observed in past interventions like PCF				
PY 1	239	<1 (3)	0.2%	15%
PY 2	249	<-1 (3)a	-0.1%	21%
Average (PY 1 to PY 2)	244	<1 (3)	<0.1%	16%
PY 3 (Cohort 1 only)	263	2 (4)	0.6%	12%
Estimates assuming greater variability in the range of likely effects than observed in past interventions like PCF				
PY 1	239	<1 (3)	0.2%	15%
PY 2	249	<-1 (3)a	-0.1%	22%
Average (PY 1 to PY 2)	244	<1 (2)	<0.1%	16%
PY 3 (Cohort 1 only)	263	2 (4)	0.6%	12%

Source: Mathematica's analysis of Medicare claims data from January 2019 to December 2023.

Note: See the footnote to Exhibit B.6.1. The probability of a decreases in an outcome reflects the model's impacts (that is, decreases relative to the comparison group) as a percentage of the counterfactual.

PCF = Primary Care First; PY = performance year; SE = standard error.

Exhibit B.6.4. Comparison of main hybrid frequentist–Bayesian impact estimates for Medicare Part A and B expenditures ($ per beneficiary per month) with results from sensitivity analyses

Performance year	PCF mean ($ per beneficiary per month)	Impact estimate (SE) ($ per beneficiary per month)	Percentage impact	Probability the outcome decreased for PCF practices, relative to comparisons, by at least 1%
Main hybrid frequentist–Bayesian estimates				
PY 1	$1,040	$19 ($8)	1.8%	< 1%
PY 2	$1,118	$11 ($9)	1%	< 1%
Average (PY 1 to PY 2)	$1,079	$15 ($8)	1.4%	< 1%
PY 3 (Cohort 1 only)	$1,213	$17 ($12)	1.5%	< 1%
Estimates assuming PCF most likely had no effect				
PY 1	$1,040	$19 ($8)	1.9%	< 1%
PY 2	$1,118	$11 ($9)	1%	< 1%
Average (PY 1 to PY 2)	$1,079	$15 ($8)	1.4%	< 1%
PY 3 (Cohort 1 only)	$1,213	$17 ($12)	1.4%	< 1%
Estimates assuming less variability in the range of likely effects than observed in past interventions like PCF				
PY 1	$1,040	$19 ($8)	1.9%	< 1%
PY 2	$1,118	$11 ($9)	1%	< 1%
Average (PY 1 to PY 2)	$1,079	$15 ($8)	1.4%	< 1%
PY 3 (Cohort 1 only)	$1,213	$17 ($12)	1.5%	< 1%
Estimates assuming greater variability in the range of likely effects than observed in past interventions like PCF				
PY 1	$1,040	$18 ($8)	1.8%	< 1%
PY 2	$1,118	$10 ($9)	0.9%	< 1%
Average (PY 1 to PY 2)	$1,079	$14 ($7)	1.3%	< 1%
PY 3 (Cohort 1 only)	$1,213	$16 ($12)	1.3%	1%

Source: Mathematica's analysis of Medicare claims data from January 2019 to December 2023.

Note: See the footnote to Exhibit B.6.1. The probability of a decreases in an outcome reflects the model's impacts (that is, decreases relative to the comparison group) as a percentage of the counterfactual.

PCF = Primary Care First; PY = performance year; SE = standard error.

Exhibit B.6.5. Number of practices and beneficiaries included in the frequentist sensitivity analyses for acute hospitalizations and Medicare Part A and B expenditures

	Number of practices (beneficiaries) in performance year 1	
	PCF	Comparison
Analysis		
Main difference-in-differences analysis	2,741 (1,923,384)	7,144 (3,162,071)
Sensitivity tests to alter the intervention effect parameter of interest		
Assess the extent to which PCF withdrawal dilutes model impacts: Estimate intervention effects for practices that continued participating in the model through 2023	2,741 (1,923,384)	7,144 (3,162,071)
Sensitivity tests to alter the sample composition		
Assess whether differences in practice closure between PCF and comparison practices biases impacts: Excludes practices that closed (and their matched comparisons, if applicable) from 2021 to 2023	2,685 (1,903,610)	6,429 (2,982,307)
Assess the influence of differences between the evaluation's attributed population and CMS' payment-attributed population: Attributes beneficiaries according to CMS' list of PCF participating NPI-TINs	2,741 (1,957,625)	7,144 (3,157,147)
Assess the influence of beneficiaries who stop receiving care from PCF practices during the baseline or intervention periods: Excludes beneficiaries who were not attributed in a given quarter	2,741 (1,923,375)	7,144 (3,162,060)
Assess the influence of beneficiaries assigned to the intervention group in the baseline period who are no longer receiving care from PCF practices during the intervention: Excludes beneficiaries who were assigned only during the baseline period or switched intervention arm or cohort between baseline and intervention periods	2,741 (1,923,384)	7,144 (3,162,071)
Assess the influence of differences in the number and types of beneficiaries attributed to the intervention and comparison groups over time: Includes only beneficiaries attributed during the first quarter of the baseline or intervention period	2,739 (1,663,219)	7,139 (2,737,027)
Assess whether results would be similar when using a single data source (OneKey) to define the entire study population: Excludes PCF practices that could not be found in OneKey data	2,524 (1,806,003)	6,462 (2,922,292)
Sensitivity tests to account for the influence of outliers		
Assess the influence of beneficiaries with high costs on expenditure impact estimates: Trims beneficiaries' FFS expenditures at 98th percentile of the beneficiary distribution	2,741 (1,923,384)	7,144 (3,162,071)
Sensitivity tests under alternatives levels of clustering		
Account for uncertainty in the appropriate level of intervention assignment: Clusters standard errors at the TIN level	2,741 (1,923,384)	7,144 (3,162,071)

Source: Mathematica's analysis of Medicare claims data from January 2019 to December 2023.

CMS = Centers for Medicare & Medicaid Services; FFS = fee for service; NPI = National Provider Identifier; PCF = Primary Care First; TIN = Taxpayer Identification Number.

B. Participation in other CMS initiatives results

Exhibit B.6.6 reports participation in various CMS initiatives for PCF and comparison practices during each baseline year and performance year. Participation in most initiatives is not at the practice level, so we measured practice participation as the proportion of assigned beneficiaries in each group (PCF and comparison) that were aligned with the initiative in a year. More details on each initiative, data sources, and the process for determining participation appear in Appendix A.2.9. Appendix A.2.9 also describes how participation in other CMS initiatives could potentially affect our interpretation of PCF's impacts.

Participation in most CMS initiatives was low (less than 1 percent) for both PCF and comparison practices during each baseline year and performance year. Two notable exceptions were for the Medicare Shared Savings Program (MSSP) and ACO REACH.

- Participation in MSSP was between 46 and 59 percent for PCF and comparison practices. This relatively high participation reflects how CMS allowed concurrent participation in PCF and MSSP, and, as a result, the evaluation selected comparison practices that participated in MSSP during the baseline at similar rates to the PCF practices. Although participation in MSSP tended to increase each year, the difference in participation between PCF and comparison practices remained stable (less than 5 percentage points each year).
- Participation in ACO REACH (formerly Global and Professional Direct Contracting [GPDC]) among PCF practices rose from about zero during the baseline years—reflecting how CMS prohibits concurrent participation in PCF and these models and that we selected comparisons from non-participants—to 7.7 percent by performance year 3. This increase in ACO REACH participation is consistent with findings we report in Chapter 2: the number of PCF practices leaving PCF to join the GPDC Model or ACO REACH rose each year. Participation in ACO REACH for comparison practices remained relatively stable over each PCF performance year (between 7.1 and 9.2 percent), leading to differences in ACO REACH participation between PCF and comparison practices that have fallen from 6.6 percentage points in performance year 1 to 1.0 percentage point by performance year 3.

Because participation in other CMS initiatives was similar between the PCF and comparison groups, we do not expect these initiatives would have a large influence on estimates of PCF's impacts.

Exhibit B.6.6. Participation in other initiatives by beneficiaries in PCF practices and comparison practices during the baseline and first three performance years

CMS initiative	PCF performance year	Percentage of Medicare FFS beneficiaries aligned with the initiative, PCF group	Percentage of Medicare FFS beneficiaries aligned with the initiative, comparison group	Percentage point difference (PCF - comparison)
Medicare Shared Savings Program (all tracks)	Baseline Year 1	50.3 %	46.2 %	4.1
	Baseline Year 2	49.3 %	47.9 %	1.4
	PY 1	56.0 %	53.4 %	2.6
	PY 2	59.5 %	54.9 %	4.7
	PY 3 (Cohort 1 only)	55.2 %	57.8 %	-2.6
Global and Professional Direct Contracting/ ACO REACH Model[a]	Baseline Year 1	0.0%	0.0%	0.0
	Baseline Year 2	< 0.1 %	2.5 %	-2.4
	PY 1	0.5 %	7.1 %	-6.6
	PY 2	3.7 %	9.2 %	-5.4
	PY 3 (Cohort 1 only)	7.7 %	8.8 %	-1.0
Independence at Home Demonstration	Baseline Year 1	0.1 %	0.0%	0.1
	Baseline Year 2	0.1 %	0.0%	0.1
	PY 1	0.1 %	0.0%	0.1
	PY 2	0.1 %	0.0%	0.1
	PY 3 (Cohort 1 only)	0.0%	0.0%	0.0
Comprehensive ESRD Care Model	Baseline Year 1	0.0%	0.1%	-0.1
	Baseline Year 2	0.0%	0.1 %	-0.1
	PY 1	0.0%	< 0.1 %	< -0.1
	PY 2	0.0%	0.0%	0.0
	PY 3 (Cohort 1 only)	0.0%	0.0%	0.0
Next Generation ACO Model	Baseline Year 1	2.6 %	7.3 %	-4.6
	Baseline Year 2	2.0 %	6.1 %	-4.0
	PY 1	0.0%	2.1 %	-2.1
	PY 2	0.0%	0.0%	0.0
	PY 3 (Cohort 1 only)	0.0%	0.0%	0.0
Value in Opioid Use Disorder Treatment Demonstration Program	Baseline Year 1	0.0%	0.0%	0.0
	Baseline Year 2	0.0%	0.0%	0.0
	PY 1	0.0%	0.0%	0.0
	PY 2	0.0%	< 0.1 %	< -0.1
	PY 3 (Cohort 1 only)	0.0%	< 0.1 %	< -0.1
Accountable Health Communities[b]	Baseline Year 1	34.8 %	26.0 %	8.7
	Baseline Year 2	38.9 %	32.4 %	6.4
	PY 1	10.1 %	3.0 %	7.0
	PY 2	NA	NA	NA
	PY 3 (Cohort 1 only)	NA	NA	NA

CMS initiative	PCF performance year	Percentage of Medicare FFS beneficiaries aligned with the initiative, PCF group	Percentage of Medicare FFS beneficiaries aligned with the initiative, comparison group	Percentage point difference (PCF - comparison)
Million Hearts Cardiovascular Disease Risk Reduction Model	Baseline Year 1	0.1 %	0.1 %	< 0.1
	Baseline Year 2	0.1 %	< 0.1 %	< 0.1
	PY 1	< 0.1 %	< 0.1 %	< 0.1
	PY 2	0.0%	0.0%	0.0
	PY 3 (Cohort 1 only)	0.0%	0.0%	0.0
BPCI Advanced[c]	Baseline Year 1	1.1 %	1.1 %	< 0.1
	Baseline Year 2	1.2 %	1.1 %	0.1
	PY 1	0.6 %	0.5 %	0.1
	PY 2	0.1 %	0.1 %	< 0.1
	PY 3 (Cohort 1 only)	NA	NA	NA
Oncology Care Model	Baseline Year 1	0.2 %	0.2 %	< 0.1
	Baseline Year 2	0.3 %	0.2 %	< 0.1
	PY 1	0.1 %	0.1 %	< -0.1
	PY 2	< 0.1 %	< 0.1 %	< -0.1
	PY 3 (Cohort 1 only)	0.0%	0.0%	0.0
Comprehensive Care for Joint Replacement Model	Baseline Year 1	0.2 %	0.2 %	< 0.1
	Baseline Year 2	0.1 %	0.1 %	< 0.1 %
	PY 1	< 0.1 %	< 0.1 %	< 0.1 %
	PY 2	0.0%	0.0%	0.0
	PY 3 (Cohort 1 only)	0.0%	0.0%	0.0

Source: Practitioner-level MDM extracts from February 25, 2024; CMS Accountable Health Communities roster, and the non-claims-based payment extract, which had payments up to February 1, 2024.

Note: We measure practice participation as the percentage of beneficiaries who were aligned with the initiative in a given year, separately for PCF and comparison practices. We calculated the difference in participation in a given year in each track between PCF and comparison practices as the percentage point difference.

[a] Global and Professional Direct Contracting was replaced by ACO REACH in January 2023.

[b] At the time of analysis, participation data were available only through 2021 for the Accountable Health Communities model. Therefore, participation rates are not available for performance years 2 and 3 for Cohort 1 and performance years 1, 2, and 3 for Cohort 2.

[c] At the time of analysis, participation data were available only through 2022 for the BPCI Advanced Model. Therefore, participation rates are not available for performance year 3 for Cohort 1 and performance year 2 for Cohort 2.

ACO = accountable care organization; ACO REACH = Accountable Care Organization Realizing Equity, Access, and Community Health Model; BPCI = Bundled Payments for Care Improvement; CMS = Centers for Medicare & Medicaid Services; ESRD= end-stage renal disease; MDM = CMS Master Data Management system; NA = not available; PCF = Primary Care First; PY = performance year.

C. Comparison of PCF impacts on Medicare Part A and B expenditures, as measured with and without payments from the MSSP

Many PCF and comparison practices participated in MSSP before and during the PCF performance years, but we did not include MSSP payments in our main Medicare Part A and B expenditures measure because of a lag in data availability for these payments. In Exhibit B.6.7, we compare estimated impacts of PCF on (1) our main Medicare Part A and B expenditures measure and (2) Medicare Part A and B expenditures, including MSSP payments. Because we did not have MSSP payment information from 2023 at the time of writing, we report results through performance year 1 (this is the only performance year in which estimates reflect effects for both Cohorts 1 and 2 before 2023). Estimates are calculated using the evaluation's main frequentist regression approach, described in Appendix A.2.4. We found PCF impacts were similar whether we incorporated MSSP payments in our expenditures measure.

Exhibit B.6.7. Comparison of PCF impacts on Medicare Part A and B expenditures, measured with and without MSSP payments, in performance year 1

Performance year	PCF outcome mean	Impact estimate (SE)	Percentage impact	*p*-value
Medicare Part A and B expenditures ($ PBPM)				
PY 1	$1,040	$17 ($3)	1.7%	<0.01
Medicare Part A and B expenditures with MSSP payments ($ PBPM)				
PY 1	$1,046	$18 ($3)	1.7%	<0.01

Source: Mathematica's analysis of Medicare claims data from January 2019 to December 2022.

Note: See the footnote to Exhibit B.6.1.

MSSP = Medicare Shared Savings Program; PBPM = per beneficiary per month; PCF = Primary Care First; PY = performance year; SE = standard error.

B.7. Detailed findings from impact analyses

A. Practice and beneficiary sample size for the main impact analysis shown in Chapter 5

Exhibit B.7.1 shows the number of practices and beneficiaries, post-acute care episodes, or discharges included in the impact analysis in Chapter 5, by outcome. Sample sizes are reported separately by PCF and comparison practices and are shown for performance year 1 (2021 for Cohort 1, 2022 for Cohort 2). Sample sizes for the baseline years and performance year 2 differ slightly from performance year 1 in that they mainly reflect changes in the beneficiary population assigned (see Appendix A.2.1) (for example, because of beneficiaries dying or being newly attributed to a practice). Impact estimates for performance year 3 reflect only Cohort 1's experience in 2023, and the sample sizes for performance year 3 are similar to the Cohort 1 sample sizes shown in performance year 1.

Exhibit B.7.1. Impact analysis sample size by cohort and outcome

Measure	Number of PCF practices (beneficiaries/discharges) in performance year 1		Number of comparison practices (beneficiaries/discharges) in performance year 1	
Primary outcomes	**Cohort 1**	**Cohort 2**	**Cohort 1**	**Cohort 2**
Acute hospitalizations	729 practices (500,070 beneficiaries)	2,012 practices (1,423,314 beneficiaries)	2,322 practices (1,127,094 beneficiaries)	4,853 practices (2,034,977 beneficiaries)
Medicare Part A and B expenditures	729 practices (500,070 beneficiaries)	2,012 practices (1,423,314 beneficiaries)	2,322 practices (1,127,094 beneficiaries)	4,853 practices (2,034,977 beneficiaries)
Secondary outcomes				
Inpatient expenditures ($ PBPM)	729 practices (500,070 beneficiaries)	2,012 practices (1,423,314 beneficiaries)	2,322 practices (1,127,094 beneficiaries)	4,853 practices (2,034,977 beneficiaries)
Post-acute care expenditures ($ per post-acute care episode)	729 practices (35,553 episodes)	1,993 practices (94,217 episodes)	2,298 practices (78,914 episodes)	4,773 practices (139,420 episodes)
Outpatient ED visits (per 1,000 beneficiaries per year)	729 practices (500,070 beneficiaries)	2,012 practices (1,423,314 beneficiaries)	2,322 practices (1,127,094 beneficiaries)	4,853 practices (2,034,977 beneficiaries)
Primary-care-substitutable ED visits (per 1,000 beneficiaries per year)	729 practices (500,070 beneficiaries)	2,012 practices (1,423,314 beneficiaries)	2,322 practices (1,127,094 beneficiaries)	4,853 practices (2,034,977 beneficiaries)
Proportion of inpatient discharges with unplanned 30-day acute care	729 practices (92,222 discharges)	2,012 practices (254,846 discharges)	2,322 practices (202,180 discharges)	4,853 practices (366,520 discharges)
Proportion of inpatient discharges with unplanned 30-day readmission	729 practices (92,222 discharges)	2,012 practices (254,846 discharges)	2,322 practices (202,180 discharges)	4,853 practices (366,520 discharges)
Medical admissions (per 1,000 beneficiaries per year)	729 practices (500,070 discharges)	2,012 practices (1,423,314 discharges)	2,322 practices (1,127,094 discharges)	4,853 practices (2,034,977 discharges)
Leading indicators				
Ambulatory primary care visits by beneficiaries at practices in their assigned treatment group (per 1,000 beneficiaries per year)	729 practices (500,065 beneficiaries)	2,012 practices (1,423,310 beneficiaries)	2,322 practices (1,127,091 beneficiaries)	4,853 practices (2,034,969 beneficiaries)
Practice revenue for primary care visits by beneficiaries at practices in their assigned treatment group ($ PBPM)	729 practices (500,065 beneficiaries)	2,012 practices (1,423,310 beneficiaries)	2,322 practices (1,127,091 beneficiaries)	4,853 practices (2,034,969 beneficiaries)

Measure	Number of PCF practices (beneficiaries/discharges) in performance year 1		Number of comparison practices (beneficiaries/discharges) in performance year 1	
Proportion of beneficiaries who received an Annual Wellness Visit	729 practices (500,070 beneficiaries)	2,012 practices (1,423,314 beneficiaries)	2,322 practices (1,127,094 beneficiaries)	4,853 practices (2,034,977 beneficiaries)
Proportion of inpatient discharges, ED visits, or observation stays with follow-up billable service within seven days	729 practices (260,072 discharges)	2,010 practices (739,951 discharges)	2,319 practices (579,880 discharges)	4,841 practices (1,052,357 discharges)
Telehealth use (per 1,000 beneficiaries per year)	729 practices (500,070 beneficiaries)	2,012 practices (1,423,314 beneficiaries)	2,322 practices (1,127,094 beneficiaries)	4,853 practices (2,034,977 beneficiaries)
Proportion of eligible beneficiaries who adhere to medications prescribed for multiple chronic conditions	729 practices (109,934 beneficiaries)	2,009 practices (315,991 beneficiaries)	2,315 practices (244,177 beneficiaries)	4,840 practices (454,445 beneficiaries)
Days in hospice for beneficiaries receiving hospice care	718 practices (11,506 beneficiaries)	1,960 practices (30,155 beneficiaries)	2,157 practices (23,673 beneficiaries)	4,413 practices (42,185 beneficiaries)
Behavioral health visits to behavioral health specialists in an ambulatory setting (per 1,000 beneficiaries per year)	729 practices (500,070 beneficiaries)	2,012 practices (1,423,314 beneficiaries)	2,322 practices (1,127,094 beneficiaries)	4,853 practices (2,034,977 beneficiaries)
Observation stays (per 1,000 beneficiaries per year)	729 practices (500,070 beneficiaries)	2,012 practices (1,423,314 beneficiaries)	2,322 practices (1,127,094 beneficiaries)	4,853 practices (2,034,977 beneficiaries)
Proportion of elderly beneficiaries experiencing high-risk medication use	729 practices (313,414 beneficiaries)	2,012 practices (942,888 beneficiaries)	2,320 practices (705,611 beneficiaries)	4,850 practices (1,347,897 beneficiaries)
Proportion of beneficiaries who received primary care–adjacent low-value services	729 practices (431,277 beneficiaries)	2,012 practices (1,228,201 beneficiaries)	2,322 practices (976,839 beneficiaries)	4,852 practices (1,752,710 beneficiaries)
Urgent care center visits (per 1,000 beneficiaries per year	729 practices (500,070 beneficiaries)	2,012 practices (1,423,314 beneficiaries)	2,322 practices (1,127,094 beneficiaries)	4,853 practices (2,034,977 beneficiaries)
Ambulatory primary care visits (per 1,000 beneficiaries per year)	729 practices (500,070 beneficiaries)	2,012 practices (1,423,314 beneficiaries)	2,322 practices (1,127,094 beneficiaries)	4,853 practices (2,034,977 beneficiaries)
Proportion of eligible beneficiaries who received a transitional care management–billable service	729 practices (500,070 beneficiaries)	2,012 practices (1,423,314 beneficiaries)	2,322 practices (1,127,094 beneficiaries)	4,853 practices (2,034,977 beneficiaries)

Source: Mathematica's analysis of Medicare claims data from January 2019 to December 2023.

ED = emergency department; PBPM = per beneficiary per month; PCF = Primary Care First.

B. Full results for primary outcomes

Exhibit B.7.2 shows frequentist impact estimates and hybrid frequentist–Bayesian probabilities for each primary outcome along with regression-adjusted means for the baseline years and performance years. The results in this table differ from those reported in the main text of the report (Chapter 5) only in that they show means for the PCF and the comparison groups in the baseline years as well as the model's performance years. For the PCF group, we show the actual unadjusted PCF means. For the comparison group, we show the actual unadjusted means for the baseline years and the adjusted mean in each performance year. We obtained the adjusted means for the comparison group by subtracting the regression-adjusted difference between the PCF and matched comparison groups in each year from the unadjusted PCF mean in that same year.

Exhibit B.7.3 shows the distribution of hybrid frequentist–Bayesian probabilities of PCF impacts on acute hospitalizations and Medicare Part A and B expenditures each performance year. We summarized these results in Chapter 5.

Exhibit B.7.2. Regression-adjusted means and impacts on primary outcomes for Medicare FFS beneficiaries over the first three performance years

Performance year	PCF outcome mean	Comparison outcome mean	Impact estimate (SE)	Percentage impact	*p*-value	Probability the outcome decreased for PCF practices, relative to comparisons, by at least 1%
Acute hospitalizations (per 1,000 beneficiaries per year)						
Baseline years	249	248	n.a.	n.a.	n.a.	n.a.
PY 1	239	238	<1 (1)	<0.1%	0.90	15%
PY 2	249	247	1 (1)	0.4%	0.34	22%
Average (PY 1 to PY 2)	244	243	<1 (<1)	0.2%	0.54	16%
PY 3 (Cohort 1 only)	263	258	4 (2)	1.4%	0.12	12%
Medicare Part A and B expenditures ($ PBPM)						
Baseline years	$992	$986	n.a.	n.a.	n.a.	n.a.
PY 1	$1,040	$1,016	$17 ($3)	1.7%	<0.01	<1%
PY 2	$1,118	$1,101	$10 ($4)	0.9%	<0.01	<1%
Average (PY 1 to PY 2)	$1,079	$1,059	$14 ($3)	1.3%	<0.01	<1%
PY 3 (Cohort 1 only)	$1,213	$1,193	$14 ($7)	1.2%	0.05	<1%

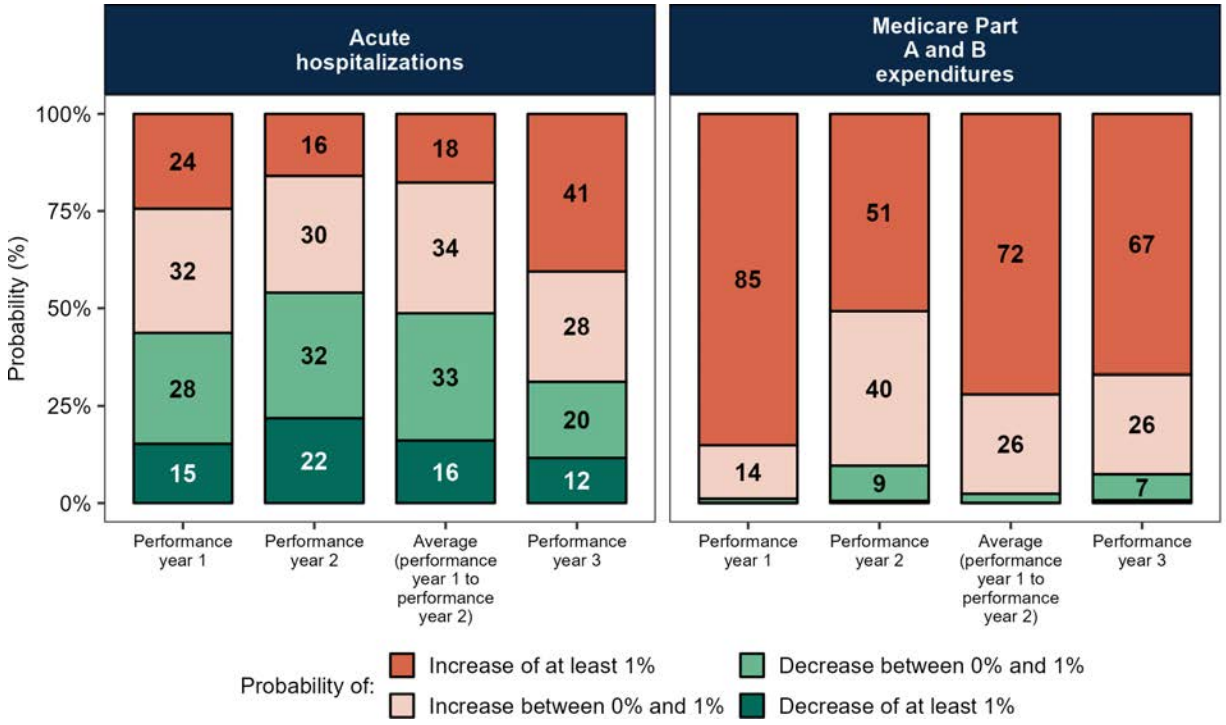
Source: Mathematica's analysis of Medicare claims data from January 2019 to December 2023.

Notes: Impact estimates are based on a difference-in-differences model with a matched comparison group (see Appendix A.2.4 for methodological details). We calculate percentage impacts by dividing the impact estimate by the estimated counterfactual, where the counterfactual is represented by the PCF mean outcome minus the impact estimate for the same performance year (that is, the mean outcome we calculate PCF practices would have experienced without the PCF Model). The percentage impacts we report may differ from those calculated from the PCF means and impact estimates in this exhibit because of rounding. For the PCF group, we show the actual unadjusted PCF means. For the comparison group, we show the actual unadjusted means for the baseline years and the adjusted mean in each performance year. We obtained the adjusted means for the comparison group by subtracting the regression-adjusted difference between the PCF and matched

comparison groups in each year from the unadjusted PCF mean in that same year. The probability of a decrease in an outcome comes from the hybrid frequentist-Bayesian analysis and reflects model impacts (that is, decreases relative to the comparison group) as a percentage of the counterfactual. Estimates for performance year 3 reflect 2023 experience for Cohort 1 practices only.

FFS = fee for service; n.a. = not applicable; PBPM = per beneficiary per month; PCF = Primary Care First; PY = performance year; SE = standard error.

Exhibit B.7.3. Distribution of likely impacts of PCF on acute hospitalizations and Medicare Part A and B expenditures, by performance year



Source: Mathematica's analysis of Medicare claims data from January 2019 to December 2023.

Note: For readability, we did not label very small bar segments. Including the unlabeled segments, the total probability in each bar sums to 100 percent.

PCF = Primary Care First.

C. Full results for leading indicators

Exhibit B.7.4 shows the impact results by performance year for leading indicators, along with regression-adjusted means for the baseline years and performance years. We did not produce hybrid frequentist–Bayesian probabilities for the leading indicators; we elaborate on the rationale for this decision in Appendix A.2.6. We summarize these results in Chapter 5.

For three leading indicators, we note in Exhibit B.7.4 that there was evidence of differences in baseline trends between PCF and comparison practices. A core assumption of difference-in-differences methods is that any outcome difference between the PCF and comparison groups would stay the same if not for the model (an assumption known as the parallel trends assumption). We show results for the three leading indicators that did not pass our tests of the parallel trends assumption for completeness, but we cannot interpret the estimates as impacts of PCF.

Exhibit B.7.4. Regression-adjusted means and impacts on leading indicators for Medicare FFS beneficiaries over the first three performance years

Performance year	PCF mean	Comparison mean	Impact estimate (SE)	Percentage impact	*p*-value
Ambulatory primary care visits by attributed beneficiaries (per 1,000 beneficiaries per year)					
Baseline years	2,931	3,110	n.a.	n.a.	n.a.
PY 1	2,848	3,008	19 (16)	0.7%	0.25
PY 2	2,791	2,927	43 (20)	1.6%	0.03
Average (PY 1 to PY 2)	2,819	2,967	31 (16)	1.1%	0.06
PY 3 (Cohort 1 only)	2,727	2,868	38 (44)	1.4%	0.39
Practice revenue for primary care visits by attributed beneficiaries ($ PBPM)					
Baseline years	$25	$26	n.a.	n.a.	n.a.
PY 1	$41	$26	$15 (<$1)	58.6%	<0.01
PY 2	$37	$26	$11 (<$1)	44.9%	<0.01
Average (PY 1 to PY 2)	$39	$26	$13 (<$1)	51.7%	<0.01
PY 3 (Cohort 1 only)	$32	$25	$7 (<$1)	28.6%	<0.01
Proportion of beneficiaries who received an Annual Wellness Visit					
Baseline years	0.46	0.45	n.a.	n.a.	n.a.
PY 1	0.52	0.51	0.007 (0.004)	1.3%	0.08
PY 2	0.55	0.53	0.015 (0.004)	2.7%	<0.01
Average (PY 1 to PY 2)	0.54	0.52	0.011 (0.004)	2.0%	<0.01
PY 3 (Cohort 1 only)	0.56	0.54	0.019 (0.009)	3.6%	0.04
Proportion of inpatient discharges, ED visits, or observation stays with follow-up billable service within seven days[a]					
Baseline years	0.51	0.50	n.a.	n.a.	n.a.
PY 1	0.51	0.50	-0.002 (0.001)	-0.4%	0.15
PY 2	0.51	0.51	-0.004 (0.001)	-0.8%	<0.01
Average (PY 1 to PY 2)	0.51	0.50	-0.003 (0.001)	-0.6%	0.01
PY 3 (Cohort 1 only)	0.50	0.50	-0.007 (0.003)	-1.4%	<0.01
Telehealth use (per 1,000 beneficiaries per year)					
Baseline years	963	928	n.a.	n.a.	n.a.
PY 1	848	821	-8 (11)	-0.9%	0.47
PY 2	704	676	-7 (12)	-1.0%	0.55
Average (PY 1 to PY 2)	776	748	-8 (11)	-1.0%	0.49
PY 3 (Cohort 1 only)	759	756	-33 (21)	-4.1%	0.12
Proportion of eligible beneficiaries who adhere to medications prescribed for multiple chronic conditions					
Baseline years	0.69	0.68	n.a.	n.a.	n.a.
PY 1	0.69	0.69	0.002 (0.001)	0.3%	0.10
PY 2	0.69	0.69	<0.001 (0.002)	<0.1%	0.75
Average (PY 1 to PY 2)	0.69	0.69	0.001 (0.001)	0.2%	0.26
PY 3 (Cohort 1 only)	0.68	0.68	<0.001 (0.003)	0.1%	0.74

Performance year	PCF mean	Comparison mean	Impact estimate (SE)	Percentage impact	*p*-value
Days in hospice (per year) for beneficiaries receiving hospice care					
Baseline years	75	72	n.a.	n.a.	n.a.
PY 1	61	58	<1 (1)	0.8%	0.63
PY 2	85	82	<1 (1)	0.7%	0.60
Average (PY 1 to PY 2)	73	70	<1 (<1)	0.8%	0.57
PY 3 (Cohort 1 only)	96	91	3 (2)	2.7%	0.19
Visits to behavioral health specialists in an ambulatory setting (per 1,000 beneficiaries per year)					
Baseline years	605	562	n.a.	n.a.	n.a.
PY 1	598	556	<-1 (5)[b]	<-0.1%[c]	0.93
PY 2	621	573	4 (6)	0.7%	0.45
Average (PY 1 to PY 2)	609	565	2 (5)	0.3%	0.69
PY 3 (Cohort 1 only)	659	596	21 (12)	3.2%	0.09
Observation stays (per 1,000 beneficiaries per year)					
Baseline years	88	85	n.a.	n.a.	n.a.
PY 1	88	84	<1 (<1)	1.1%	0.17
PY 2	88	85	<-1 (<1)[b]	-0.6%	0.53
Average (PY 1 to PY 2)	88	85	<1 (<1)	0.2%	0.77
PY 3 (Cohort 1 only)	90	88	-1 (1)	-1.5%	0.37
Proportion of elderly beneficiaries experiencing high-risk medication use					
Baseline years	0.14	0.14	n.a.	n.a.	n.a.
PY 1	0.13	0.13	<-0.001 (<0.001)[b]	-0.2%	0.64
PY 2	0.13	0.13	<0.001 (<0.001)	0.1%	0.76
Average (PY 1 to PY 2)	0.13	0.13	<-0.001 (<0.001)[b]	<-0.1%[c]	0.96
PY 3 (Cohort 1 only)	0.13	0.13	<-0.001 (0.001)[b]	-0.6%	0.46
Number of primary care–adjacent low-value services (per 1,000 beneficiaries per year)					
Baseline years	115	131	n.a.	n.a.	n.a.
PY 1	124	139	<1 (1)	0.4%	0.66
PY 2	128	142	2 (1)	1.8%	0.09
Average (PY 1 to PY 2)	126	140	1 (1)	1.1%	0.22
PY 3 (Cohort 1 only)	152	162	6 (4)	4.1%	0.14
Urgent care center visits (per 1,000 beneficiaries per year) (evidence of PCF-comparison differences in baseline trends)					
Baseline years	194	194	n.a.	n.a.	n.a.
PY 1	225	228	-3 (2)	-1.4%	0.19
PY 2	224	233	-10 (3)	-4.1%	<0.01
Average (PY 1 to PY 2)	224	230	-6 (2)	-2.8%	<0.01
PY 3 (Cohort 1 only)	234	246	-12 (5)	-4.9%	0.02

Performance year	PCF mean	Comparison mean	Impact estimate (SE)	Percentage impact	*p*-value
Ambulatory primary care visits (per 1,000 beneficiaries per year) (evidence of PCF-comparison differences in baseline trends)					
Baseline years	4,665	4,797	n.a.	n.a.	n.a.
PY 1	4,818	4,976	-27 (13)	-0.5%	0.04
PY 2	5,001	5,161	-28 (16)	-0.6%	0.08
Average (PY 1 to PY 2)	4,910	5,069	-27 (14)	-0.6%	0.04
PY 3 (Cohort 1 only)	5,205	5,369	-33 (34)	-0.6%	0.33
Proportion of eligible beneficiaries who received a transitional care management–billable service (evidence of PCF-comparison differences in baseline trends)					
Baseline years	`	0.04	n.a.	n.a.	n.a.
PY 1	0.05	0.05	<0.001 (<0.001)	1.4%	0.31
PY 2	0.05	0.05	<0.001 (<0.001)	0.9%	0.56
Average (PY 1 to PY 2)	0.05	0.05	<0.001 (<0.001)	1.1%	0.40
PY 3 (Cohort 1 only)	0.05	0.05	<0.001 (0.002)	1.4%	0.66

Source: Mathematica's analysis of Medicare claims data from January 2019 to December 2023.

Note: See the footnote to Exhibit B.7.2.

[a] We constructed our analytic sample for the proportion of inpatient discharges, ED visits, or observation stays with follow-up billable service within seven days from discharge-level observations. The regression models for these outcomes included additional control variables compared with models run on outcomes constructed from beneficiary-level observations.

[b] The impact estimate is between 0 and -1.

[c] The percentage impact is between 0 and -0.1 percent.

ED = emergency department; FFS = fee for service; n.a. = not applicable; PBPM = per beneficiary per month; PCF = Primary Care First; PY = performance year; SE = standard error.

D. Full results for secondary outcomes

Exhibit B.7.5 shows the frequentist impact estimates and hybrid frequentist–Bayesian probabilities for secondary outcomes by performance year, along with regression-adjusted means for the baseline years and each performance year. Exhibit B.7.6 shows the distribution of hybrid frequentist–Bayesian probabilities of PCF impacts for the secondary outcomes each performance year. We summarized these results in Chapter 5.

For one secondary outcome (medical admissions), Exhibit B.7.5 notes that there was evidence of differences in baseline trends between PCF and comparison practices. A core assumption of difference-in-differences methods is that any outcome difference between the PCF and comparison groups would stay the same if not for the model (an assumption known as the parallel trends assumption). We show the difference-in-differences results for medical admissions for completeness, but we cannot interpret the estimates as impacts of PCF. We do not present hybrid frequentist–Bayesian probabilities for medical admissions in Exhibit B.7.6.

Exhibit B.7.5. Regression-adjusted means and impact estimates for secondary outcomes for Medicare FFS beneficiaries over the first three performance years

Performance year	PCF mean	Comparison mean	Impact estimate (SE)	Percentage impact	*p*-value	Probability the outcome decreased for PCF practices, relative to comparisons, by at least 1%
Inpatient expenditures ($ PBPM)						
Baseline years	$329	$327	n.a.	n.a.	n.a.	n.a.
PY 1	$328	$328	-$2 ($2)	-0.5%	0.47	23%
PY 2	$344	$342	<-$1 ($2)[b]	<-0.1%[c]	0.94	24%
Average (PY 1 to PY 2)	$336	$335	<-$1 ($2)[b]	-0.3%	0.64	21%
PY 3 (Cohort 1 only)	$379	$367	$11 ($4)	3.0%	<0.01	13%
Post-acute care expenditures ($ per post-acute care episode)[a]						
Baseline years	$31,484	$31,561	n.a.	n.a.	n.a.	n.a.
PY 1	$32,992	$33,106	-$38 ($164)	-0.1%	0.82	25%
PY 2	$33,468	$33,438	$107 ($191)	0.3%	0.58	16%
Average (PY 1 to PY 2)	$33,230	$33,272	$34 ($147)	0.1%	0.82	17%
PY 3 (Cohort 1 only)	$34,537	$34,151	$463 ($354)	1.4%	0.19	18%
Outpatient ED visits (per 1,000 beneficiaries per year)						
Baseline years	383	390	n.a.	n.a.	n.a.	n.a.
PY 1	390	396	<1 (2)	<0.1%	0.87	26%
PY 2	402	409	<-1 (2)[b]	-0.1%	0.79	27%
Average (PY 1 to PY 2)	396	403	<-1 (2)[b]	<-0.1%[c]	0.95	24%
PY 3 (Cohort 1 only)	433	441	-1 (4)	-0.3%	0.76	41%
Primary-care-substitutable ED visits (per 1,000 beneficiaries per year)						
Baseline years	135	138	n.a.	n.a.	n.a.	n.a.
PY 1	130	132	<1 (<1)	0.2%	0.69	31%
PY 2	135	137	<1 (<1)	0.2%	0.72	26%
Average (PY 1 to PY 2)	132	135	<1 (<1)	0.2%	0.68	27%
PY 3 (Cohort 1 only)	148	150	1 (2)	0.9%	0.40	33%
Proportion of inpatient discharges with unplanned 30-day acute care[a]						
Baseline years	0.25	0.25	n.a.	n.a.	n.a.	n.a.
PY 1	0.24	0.24	0.001 (0.002)	0.5%	0.49	13%
PY 2	0.25	0.24	0.003 (0.002)	1.1%	0.08	7%
Average (PY 1 to PY 2)	0.24	0.24	0.002 (0.001)	0.8%	0.17	7%
PY 3 (Cohort 1 only)	0.25	0.25	-0.003 (0.002)	-1.2%	0.20	40%

Performance year	PCF mean	Comparison mean	Impact estimate (SE)	Percentage impact	*p*-value	Probability the outcome decreased for PCF practices, relative to comparisons, by at least 1%
Proportion of inpatient discharges with unplanned 30-day readmission[a]						
Baseline years	0.15	0.15	n.a.	n.a.	n.a.	n.a.
PY 1	0.15	0.14	<0.001 (0.001)	0.5%	0.58	20%
PY 2	0.15	0.15	0.002 (0.001)	1.1%	0.21	16%
Average (PY 1 to PY 2)	0.15	0.14	0.001 (0.001)	0.8%	0.29	16%
PY 3 (Cohort 1 only)	0.15	0.15	<0.001 (0.002)	0.2%	0.86	29%
Medical admissions (per 1,000 beneficiaries per year) (evidence of PCF-comparison differences in baseline trends)						
Baseline years	173	173	n.a.	n.a.	n.a.	n.a.
PY 1	169	167	<1 (<1)	0.4%	0.42	17%
PY 2	176	175	<1 (<1)	0.5%	0.36	24%
Average (PY 1 to PY 2)	172	171	<1 (<1)	0.5%	0.33	18%
PY 3 (Cohort 1 only)	187	184	3 (2)	1.5%	0.16	19%

Source: Mathematica's analysis of Medicare claims data from January 2019 to December 2023.

Note: See the footnote to Exhibit B.7.2.

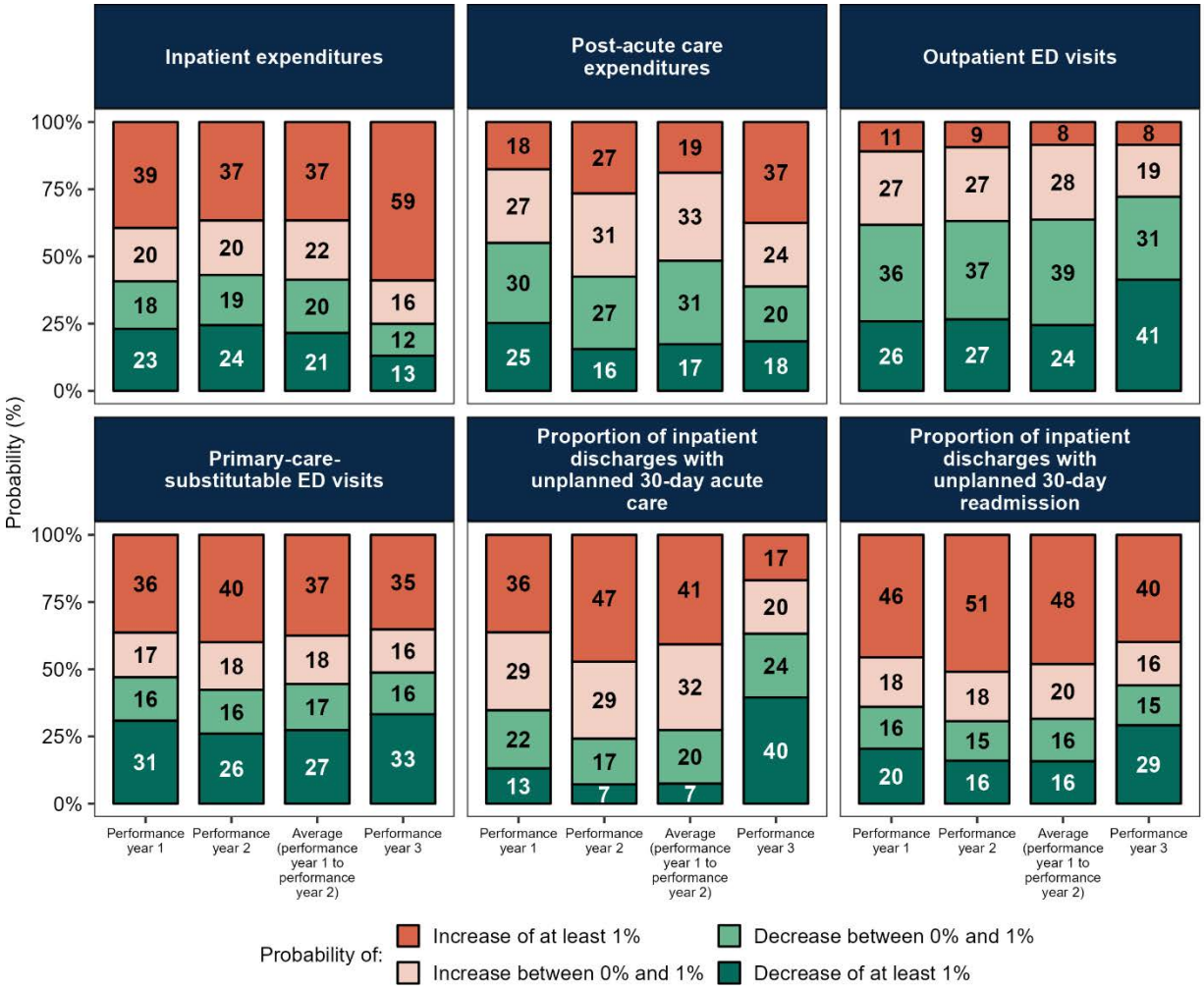
[a] We constructed our analytic sample for post-acute care expenditures, proportion of inpatient discharges with unplanned 30-day acute care, and proportion of inpatient discharges with unplanned 30-day readmission from discharge-level observations. The regression models for these outcomes included additional control variables compared with models run on outcomes constructed from beneficiary-level observations. See Appendix A.2.4 for details.

[b] The impact estimate is between 0 and -1.

[c] The percentage impact is between 0 and -0.1 percent.

ED = emergency department; FFS = fee for service; n.a. = not applicable; PBPM = per beneficiary per month; PCF = Primary Care First; PY = performance year; SE = standard error.

Exhibit B.7.6. Distribution of likely impacts of PCF on secondary outcomes, by performance year



Source: Mathematica's analysis of Medicare claims data from January 2019 to December 2023.

ED = emergency department; PCF = Primary Care First.

E. Full results for effects by subgroups

Exhibits B.7.7 to B.7.15 show frequentist impact estimates and hybrid frequentist–Bayesian probabilities by practice and beneficiary characteristics (subgroups) for each primary and secondary outcome. We present the results here in the order in which we reference them in Chapter 5, section E. Appendix A.2.4 summarizes our rationale for analyzing various outcomes by subgroup, including hypotheses for why PCF might have different effects for different subgroups of practices and beneficiaries. For each outcome, we show subgroup estimates by CPC+ participation only through performance year 2 because CPC+ participants were not allowed to join PCF until 2022 (giving us only two performance years of data for them).

For some subgroup-outcome combinations (Exhibits B.7.9 to B.7.10, B.7.12 to B.7.13, and B.7.15), there was evidence of PCF-comparison differences in baseline trends in one of the subgroups. It is possible for one subgroup to show evidence of PCF-comparison differences in baseline trends while its complement meets the criteria for the parallel trends assumption (that is, that any outcome difference between the PCF and comparison groups would stay the same if not for the model). We show results for all subgroup-outcome combinations for completeness, but we cannot interpret estimates as impacts of PCF for instances in which there was evidence of PCF-comparison differences in baseline trends.

Exhibit B.7.7. Impacts on Medicare Part A and B expenditures ($ PBPM) for Medicare FFS beneficiaries over the first three performance years, by practice subgroup

Performance year	Subgroup categories	Number (percentage) of PCF practices in subgroup	PCF mean ($ PBPM)	Comparison mean ($ PBPM)	Impact estimate (SE) ($ PBPM)	Percentage impact	*p*-value	*p*-value for difference in impact estimates between subgroup categories	Probability the outcome decreased for PCF practices, relative to comparisons, by at least 1%	Probability the impact estimates differ between subgroup categories by at least 1%
Whether practice participated in CPC+ before model start										
Baseline years	Yes	1,157 (42%)	$960	$969	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
	No	1,584 (58%)	$1,022	$1,001	n.a.	n.a.	n.a.		n.a.	
PY 1	Yes	1,157 (42%)	$999	$998	$10 ($5)	1.0%	0.06	0.02	<1%	22%
	No	1,584 (58%)	$1,077	$1,031	$25 ($4)	2.3%	<0.01		<1%	
PY 2	Yes	1,157 (42%)	$1,080	$1,082	$7 ($5)	0.6%	0.22	0.23	4%	30%
	No	1,584 (58%)	$1,150	$1,114	$15 ($5)	1.3%	<0.01		<1%	
Average (PY 1 to PY 2)	Yes	1,157 (42%)	$1,039	$1,040	$8 ($5)	0.8%	0.08	0.04	<1%	24%
	No	1,584 (58%)	$1,113	$1,072	$20 ($4)	1.8%	<0.01		<1%	
Whether practice participated in the Medicare Shared Savings Program at model launch										
Baseline years	Yes	1,526 (56%)	$997	$1,005	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
	No	1,215 (44%)	$987	$969	n.a.	n.a.	n.a.		n.a.	
PY 1	Yes	1,526 (56%)	$1,036	$1,032	$12 ($4)	1.2%	<0.01	0.05	<1%	13%
	No	1,215 (44%)	$1,045	$1,003	$25 ($5)	2.5%	<0.01		<1%	
PY 2	Yes	1,526 (56%)	$1,113	$1,112	$9 ($5)	0.8%	0.05	0.59	<1%	11%
	No	1,215 (44%)	$1,123	$1,093	$13 ($6)	1.2%	0.03		1%	
Average (PY 1 to PY 2)	Yes	1,526 (56%)	$1,075	$1,072	$11 ($4)	1.0%	<0.01	0.16	<1%	11%
	No	1,215 (44%)	$1,084	$1,048	$19 ($5)	1.8%	<0.01		<1%	
PY 3 (Cohort 1 only)	Yes	400 (55%)	$1,177	$1,175	$9 ($10)	0.8%	0.34	0.50	1%	12%
	No	329 (45%)	$1,259	$1,224	$18 ($9)	1.5%	0.05		1%	

Performance year	Subgroup categories	Number (percentage) of PCF practices in subgroup	PCF mean ($ PBPM)	Comparison mean ($ PBPM)	Impact estimate (SE) ($ PBPM)	Percentage impact	*p*-value	*p*-value for difference in impact estimates between subgroup categories	Probability the outcome decreased for PCF practices, relative to comparisons, by at least 1%	Probability the impact estimates differ between subgroup categories by at least 1%
Whether practice was affiliated with a health system including a hospital at model launch										
Baseline years	Yes	1,881 (69%)	$987	$997	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
	No	860 (31%)	$1,001	$973	n.a.	n.a.	n.a.		n.a.	
PY 1	Yes	1,881 (69%)	$1,036	$1,028	$18 ($4)	1.8%	<0.01	0.97	<1%	12%
	No	860 (31%)	$1,048	$1,001	$18 ($5)	1.8%	<0.01		<1%	
PY 2	Yes	1,881 (69%)	$1,115	$1,114	$11 ($5)	1.0%	0.02	0.94	<1%	11%
	No	860 (31%)	$1,124	$1,084	$11 ($6)	1.0%	0.05		2%	
Average (PY 1 to PY 2)	Yes	1,881 (69%)	$1,075	$1,071	$14 ($4)	1.4%	<0.01	0.95	<1%	10%
	No	860 (31%)	$1,086	$1,043	$15 ($5)	1.4%	<0.01		<1%	
PY 3 (Cohort 1 only)	Yes	513 (70%)	$1,208	$1,205	$13 ($9)	1.1%	0.13	0.95	<1%	14%
	No	216 (30%)	$1,226	$1,184	$14 ($10)	1.2%	0.18		2%	
Whether practice was multispecialty (versus primary care only) at model launch										
Baseline years	Yes	773 (28%)	$1,024	$1,016	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
	No	1,968 (72%)	$974	$972	n.a.	n.a.	n.a.		n.a.	
PY 1	Yes	773 (28%)	$1,065	$1,040	$17 ($5)	1.6%	<0.01	0.80	<1%	17%
	No	1,968 (72%)	$1,026	$1,006	$19 ($4)	1.8%	<0.01		<1%	
PY 2	Yes	773 (28%)	$1,145	$1,131	$5 ($6)	0.4%	0.42	0.24	2%	18%
	No	1,968 (72%)	$1,103	$1,088	$13 ($5)	1.2%	<0.01		<1%	
Average (PY 1 to PY 2)	Yes	773 (28%)	$1,105	$1,085	$11 ($5)	1.0%	0.03	0.40	<1%	16%
	No	1,968 (72%)	$1,064	$1,047	$16 ($4)	1.5%	<0.01		<1%	

Performance year	Subgroup categories	Number (percentage) of PCF practices in subgroup	PCF mean ($ PBPM)	Comparison mean ($ PBPM)	Impact estimate (SE) ($ PBPM)	Percentage impact	*p*-value	*p*-value for difference in impact estimates between subgroup categories	Probability the outcome decreased for PCF practices, relative to comparisons, by at least 1%	Probability the impact estimates differ between subgroup categories by at least 1%
PY 3 (Cohort 1 only)	Yes	196 (27%)	$1,259	$1,224	$26 ($13)	2.1%	0.04	0.23	1%	15%
	No	533 (73%)	$1,190	$1,180	$9 ($8)	0.7%	0.27		<1%	

Source: Mathematica's analysis of Medicare claims data from January 2019 to December 2023.

Notes: This table includes estimates from a difference-in-differences analysis that reflects the difference of the average outcome for Medicare FFS beneficiaries assigned to a PCF practice in a given subgroup during the first three years of PCF compared with the average outcome in the baseline period, relative to the same difference over time for Medicare FFS beneficiaries assigned to comparison practices in the same subgroup (except for the CPC+ analysis, for which we use the difference over time for Medicare FFS beneficiaries assigned to comparison practices matched to PCF practices regardless of whether the comparisons are CPC+ participants), conditional on covariates and fixed effects for each practice and each calendar year (see Appendix A.2.4 for methodological details). Estimates for performance year 3 reflect Cohort 1 practices' experience in 2023 only. See the footnote in Exhibit B.7.2 for details on percentage impacts and probabilities.

CPC+ = Comprehensive Primary Care Plus; FFS = fee for service; n.a. = not applicable; PBPM = per beneficiary per month; PCF = Primary Care First; PY = performance year; SE = standard error.

Exhibit B.7.8. Impacts on Medicare Part A and B expenditures ($ PBPM) for Medicare FFS beneficiaries over the first three performance years, by beneficiary subgroup

Performance year	Subgroup categories	Number (percentage) of PCF beneficiaries in subgroup	PCF mean ($ PBPM)	Comparison mean ($ PBPM)	Impact estimate (SE) ($ PBPM)	Percentage impact	*p*-value	*p*-value for difference in impact estimates between subgroup categories	Probability the outcome decreased for PCF practices, relative to comparisons, by at least 1%	Probability the impact estimates differ between subgroup categories by at least 1%
Beneficiaries with behavioral health conditions at model launch										
Baseline years	Yes	491,413 (13%)	$1,882	$1,874	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
	No	3,067,112 (78%)	$872	$869	n.a.	n.a.	n.a.		n.a.	
PY 1	Yes	221,898 (12%)	$2,175	$2,154	$14 ($14)	0.7%	0.32	0.86	<1%	9%
	No	1,590,690 (83%)	$895	$875	$17 ($3)	1.9%	<0.01		<1%	
PY 2	Yes	203,756 (10%)	$2,112	$2,108	-$3 ($15)	-0.2%	0.82	0.34	<1%	10%
	No	1,586,595 (79%)	$1,022	$1,008	$11 ($4)	1.1%	<0.01		<1%	
Average (PY 1 to PY 2)	Yes	212,827 (11%)	$2,144	$2,131	$5 ($13)	0.3%	0.68	0.51	<1%	8%
	No	1,588,643 (81%)	$958	$941	$14 ($3)	1.5%	<0.01		<1%	
Average (PY 1 to PY 2)	Yes	50,619 (9%)	$2,217	$2,196	$13 ($26)	0.6%	0.60	0.93	<1%	12%
	No	414,728 (76%)	$1,146	$1,127	$16 ($7)	1.4%	0.03		<1%	
Medicare FFS–Medicaid dually eligible beneficiaries versus non-dually eligible beneficiaries at model launch										
Baseline years	Dual	427,970 (11%)	$1,234	$1,212	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
	Non-dual	3,497,597 (89%)	$963	$958	n.a.	n.a.	n.a.		n.a.	
PY 1	Dual	205,990 (11%)	$1,297	$1,248	$27 ($12)	2.1%	0.02	0.38	<1%	18%
	Non-dual	1,717,394 (89%)	$1,011	$990	$16 ($3)	1.6%	<0.01		<1%	
PY 2	Dual	193,058 (10%)	$1,358	$1,324	$13 ($13)	1.0%	0.30	0.81	<1%	18%
	Non-dual	1,819,549 (90%)	$1,093	$1,078	$10 ($4)	0.9%	<0.01		<1%	
Average (PY 1 to PY 2)	Dual	199,524 (10%)	$1,328	$1,286	$20 ($11)	1.5%	0.06	0.53	<1%	17%
	Non-dual	1,768,472 (90%)	$1,052	$1,034	$13 ($3)	1.3%	<0.01		<1%	

Performance year	Subgroup categories	Number (percentage) of PCF beneficiaries in subgroup	PCF mean ($ PBPM)	Comparison mean ($ PBPM)	Impact estimate (SE) ($ PBPM)	Percentage impact	*p*-value	*p*-value for difference in impact estimates between subgroup categories	Probability the outcome decreased for PCF practices, relative to comparisons, by at least 1%	Probability the impact estimates differ between subgroup categories by at least 1%
PY 3 (Cohort 1 only)	Dual	58,026 (11%)	$1,518	$1,441	$56 ($22)	3.8%	0.01	0.03	<1%	26%
	Non-dual	490,552 (89%)	$1,179	$1,164	$9 ($7)	0.8%	0.20		<1%	

Source: Mathematica's analysis of Medicare claims data from January 2019 to December 2023.

Note: See the footnote to Exhibit B.7.7.

FFS = fee for service; n.a. = not applicable; PBPM = per beneficiary per month; PCF = Primary Care First; PY = performance year; SE = standard error.

Exhibit B.7.9. Impacts on acute hospitalizations (per 1,000 beneficiaries per year) for Medicare FFS beneficiaries over the first three performance years, by practice subgroup

Performance year	Subgroup categories	Number (percentage) of PCF practices in subgroup	PCF mean (hospitalizations per 1,000 beneficiaries per year)	Comparison mean (hospitalizations per 1,000 beneficiaries per year)	Impact estimate (SE) (hospitalizations per 1,000 beneficiaries per year)	Percentage impact	*p*-value	*p*-value for difference in impact estimates between subgroup categories	Probability the outcome decreased for PCF practices, relative to comparisons, by at least 1%	Probability the impact estimates differ between subgroup categories by at least 1%
Whether practice participated in CPC+ before model start (evidence of PCF-comparison differences in baseline trends for non-CPC+ participants)										
Baseline years	Yes	1,157 (42%)	237	241	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
	No	1,584 (58%)	261	256	n.a.	n.a.	n.a.		n.a.	
PY 1	Yes	1,157 (42%)	233	236	<-1 (2)[a]	-0.2%	0.83	0.52	22%	24%
	No	1,584 (58%)	245	239	<1 (1)	0.4%	0.49		14%	
PY 2	Yes	1,157 (42%)	241	244	<1 (2)	0.4%	0.62	0.61	34%	35%
	No	1,584 (58%)	255	248	2 (1)	0.8%	0.19		16%	
Average (PY 1 to PY 2)	Yes	1,157 (42%)	237	240	<1 (1)	<0.1%	0.87	0.51	26%	28%
	No	1,584 (58%)	250	244	1 (1)	0.6%	0.25		13%	
Whether practice participated in the MSSP at model launch (evidence of PCF-comparison differences in baseline trends for non-MSSP participants)										
Baseline years	Yes	1,526 (56%)	254	256	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
	No	1,215 (44%)	244	242	n.a.	n.a.	n.a.		n.a.	
PY 1	Yes	1,526 (56%)	241	243	<-1 (1)[a]	-0.4%	0.55	0.23	17%	17%
	No	1,215 (44%)	237	234	2 (2)	0.8%	0.30		17%	
PY 2	Yes	1,526 (56%)	251	252	<1 (2)	0.3%	0.63	0.50	23%	15%
	No	1,215 (44%)	246	242	2 (2)	0.9%	0.19		25%	
Average (PY 1 to PY 2)	Yes	1,526 (56%)	246	247	<-1 (1)[a]	<-0.1%[b]	0.96	0.28	18%	14%
	No	1,215 (44%)	242	238	2 (1)	0.8%	0.18		19%	
PY 3 (Cohort 1 only)	Yes	400 (55%)	264	260	5 (3)	2.0%	0.12	0.51	11%	22%
	No	329 (45%)	261	257	2 (3)	0.9%	0.44		15%	

Performance year	Subgroup categories	Number (percentage) of PCF practices in subgroup	PCF mean (hospitalizations per 1,000 beneficiaries per year)	Comparison mean (hospitalizations per 1,000 beneficiaries per year)	Impact estimate (SE) (hospitalizations per 1,000 beneficiaries per year)	Percentage impact	*p*-value	*p*-value for difference in impact estimates between subgroup categories	Probability the outcome decreased for PCF practices, relative to comparisons, by at least 1%	Probability the impact estimates differ between subgroup categories by at least 1%
Whether practice was affiliated with a health system including a hospital at model launch										
Baseline years	Yes	1,881 (69%)	252	255	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
	No	860 (31%)	245	241	n.a.	n.a.	n.a.		n.a.	
PY 1	Yes	1,881 (69%)	240	243	<1 (1)	0.3%	0.62	0.54	15%	19%
	No	860 (31%)	237	234	<-1 (2)[a]	-0.3%	0.71		22%	
PY 2	Yes	1,881 (69%)	250	251	2 (1)	0.8%	0.16	0.35	22%	19%
	No	860 (31%)	246	242	<-1 (2)[a]	<-0.1%[b]	0.97		28%	
Average (PY 1 to PY 2)	Yes	1,881 (69%)	245	247	1 (1)	0.6%	0.27	0.38	16%	17%
	No	860 (31%)	241	238	<-1 (2)[a]	-0.1%	0.82		23%	
PY 3 (Cohort 1 only)	Yes	513 (70%)	259	257	5 (3)	2.1%	0.07	0.31	10%	24%
	No	216 (30%)	273	269	<1 (4)	0.2%	0.86		16%	
Whether practice was multispecialty (versus primary care only) at model launch (evidence of PCF-comparison differences in baseline trends for primary care only practices)										
Baseline years	Yes	773 (28%)	251	249	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
	No	1,968 (72%)	248	248	n.a.	n.a.	n.a.		n.a.	
PY 1	Yes	773 (28%)	237	236	<-1 (2)[a]	-0.3%	0.71	0.53	20%	22%
	No	1,968 (72%)	240	240	<1 (1)	0.3%	0.60		16%	
PY 2	Yes	773 (28%)	246	245	<-1 (2)[a]	-0.4%	0.60	0.15	26%	20%
	No	1,968 (72%)	250	248	2 (1)	0.9%	0.10		23%	
Average (PY 1 to PY 2)	Yes	773 (28%)	242	240	<-1 (2)[a]	-0.3%	0.61	0.23	21%	19%
	No	1,968 (72%)	245	244	2 (1)	0.6%	0.21		17%	
PY 3 (Cohort 1 only)	Yes	196 (27%)	265	259	3 (4)	1.3%	0.40	0.88	12%	19%
	No	533 (73%)	262	258	4 (3)	1.6%	0.14		12%	

Source: Mathematica's analysis of Medicare claims data from January 2019 to December 2023.

Note: See the footnote to Exhibit B.7.7.

[a] The impact estimate is between 0 and -1.

[b] The percentage impact is between 0 and -0.1 percent.

CPC+ = Comprehensive Primary Care Plus; FFS = fee for service; MSSP = Medicare Shared Savings Program; n.a. = not applicable; PCF = Primary Care First; PY = performance year; SE = standard error.

Exhibit B.7.10. Impacts on acute hospitalizations (per 1,000 beneficiaries per year) for Medicare FFS beneficiaries over the first three performance years, by beneficiary subgroup

Performance year	Subgroup categories	Number (percentage) of PCF beneficiaries in subgroup	PCF mean (hospitalizations per 1,000 beneficiaries per year)	Comparison mean (hospitalizations per 1,000 beneficiaries per year)	Impact estimate (SE) (hospitalizations per 1,000 beneficiaries per year)	Percentage impact	*p*-value	*p*-value for difference in impact estimates between subgroup categories	Probability the outcome decreased for PCF practices, relative to comparisons, by at least 1%	Probability the impact estimates differ between subgroup categories by at least 1%
Beneficiaries with behavioral health conditions at model launch										
Baseline years	Yes	491,413 (13%)	574	570	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
	No	3,067,112 (78%)	206	208	n.a.	n.a.	n.a.		n.a.	
PY 1	Yes	221,898 (12%)	620	612	5 (5)	0.8%	0.36	0.34	2%	19%
	No	1,590,690 (83%)	191	193	<-1 (1)[a]	<-0.1%[b]	0.87		20%	
PY 2	Yes	203,756 (10%)	585	584	-2 (5)	-0.3%	0.71	0.43	6%	19%
	No	1,586,595 (79%)	217	216	2 (1)	1.0%	0.06		25%	
Average (PY 1 to PY 2)	Yes	212,827 (11%)	602	598	1 (5)	0.2%	0.77	0.94	3%	14%
	No	1,588,643 (81%)	204	204	<1 (<1)	0.5%	0.30		20%	
PY 3 (Cohort 1 only)	Yes	50,619 (9%)	591	596	-8 (9)	-1.3%	0.37	0.10	4%	26%
	No	414,728 (76%)	241	236	7 (2)	2.8%	<0.01		11%	
Medicare FFS–Medicaid dually eligible beneficiaries versus non-dually eligible beneficiaries at model launch (evidence of PCF-comparison differences in baseline trends for non-dually eligible beneficiaries)										
Baseline years	Dual	427,970 (11%)	363	357	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
	Non-dual	3,497,597 (89%)	236	235	n.a.	n.a.	n.a.		n.a.	
PY 1	Dual	205,990 (11%)	351	339	6 (4)	1.8%	0.15	0.13	7%	26%
	Non-dual	1,717,394 (89%)	227	227	<-1 (1)[a]	-0.2%	0.62		18%	
PY 2	Dual	193,058 (10%)	353	347	<-1 (4)[a]	<-0.1%[b]	0.98	0.78	14%	20%
	Non-dual	1,819,549 (90%)	238	236	1 (1)	0.5%	0.31		24%	
Average (PY 1 to PY 2)	Dual	199,524 (10%)	352	343	3 (4)	0.9%	0.42	0.48	8%	21%
	Non-dual	1,768,472 (90%)	232	232	<1 (1)	0.1%	0.76		18%	

Performance year	Subgroup categories	Number (percentage) of PCF beneficiaries in subgroup	PCF mean (hospitalizations per 1,000 beneficiaries per year)	Comparison mean (hospitalizations per 1,000 beneficiaries per year)	Impact estimate (SE) (hospitalizations per 1,000 beneficiaries per year)	Percentage impact	*p*-value	*p*-value for difference in impact estimates between subgroup categories	Probability the outcome decreased for PCF practices, relative to comparisons, by at least 1%	Probability the impact estimates differ between subgroup categories by at least 1%
PY 3 (Cohort 1 only)	Dual	58,026 (11%)	376	363	7 (7)	1.8%	0.30	0.60	7%	25%
	Non-dual	490,552 (89%)	250	246	3 (2)	1.3%	0.19		13%	

Source: Mathematica's analysis of Medicare claims data from January 2019 to December 2023.

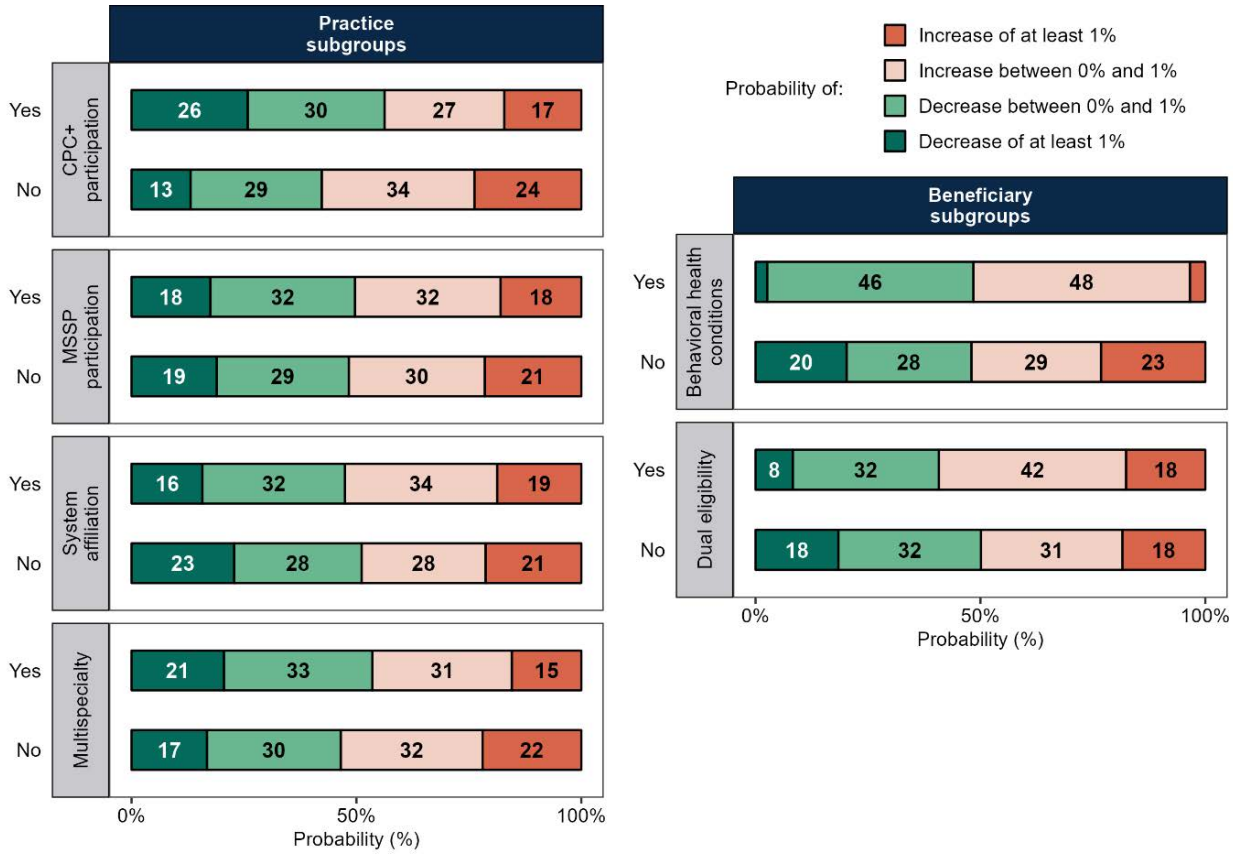
Note: See the footnote to Exhibit B.7.7.

[a] The impact estimate is between 0 and -1.

[b] The percentage impact is between 0 and -0.1 percent.

FFS = fee for service; n.a. = not applicable; PCF = Primary Care First; PY = performance year; SE = standard error.

Exhibit B.7.11. Distribution of likely impacts of PCF on acute hospitalizations within subgroups over the first two performance years



Source: Mathematica's analysis of Medicare claims data from January 2019 to December 2023.

Note: For readability, we did not label very small bar segments. Including the unlabeled segments, the total probability in each bar sums to 100 percent. We calculated the percentage impact within each subgroup by dividing the subgroup impact estimate by the counterfactual outcome within that subgroup.

CPC+ = Comprehensive Primary Care Plus; MSSP = Medicare Shared Savings Program; PCF = Primary Care First.

Exhibit B.7.12. Impacts on primary-care-substitutable ED visits (per 1,000 beneficiaries per year) for Medicare FFS beneficiaries over the first three performance years, by practice subgroup

Performance year	Subgroup categories	Number (percentage) of PCF practices in subgroup	PCF mean (visits per 1,000 beneficiaries per year)	Comparison mean (visits per 1,000 beneficiaries per year)	Impact estimate (SE) (visits per 1,000 beneficiaries per year)	Percentage impact	*p*-value	*p*-value for difference in impact estimates between subgroup categories	Probability the outcome decreased for PCF practices, relative to comparisons, by at least 1%	Probability the impact estimates differ between subgroup categories by at least 1%
Whether practice participated in CPC+ before model start										
Baseline years	Yes	1,157 (42%)	121	126	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
	No	1,584 (58%)	148	148	n.a.	n.a.	n.a.		n.a.	
PY 1	Yes	1,157 (42%)	123	129	<-1 (1)[a]	-0.5%	0.59	0.23	37%	36%
	No	1,584 (58%)	136	134	1 (<1)	0.8%	0.26		28%	
PY 2	Yes	1,157 (42%)	128	134	<-1 (1)[a]	-0.3%	0.79	0.34	34%	41%
	No	1,584 (58%)	140	139	1 (1)	0.8%	0.29		22%	
Average (PY 1 to PY 2)	Yes	1,157 (42%)	126	132	<-1 (1)[a]	-0.4%	0.67	0.24	34%	38%
	No	1,584 (58%)	138	137	1 (<1)	0.8%	0.23		23%	
Whether practice participated in the Medicare Shared Savings Program at model launch										
Baseline years	Yes	1,526 (56%)	136	138	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
	No	1,215 (44%)	133	137	n.a.	n.a.	n.a.		n.a.	
PY 1	Yes	1,526 (56%)	127	129	<-1 (<1)[a]	-0.6%	0.41	0.08	33%	30%
	No	1,215 (44%)	132	135	2 (1)	1.4%	0.15		30%	
PY 2	Yes	1,526 (56%)	132	135	-2 (1)	-1.6%	0.05	<0.01	30%	33%
	No	1,215 (44%)	138	139	4 (1)	2.8%	<0.01		26%	
Average (PY 1 to PY 2)	Yes	1,526 (56%)	130	132	-1 (<1)	-1.1%	0.11	<0.01	30%	30%
	No	1,215 (44%)	135	137	3 (1)	2.1%	0.02		27%	

Performance year	Subgroup categories	Number (percentage) of PCF practices in subgroup	PCF mean (visits per 1,000 beneficiaries per year)	Comparison mean (visits per 1,000 beneficiaries per year)	Impact estimate (SE) (visits per 1,000 beneficiaries per year)	Percentage impact	*p*-value	*p*-value for difference in impact estimates between subgroup categories	Probability the outcome decreased for PCF practices, relative to comparisons, by at least 1%	Probability the impact estimates differ between subgroup categories by at least 1%
PY 3 (Cohort 1 only)	Yes	400 (55%)	150	152	-1 (2)	-0.7%	0.63	0.10	35%	29%
	No	329 (45%)	147	147	4 (2)	2.7%	0.09		34%	
Whether practice was affiliated with a health system including a hospital at model launch										
Baseline years	Yes	1,881 (69%)	143	149	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
	No	860 (31%)	118	124	n.a.	n.a.	n.a.		n.a.	
PY 1	Yes	1,881 (69%)	136	141	<1 (1)	0.6%	0.44	0.34	28%	31%
	No	860 (31%)	116	122	<-1 (1)[a]	-0.6%	0.57		37%	
PY 2	Yes	1,881 (69%)	140	145	1 (1)	0.8%	0.34	0.20	24%	34%
	No	860 (31%)	122	129	<-1 (1)[a]	-0.8%	0.40		34%	
Average (PY 1 to PY 2)	Yes	1,881 (69%)	138	143	<1 (<1)	0.7%	0.34	0.21	25%	31%
	No	860 (31%)	119	125	<-1 (1)[a]	-0.7%	0.44		34%	
PY 3 (Cohort 1 only)	Yes	513 (70%)	154	159	<1 (2)	0.4%	0.77	0.49	33%	29%
	No	216 (30%)	135	138	3 (2)	2.0%	0.27		38%	
Whether practice was multispecialty (versus primary care only) at model launch										
Baseline years	Yes	773 (28%)	142	145	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
	No	1,968 (72%)	131	134	n.a.	n.a.	n.a.		n.a.	
PY 1	Yes	773 (28%)	136	137	2 (1)	1.8%	0.07	0.06	26%	36%
	No	1,968 (72%)	126	130	<-1 (<1)[a]	-0.4%	0.62		35%	
PY 2	Yes	773 (28%)	141	143	<1 (1)	0.5%	0.60	0.83	24%	31%
	No	1,968 (72%)	131	135	<1 (1)	0.3%	0.73		30%	

Performance year	Subgroup categories	Number (percentage) of PCF practices in subgroup	PCF mean (visits per 1,000 beneficiaries per year)	Comparison mean (visits per 1,000 beneficiaries per year)	Impact estimate (SE) (visits per 1,000 beneficiaries per year)	Percentage impact	*p*-value	*p*-value for difference in impact estimates between subgroup categories	Probability the outcome decreased for PCF practices, relative to comparisons, by at least 1%	Probability the impact estimates differ between subgroup categories by at least 1%
Average (PY 1 to PY 2)	Yes	773 (28%)	138	140	2 (1)	1.2%	0.20	0.26	24%	32%
	No	1,968 (72%)	129	132	<-1 (<1)[a]	<-0.1%[b]	0.95		31%	
PY 3 (Cohort 1 only)	Yes	196 (27%)	155	156	3 (3)	1.9%	0.30	0.47	30%	36%
	No	533 (73%)	145	148	<1 (2)	0.4%	0.76		31%	

Source: Mathematica's analysis of Medicare claims data from January 2019 to December 2023.

Note: See the footnote to Exhibit B.7.7.

[a] The impact estimate is between 0 and -1.

[b] The percentage impact is between 0 and -0.1 percent.

CPC+ = Comprehensive Primary Care Plus; FFS = fee for service; n.a. = not applicable; PCF = Primary Care First; PY = performance year; SE = standard error.

Exhibit B.7.13. Impacts on primary-care-substitutable ED visits (per 1,000 beneficiaries per year) for Medicare FFS beneficiaries over the first three performance years, by beneficiary subgroup

Performance year	Subgroup categories	Number (percentage) of PCF beneficiaries in subgroup	PCF mean (visits per 1,000 beneficiaries per year)	Comparison mean (visits per 1,000 beneficiaries per year)	Impact estimate (SE) (visits per 1,000 beneficiaries per year)	Percentage impact	*p*-value	*p*-value for difference in impact estimates between subgroup categories	Probability the outcome decreased for PCF practices, relative to comparisons, by at least 1%	Probability the impact estimates differ between subgroup categories by at least 1%
Beneficiaries with behavioral health conditions at model launch										
Baseline years	Yes	491,413 (13%)	321	330	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
	No	3,067,112 (78%)	108	111	n.a.	n.a.	n.a.		n.a.	
PY 1	Yes	221,898 (12%)	313	318	3 (4)	1.0%	0.41	0.45	15%	26%
	No	1,590,690 (83%)	106	109	<1 (<1)	0.1%	0.87		34%	
PY 2	Yes	203,756 (10%)	305	310	4 (4)	1.4%	0.28	0.28	15%	28%
	No	1,586,595 (79%)	117	120	<-1 (<1)[a]	<-0.1%[b]	0.94		28%	
Average (PY 1 to PY 2)	Yes	212,827 (11%)	309	314	1 (5)	0.4%	0.77	0.32	14%	25%
	No	1,588,643 (81%)	111	114	<1 (<1)	0.9%	0.30		30%	
PY 3 (Cohort 1 only)	Yes	50,619 (9%)	339	340	7 (8)	2.1%	0.37	0.45	22%	32%
	No	414,728 (76%)	132	134	<1 (2)	0.7%	0.56		35%	

Source: Mathematica's analysis of Medicare claims data from January 2019 to December 2023.

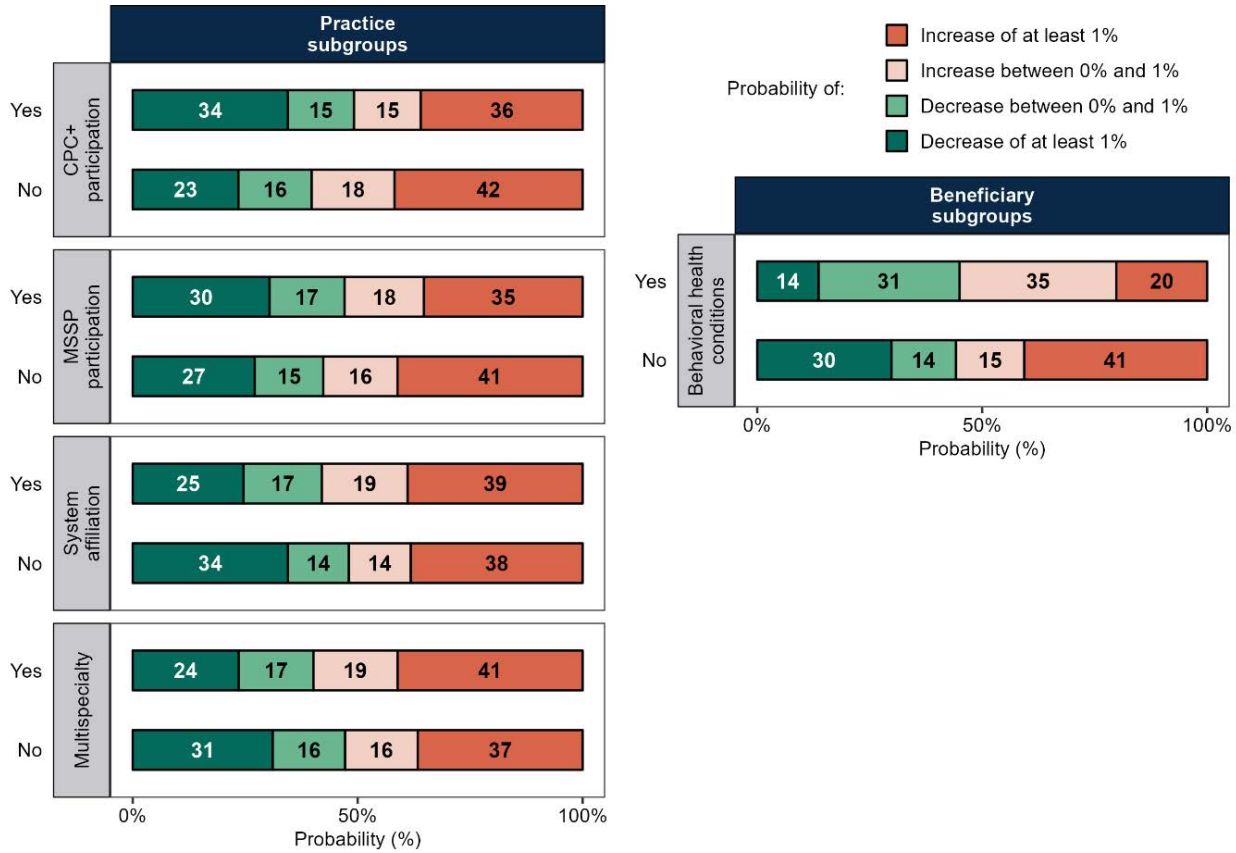
Note: See the footnote to Exhibit B.7.7.

[a] The impact estimate is between 0 and -1.

[b] The percentage impact is between 0 and -0.1 percent.

FFS = fee for service; n.a. = not applicable; PCF = Primary Care First; PY = performance year; SE = standard error.

Exhibit B.7.14. Distribution of likely impacts of PCF on primary-care-substitutable ED visits within subgroups over the first two performance years



Source: Mathematica's analysis of Medicare claims data from January 2019 to December 2023.

Note: We calculated the percentage impact within each subgroup by dividing the subgroup impact estimate by the counterfactual outcome within that subgroup.

CPC+ = Comprehensive Primary Care Plus; MSSP = Medicare Shared Savings Program; PCF = Primary Care Firs

Exhibit B.7.15. Impacts on visits to behavioral health specialists in an ambulatory setting (per 1,000 beneficiaries per year) for Medicare FFS beneficiaries over the first three performance years

Performance year	Subgroup categories	Number (percentage) of PCF beneficiaries in subgroup	PCF mean (visits per 1,000 beneficiaries per year)	Comparison mean (visits per 1,000 beneficiaries per year)	Impact estimate (SE) (visits per 1,000 beneficiaries per year)	Percentage impact	*p*-value	*p*-value for difference in impact estimates between subgroup categories
Beneficiaries with behavioral health conditions at model launch (evidence of PCF-comparison differences in baseline trends for beneficiaries with behavioral health conditions)								
Baseline years	Yes	491,413 (13%)	1,418	1,359	n.a.	n.a.	n.a.	n.a.
	No	3,067,112 (78%)	478	441	n.a.	n.a.	n.a.	
PY 1	Yes	221,898 (12%)	1,462	1,396	8 (26)	0.6%	0.75	0.71
	No	1,590,690 (83%)	483	446	-2 (6)	-0.4%	0.75	
PY 2	Yes	203,756 (10%)	1,487	1,408	21 (28)	1.4%	0.44	0.52
	No	1,586,595 (79%)	514	473	3 (6)	0.6%	0.61	
Average (PY 1 to PY 2)	Yes	212,827 (11%)	1,474	1,402	15 (25)	1.0%	0.56	0.59
	No	1,588,643 (81%)	498	460	1 (6)	0.1%	0.90	
PY 3 (Cohort 1 only)	Yes	50,619 (9%)	1,535	1,505	-33 (55)	-2.2%	0.55	0.22
	No	414,728 (76%)	557	481	37 (14)	6.7%	0.01	

Source: Mathematica's analysis of Medicare claims data from January 2019 to December 2023.

Note: See the footnote to Exhibit B.7.7.

FFS = fee for service; n.a. = not applicable; PCF = Primary Care First; PY = performance year; SE = standard error.

F. Hybrid frequentist–Bayesian impact estimates

The hybrid frequentist–Bayesian analysis puts the frequentist difference-in-differences impact estimates into the context of evidence from previous, similar evaluations and borrows information about impacts across subgroups, across cohorts, and over time for the same outcome. For more details on the methodology, see Appendix A.2.6. With this approach, we expect to obtain impact estimates that are more plausible, especially for small subgroups, and potentially more precise. Here, we present the impact estimates and standard errors obtained from the hybrid frequentist–Bayesian analysis as additional context for the probability statements in Chapter 5.

Because the hybrid frequentist–Bayesian approach takes the frequentist difference-in-differences impact estimates as its starting point, PCF-comparison differences in baseline trends also affect the interpretation of hybrid frequentist–Bayesian impact estimates. A consequence of finding evidence of differences in baseline trends between PCF and the comparison group is that we cannot necessarily interpret the estimates as impacts of PCF. Unlike the main frequentist approach, however, the hybrid frequentist–Bayesian approach adjusts for differences in baseline trends by down weighting the frequentist impact estimates proportional to the size of the baseline trend difference. This adjustment cannot counteract violations of our modeling assumptions, however, so we continue to note outcomes with evidence of PCF-comparison differences in baseline trends.

Overall sample

Exhibits B.7.16 and B.7.17 show the impact estimates and standard errors for the primary and secondary outcomes, respectively, alongside percentage impacts that express the impact estimate as a percentage of the counterfactual mean (that is, the mean outcome expected without the PCF Model).

Exhibit B.7.16. Hybrid frequentist–Bayesian impact estimates for primary outcomes over the first three performance years

Performance year	PCF mean	Impact estimate (SE)	Percentage impact
Acute hospitalizations (per 1,000 beneficiaries per year)			
PY 1	239	<1 (3)	0.2%
PY 2	249	<-1 (3)[a]	-0.1%
Average (PY 1 to PY 2)	244	<1 (3)	<0.1%
PY 3 (Cohort 1 only)	263	2 (4)	0.7%
Medicare Part A and B expenditures ($ PBPM)			
PY 1	$1,040	$19 ($8)	1.8%
PY 2	$1,118	$11 ($9)	1.0%
Average (PY 1 to PY 2)	$1,079	$15 ($8)	1.4%
PY 3 (Cohort 1 only)	$1,213	$17 ($12)	1.5%

Source: Mathematica's analysis of Medicare claims data from January 2019 to December 2023.

Notes: We calculated percentage impacts by dividing the impact estimate by the estimated counterfactual, where the counterfactual is represented by the PCF mean outcome minus the impact estimate for the same performance year (that is, the mean outcome we calculate PCF practices would have experienced without the PCF Model). The percentage impacts we report may differ from those calculated using the PCF means and impact estimates in this exhibit because of rounding. Estimates for performance year 3 reflect 2023 experience for Cohort 1 practices only.

[a] The impact estimate is between 0 and -1.

PBPM = per beneficiary per month; PCF = Primary Care First; PY = performance year; SE = standard error.

Exhibit B.7.17. Hybrid frequentist–Bayesian impact estimates for secondary outcomes over the first three performance years

Performance year	PCF mean	Impact estimate (SE)	Percentage impact
Inpatient expenditures ($ PBPM)			
PY 1	$328	$1 ($7)	0.5%
PY 2	$344	$1 ($7)	0.3%
Average (PY 1 to PY 2)	$336	$1 ($6)	0.4%
PY 3 (Cohort 1 only)	$379	$6 ($9)	1.6%
Post-acute care expenditures ($ per post-acute care episode)[a]			
PY 1	$32,992	$-57 ($416)	-0.2%
PY 2	$33,468	$77 ($406)	0.2%
Average (PY 1 to PY 2)	$33,230	$10 ($363)	<0.1%
PY 3 (Cohort 1 only)	$34,537	$160 ($566)	0.5%
Outpatient ED visits (per 1,000 beneficiaries per year)			
PY 1	390	-1 (4)	-0.3%
PY 2	402	-1 (4)	-0.3%
Average (PY 1 to PY 2)	396	-1 (4)	-0.3%
PY 3 (Cohort 1 only)	433	-3 (5)	-0.7%
Primary-care-substitutable ED visits (per 1,000 beneficiaries per year)			
PY 1	130	<1 (3)	0.2%
PY 2	135	<1 (3)	0.4%
Average (PY 1 to PY 2)	132	<1 (3)	0.3%
PY 3 (Cohort 1 only)	148	<1 (4)	<0.1%
Proportion of inpatient discharges with unplanned 30-day acute care[a]			
PY 1	0.24	0.001 (0.003)	0.5%
PY 2	0.25	0.002 (0.003)	0.9%
Average (PY 1 to PY 2)	0.24	0.002 (0.003)	0.7%
PY 3 (Cohort 1 only)	0.25	-0.001 (0.004)	-0.6%
Proportion of inpatient discharges with unplanned 30-day readmission[a]			
PY 1	0.15	0.001 (0.003)	0.8%
PY 2	0.15	0.002 (0.003)	1.1%
Average (PY 1 to PY 2)	0.15	0.001 (0.003)	0.9%
PY 3 (Cohort 1 only)	0.15	<0.001 (0.004)	0.4%
Medical admissions (per 1,000 beneficiaries per year) (evidence of PCF-comparison differences in baseline trends)			
PY 1	169	1 (3)	0.6%
PY 2	176	<1 (3)	0.1%
Average (PY 1 to PY 2)	172	<1 (3)	0.4%
PY 3 (Cohort 1 only)	187	1 (4)	0.7%

Source: Mathematica's analysis of Medicare claims data from January 2019 through December 2023.

Note: See Exhibit B.7.16 footnote.

[a] We constructed our analytic sample for post-acute care expenditures, proportion of inpatient discharges with unplanned 30-day acute care, and proportion of inpatient discharges with unplanned 30-day readmission from discharge-level observations.

ED = emergency department; PBPM = per beneficiary per month; PCF = Primary Care First; PY = performance year; SE = standard error.

Subgroup results

Exhibits B.7.18 to B.7.23 report hybrid frequentist–Bayesian impact estimates for practice and beneficiary characteristics (subgroups) for each primary outcome and for primary-care-substitutable ED visits. We present the results in the order in which we reference outcomes in Chapter 5, section E. Appendix A.2.4 summarizes our rationale for analyzing various outcomes by subgroup, including hypotheses for why PCF might have different effects for different subgroups of practices and beneficiaries.

Exhibit B.7.18. Hybrid frequentist–Bayesian estimates of impacts on Medicare Part A and B expenditures ($ per beneficiary per month) for Medicare FFS beneficiaries over the first three performance years, by practice subgroup

Performance year	Subgroup categories	Number (percentage) of PCF practices in subgroup	PCF mean ($ per beneficiary per month)	Impact estimate (SE) ($ per beneficiary per month)	Percentage impact
Whether practice participated in CPC+ before model start					
PY 1	Yes	1,157 (42%)	$999	$16 ($10)	1.7%
	No	1,584 (58%)	$1,077	$21 ($9)	2.0%
PY 2	Yes	1,157 (42%)	$1,080	$8 ($10)	0.7%
	No	1,584 (58%)	$1,150	$14 ($9)	1.3%
Average (PY 1 to PY 2)	Yes	1,157 (42%)	$1,039	$12 ($9)	1.2%
	No	1,584 (58%)	$1,113	$17 ($8)	1.6%
Whether practice participated in the Medicare Shared Savings Program at model launch					
PY 1	Yes	1,526 (56%)	$1,036	$18 ($9)	1.7%
	No	1,215 (44%)	$1,045	$20 ($10)	1.9%
PY 2	Yes	1,526 (56%)	$1,113	$11 ($9)	1.0%
	No	1,215 (44%)	$1,123	$12 ($10)	1.1%
Average (PY 1 to PY 2)	Yes	1,526 (56%)	$1,075	$14 ($8)	1.3%
	No	1,215 (44%)	$1,084	$16 ($9)	1.5%
PY 3 (Cohort 1 only)	Yes	400 (55%)	$1,177	$17 ($13)	1.5%
	No	329 (45%)	$1,259	$18 ($14)	1.4%
Whether practice was affiliated with a health system including a hospital at model launch					
PY 1	Yes	1,881 (69%)	$1,036	$19 ($9)	1.9%
	No	860 (31%)	$1,048	$18 ($11)	1.8%
PY 2	Yes	1,881 (69%)	$1,115	$11 ($9)	1.0%
	No	860 (31%)	$1,124	$11 ($11)	1.0%
Average (PY 1 to PY 2)	Yes	1,881 (69%)	$1,075	$15 ($8)	1.4%
	No	860 (31%)	$1,086	$15 ($10)	1.4%
PY 3 (Cohort 1 only)	Yes	513 (70%)	$1,208	$18 ($12)	1.5%
	No	216 (30%)	$1,226	$17 ($14)	1.4%

Performance year	Subgroup categories	Number (percentage) of PCF practices in subgroup	PCF mean ($ per beneficiary per month)	Impact estimate (SE) ($ per beneficiary per month)	Percentage impact
Whether practice was multispecialty (versus primary care only) at model launch					
PY 1	Yes	773 (28%)	$1,065	$16 ($9)	1.6%
	No	1,968 (72%)	$1,026	$20 ($9)	2.0%
PY 2	Yes	773 (28%)	$1,145	$9 ($9)	0.7%
	No	1,968 (72%)	$1,103	$13 ($10)	1.2%
Average (PY 1 to PY 2)	Yes	773 (28%)	$1,105	$12 ($8)	1.1%
	No	1,968 (72%)	$1,064	$16 ($9)	1.6%
PY 3 (Cohort 1 only)	Yes	196 (27%)	$1,259	$16 ($13)	1.3%
	No	533 (73%)	$1,190	$18 ($13)	1.6%

Source: Mathematica's analysis of Medicare claims data from January 2019 to December 2023.

Notes: We calculated percentage impacts within each subgroup by dividing the subgroup impact estimate by the estimated counterfactual within the same subgroup, where the counterfactual is represented by the PCF mean outcome for the subgroup minus the impact estimate for the same performance year (that is, the mean outcome we calculate PCF practices would have experienced without the PCF Model). The percentage impacts we report may differ from those calculated from the PCF means and impact estimates in this exhibit because of rounding. Estimates for performance year 3 reflect the 2023 experience for Cohort 1 practices only.

CPC+ = Comprehensive Primary Care Plus; FFS = fee for service; PCF = Primary Care First; PY = performance year; SE = standard error.

Exhibit B.7.19. Hybrid frequentist–Bayesian estimates of impacts on Medicare Part A and B expenditures ($ per beneficiary per month) for Medicare FFS beneficiaries over the first three performance years, by beneficiary subgroup

Performance year	Subgroup categories	Number (percentage) of PCF beneficiaries in subgroup	PCF mean ($ per beneficiary per month)	Impact estimate (SE) ($ per beneficiary per month)	Percentage impact
Beneficiaries with behavioral health conditions at model launch					
PY 1	Yes	221,898 (12%)	$2,175	$19 ($10)	0.9%
	No	1,590,690 (83%)	$895	$19 ($9)	2.1%
PY 2	Yes	203,756 (10%)	$2,112	$10 ($10)	0.5%
	No	1,586,595 (79%)	$1,022	$11 ($9)	1.1%
Average (PY 1 to PY 2)	Yes	212,827 (11%)	$2,144	$14 ($10)	0.7%
	No	1,588,643 (81%)	$958	$15 ($8)	1.6%
PY 3 (Cohort 1 only)	Yes	50,619 (9%)	$2,217	$18 ($14)	0.8%
	No	414,728 (76%)	$1,146	$18 ($13)	1.6%
Medicare FFS–Medicaid dually eligible beneficiaries versus non-dually eligible beneficiaries at model launch					
PY 1	Dual	205,990 (11%)	$1,297	$22 ($11)	1.7%
	Non-dual	1,717,394 (89%)	$1,011	$18 ($8)	1.8%
PY 2	Dual	193,058 (10%)	$1,358	$14 ($11)	1.1%
	Non-dual	1,819,549 (90%)	$1,093	$11 ($9)	1%
Average (PY 1 to PY 2)	Dual	199,524 (10%)	$1,328	$18 ($10)	1.4%
	Non-dual	1,768,472 (90%)	$1,052	$15 ($8)	1.4%
PY 3 (Cohort 1 only)	Dual	58,026 (11%)	$1,518	$23 ($15)	1.6%
	Non-dual	490,552 (89%)	$1,179	$17 ($12)	1.5%

Source: Mathematica's analysis of Medicare claims data from January 2019 to December 2023.

Note: See the footnote to Exhibit B.7.18.

FFS = fee for service; PCF = Primary Care First; PY = performance year; SE = standard error.

Exhibit B.7.20. Hybrid frequentist–Bayesian estimates of impacts on acute hospitalizations (per 1,000 beneficiaries per year) for Medicare FFS beneficiaries over the first three performance years, by practice subgroup

Performance year	Subgroup categories	Number (percentage) of PCF practices in subgroup	PCF mean (hospitalizations per 1,000 beneficiaries per year)	Impact estimate (SE) (hospitalizations per 1,000 beneficiaries per year)	Percentage impact
Whether practice participated in CPC+ before model start					
PY 1	Yes	1,157 (42%)	233	<1 (3)	<0.1%
	No	1,584 (58%)	245	<1 (3)	0.3%
PY 2	Yes	1,157 (42%)	241	-1 (3)	-0.4%
	No	1,584 (58%)	255	<1 (3)	0.2%
Average (PY 1 to PY 2)	Yes	1,157 (42%)	237	<-1 (3)[a]	-0.2%
	No	1,584 (58%)	250	<1 (3)	0.2%
Whether practice participated in the Medicare Shared Savings Program at model launch					
PY 1	Yes	1,526 (56%)	241	<1 (3)	0.1%
	No	1,215 (44%)	237	<1 (3)	0.2%
PY 2	Yes	1,526 (56%)	251	<-1 (3)[a]	-0.1%
	No	1,215 (44%)	246	<-1 (3)[a]	-0.1%
Average (PY 1 to PY 2)	Yes	1,526 (56%)	246	<1 (3)	<0.1%
	No	1,215 (44%)	242	<1 (3)	<0.1%
PY 3 (Cohort 1 only)	Yes	400 (55%)	264	2 (4)	0.8%
	No	329 (45%)	261	2 (4)	0.6%
Whether practice was affiliated with a health system including a hospital at model launch					
PY 1	Yes	1,881 (69%)	240	<1 (3)	0.2%
	No	860 (31%)	237	<1 (3)	0.1%
PY 2	Yes	1,881 (69%)	250	<-1 (3)[a]	<-0.1%[b]
	No	860 (31%)	246	<-1 (4)[a]	-0.2%
Average (PY 1 to PY 2)	Yes	1,881 (69%)	245	<1 (3)	<0.1%
	No	860 (31%)	241	<-1 (3)[a]	<-0.1%[b]
PY 3 (Cohort 1 only)	Yes	513 (70%)	259	2 (4)	0.8%
	No	216 (30%)	273	1 (4)	0.5%
Whether practice was multispecialty (versus primary care only) at model launch					
PY 1	Yes	773 (28%)	237	<1 (3)	<0.1%
	No	1,968 (72%)	240	<1 (3)	0.3%
PY 2	Yes	773 (28%)	246	<-1 (3)[a]	-0.2%
	No	1,968 (72%)	250	<-1 (3)[a]	<-0.1%[b]
Average (PY 1 to PY 2)	Yes	773 (28%)	242	<-1 (3)[a]	-0.1%
	No	1,968 (72%)	245	<1 (3)	0.1%
PY 3 (Cohort 1 only)	Yes	196 (27%)	265	2 (4)	0.7%
	No	533 (73%)	262	2 (4)	0.7%

Source: Mathematica's analysis of Medicare claims data from January 2019 to December 2023.
Note: See the footnote to Exhibit B.7.18.
[a] The impact estimate is between 0 and -1.
[b] The percentage impact is between 0 and -0.1 percent.
CPC+ = Comprehensive Primary Care Plus; FFS = fee for service; PCF = Primary Care First; PY = performance year; SE = standard error.

Exhibit B.7.21. Hybrid frequentist–Bayesian estimates of impacts on acute hospitalizations (per 1,000 beneficiaries per year) for Medicare FFS beneficiaries over the first three performance years, by beneficiary subgroup

Performance year	Subgroup categories	Number (percentage) of PCF beneficiaries in subgroup	PCF mean (hospitalizations per 1,000 beneficiaries per year)	Impact estimate (SE) (hospitalizations per 1,000 beneficiaries per year)	Percentage impact
Beneficiaries with behavioral health conditions at model launch					
PY 1	Yes	221,898 (12%)	620	<1 (3)	0.1%
	No	1,590,690 (83%)	191	<1 (3)	0.2%
PY 2	Yes	203,756 (10%)	585	<-1 (3)[a]	<-0.1%[b]
	No	1,586,595 (79%)	217	<-1 (3)[a]	<-0.1%[b]
Average (PY 1 to PY 2)	Yes	212,827 (11%)	602	<1 (3)	<0.1%
	No	1,588,643 (81%)	204	<1 (3)	<0.1%
PY 3 (Cohort 1 only)	Yes	50,619 (9%)	591	1 (4)	0.2%
	No	414,728 (76%)	241	2 (4)	0.9%
Medicare FFS–Medicaid dually eligible beneficiaries versus non-dually eligible beneficiaries at model launch					
PY 1	Dual	205,990 (11%)	351	1 (3)	0.4%
	Non-dual	1,717,394 (89%)	227	<1 (3)	0.2%
PY 2	Dual	193,058 (10%)	353	<1 (3)	<0.1%
	Non-dual	1,819,549 (90%)	238	<-1 (3)[a]	-0.2%
Average (PY 1 to PY 2)	Dual	199,524 (10%)	352	<1 (3)	0.2%
	Non-dual	1,768,472 (90%)	232	<-1 (3)[a]	<-0.1%[b]
PY 3 (Cohort 1 only)	Dual	58,026 (11%)	376	2 (4)	0.7%
	Non-dual	490,552 (89%)	250	2 (4)	0.7%

Source: Mathematica's analysis of Medicare claims data from January 2019 to December 2023.

Note: See the footnote to Exhibit B.7.18.

[a] The impact estimate is between 0 and -1.

[b] The percentage impact is between 0 and -0.1 percent.

FFS = fee for service; PCF = Primary Care First; PY = performance year; SE = standard error.

Exhibit B.7.22. Hybrid frequentist–Bayesian estimates of impacts on primary-care-substitutable ED visits (per 1,000 beneficiaries per year) for Medicare FFS beneficiaries over the first three performance years, by practice subgroup

Performance year	Subgroup categories	Number (percentage) of PCF practices in subgroup	PCF mean (visits per 1,000 beneficiaries per year)	Impact estimate (SE) (visits per 1,000 beneficiaries per year)	Percentage impact
Whether practice participated in CPC+ before model start					
PY 1	Yes	1,157 (42%)	123	<-1 (4)[a]	<-0.1%[b]
	No	1,584 (58%)	136	<1 (3)	0.4%
PY 2	Yes	1,157 (42%)	128	<1 (4)	<0.1%
	No	1,584 (58%)	140	1 (3)	0.7%
Average (PY 1 to PY 2)	Yes	1,157 (42%)	126	<1 (3)	<0.1%
	No	1,584 (58%)	138	<1 (3)	0.6%
Whether practice participated in the Medicare Shared Savings Program at model launch					
PY 1	Yes	1,526 (56%)	127	<1 (3)	0.1%
	No	1,215 (44%)	132	<1 (3)	0.3%
PY 2	Yes	1,526 (56%)	132	<1 (3)	0.2%
	No	1,215 (44%)	138	<1 (3)	0.6%
Average (PY 1 to PY 2)	Yes	1,526 (56%)	130	<1 (3)	0.1%
	No	1,215 (44%)	135	<1 (3)	0.5%
PY 3 (Cohort 1 only)	Yes	400 (55%)	150	<-1 (4)[a]	<-0.1%[b]
	No	329 (45%)	147	<1 (4)	<0.1%
Whether practice was affiliated with a health system including a hospital at model launch					
PY 1	Yes	1,881 (69%)	136	<1 (3)	0.3%
	No	860 (31%)	116	<1 (4)	<0.1%
PY 2	Yes	1,881 (69%)	140	<1 (3)	0.6%
	No	860 (31%)	122	<1 (4)	0.2%
Average (PY 1 to PY 2)	Yes	1,881 (69%)	138	<1 (3)	0.4%
	No	860 (31%)	119	<1 (3)	0.1%
PY 3 (Cohort 1 only)	Yes	513 (70%)	154	<1 (4)	<0.1%
	No	216 (30%)	135	<-1 (4)[a]	<-0.1%[b]
Whether practice was multispecialty (versus primary care only) at model launch					
PY 1	Yes	773 (28%)	136	<1 (3)	0.5%
	No	1,968 (72%)	126	<1 (3)	<0.1%
PY 2	Yes	773 (28%)	141	<1 (3)	0.6%
	No	1,968 (72%)	131	<1 (3)	0.3%
Average (PY 1 to PY 2)	Yes	773 (28%)	138	<1 (3)	0.6%
	No	1,968 (72%)	129	<1 (3)	0.2%
PY 3 (Cohort 1 only)	Yes	196 (27%)	155	<1 (4)	0.3%
	No	533 (73%)	145	<-1 (4)[a]	-0.2%

Source: Mathematica's analysis of Medicare claims data from January 2019 to December 2023.

Note: See the footnote to Exhibit B.7.18.

[a] The impact estimate is between 0 and -1.

[b] The percentage impact is between 0 and -0.1 percent.

CPC+ = Comprehensive Primary Care Plus; ED = emergency department; FFS = fee for service; PCF = Primary Care First; PY = performance year; SE = standard error.

Exhibit B.7.23. Hybrid frequentist–Bayesian estimates of impacts on primary-care-substitutable ED visits (per 1,000 beneficiaries per year) for Medicare FFS beneficiaries over the first three performance years, by beneficiary subgroup

Performance year	Subgroup categories	Number (percentage) of PCF beneficiaries in subgroup	PCF mean (visits per 1,000 beneficiaries per year)	Impact estimate (SE) (visits per 1,000 beneficiaries per year)	Percentage impact
Beneficiaries with behavioral health conditions at model launch					
PY 1	Yes	221,898 (12%)	313	<1 (3)	<0.1%
	No	1,590,690 (83%)	106	<1 (3)	0.2%
PY 2	Yes	203,756 (10%)	305	<1 (3)	0.2%
	No	1,586,595 (79%)	117	<1 (3)	0.5%
Average (PY 1 to PY 2)	Yes	212,827 (11%)	309	<1 (3)	0.1%
	No	1,588,643 (81%)	111	<1 (3)	0.4%
PY 3 (Cohort 1 only)	Yes	50,619 (9%)	339	<-1 (4)[a]	<-0.1%[b]
	No	414,728 (76%)	132	<1 (4)	<0.1%

Source: Mathematica's analysis of Medicare claims data from January 2019 to December 2023.

Note: See the footnote to Exhibit B.7.18.

[a] The impact estimate is between 0 and -1.

[b] The percentage impact is between 0 and -0.1 percent.

ED = emergency department; FFS = fee for service; PCF = Primary Care First; PY = performance year; SE = standard error.

B.8. Additional results from the PBA analysis

This appendix contains additional findings from the PBA analysis described in Chapter 6 using the methods described in Appendix A.2.8. All results apply to PCF practices in risk groups 1 and 2 and use practice-specific impacts on the acute hospitalization rate per 1,000 beneficiaries from performance year 2023 and PBAs for quarter 2 of performance year 2024. Exhibit B.8.1 shows the weighted means of the practice-specific terms we obtained from the aggregate Bayesian Causal Forest (aBCF) approach ($I_j^1 = \hat{\tau}_j$, $I_j^2 = \hat{\tau}_j + \hat{u}_j, \hat{u}_j, \hat{\mu}_j$, see Appendix A.2.8) and the number of practices and total assigned beneficiaries by PBA percentage, overall, by risk group, and by cohort. The table summarizes the data we used for the PBA analysis.

Exhibit B.8.1. Mean practice-specific aBCF terms by PBA percentage, performance year 2023

	PBA percentage												
	-10	-6.5	0	3.5	6.5	10	13	20	27	30	34	40	50
All practices													
$I_j^1 = \hat{\tau}_j$	1.64	1.20	1.67	1.10	1.70	1.58	1.46	1.47	1.05	1.25	0.20	0.96	1.30
$I_j^2 = \hat{\tau}_j + \hat{u}_j$	2.73	2.41	2.03	1.87	1.17	1.26	1.04	0.99	0.05	0.57	-0.85	-0.35	0.43
$\hat{u}_j$	1.09	1.21	0.36	0.76	-0.53	-0.32	-0.42	-0.48	-1.00	-0.67	-1.05	-1.31	-0.88
$\hat{\mu}_j$	-4.88	8.55	-0.12	0.36	8.17	2.25	5.88	1.61	9.97	7.84	18.25	7.17	0.25
Practices	373	7	686	45	130	17	183	169	97	41	33	45	28
Beneficiaries	207,527	3,645	513,926	42,967	102,643	18,281	129,420	123,883	68,327	30,740	13,909	34,281	10,277
Cohort 1 practices													
$I_j^1 = \hat{\tau}_j$	2.51	n.a.	2.60	2.44	2.85	2.83	2.34	2.09	1.95	1.93	2.00	1.95	1.95
$I_j^2 = \hat{\tau}_j + \hat{u}_j$	4.69	n.a.	3.56	2.05	2.19	1.85	1.47	0.97	-0.39	0.02	-1.35	-1.28	-0.11
$\hat{u}_j$	2.19	n.a.	0.96	-0.39	-0.66	-0.98	-0.87	-1.12	-2.34	-1.91	-3.34	-3.23	-2.06
$\hat{\mu}_j$	-17.58	n.a.	-9.95	-15.58	-3.67	4.99	-10.13	-16.95	-15.38	-14.93	-5.16	-13.25	-8.79
Practices	91	0	166	11	32	4	42	45	15	7	5	6	9
Beneficiaries	55,098	0	123,560	7,672	26,440	4,129	25,776	27,001	7,037	3,437	2,574	2,963	2,843
Cohort 2 practices													
$I_j^1 = \hat{\tau}_j$	1.33	1.20	1.37	0.81	1.30	1.21	1.24	1.29	0.95	1.16	-0.21	0.86	1.06
$I_j^2 = \hat{\tau}_j + \hat{u}_j$	2.02	2.41	1.54	1.83	0.82	1.08	0.93	1.00	0.10	0.64	-0.73	-0.26	0.63
$\hat{u}_j$	0.69	1.21	0.17	1.02	-0.48	-0.13	-0.31	-0.30	-0.85	-0.52	-0.53	-1.12	-0.43
$\hat{\mu}_j$	-0.28	8.55	2.99	3.83	12.27	1.45	9.86	6.79	12.88	10.71	23.57	9.10	3.71

	PBA percentage												
	-10	-6.5	0	3.5	6.5	10	13	20	27	30	34	40	50
Practices	282	7	520	34	98	13	141	124	82	34	28	39	19
Beneficiaries	152,429	3,645	390,367	35,295	76,203	14,152	103,644	96,876	61,290	27,303	11,335	31,318	7,435
Risk group 1 practices													
$I_j^1 = \hat{\tau}_j$	1.66	1.48	1.70	1.13	1.71	1.69	1.48	1.47	1.15	1.08	0.46	0.96	1.33
$I_j^2 = \hat{\tau}_j + \hat{u}_j$	2.77	2.59	2.04	1.94	1.25	1.29	1.05	0.99	0.14	0.41	-0.18	-0.40	0.49
$\hat{u}_j$	1.11	1.11	0.34	0.81	-0.46	-0.40	-0.42	-0.49	-1.01	-0.66	-0.64	-1.36	-0.84
$\hat{\mu}_j$	-4.55	5.42	0.05	1.69	8.92	0.06	5.58	2.29	10.84	8.93	20.86	6.11	0.91
Practices	334	6	624	42	122	16	173	162	88	36	26	43	27
Beneficiaries	193,876	3,202	478,459	41,426	97,791	17,515	125,314	119,994	63,610	27,912	10,208	32,708	10,138
Risk group 2 practices													
$I_j^1 = \hat{\tau}_j$	1.36	-0.83	1.16	0.48	1.59	-1.00	0.87	1.26	-0.20	2.91	-0.52	0.78	-0.22
$I_j^2 = \hat{\tau}_j + \hat{u}_j$	2.21	1.11	1.87	-0.06	-0.32	0.42	0.64	1.09	-1.15	2.14	-2.68	0.67	-4.16
$\hat{u}_j$	0.86	1.94	0.72	-0.54	-1.91	1.42	-0.23	-0.17	-0.94	-0.77	-2.16	-0.11	-3.94
$\hat{\mu}_j$	-9.54	31.16	-2.35	-35.21	-7.07	52.34	15.05	-19.42	-1.84	-2.84	11.05	29.21	-47.27
Practices	39	1	62	3	8	1	10	7	9	5	7	2	1
Beneficiaries	13,651	443	35,467	1,541	4,852	766	4,106	3,889	4,717	2,829	3,701	1,573	140

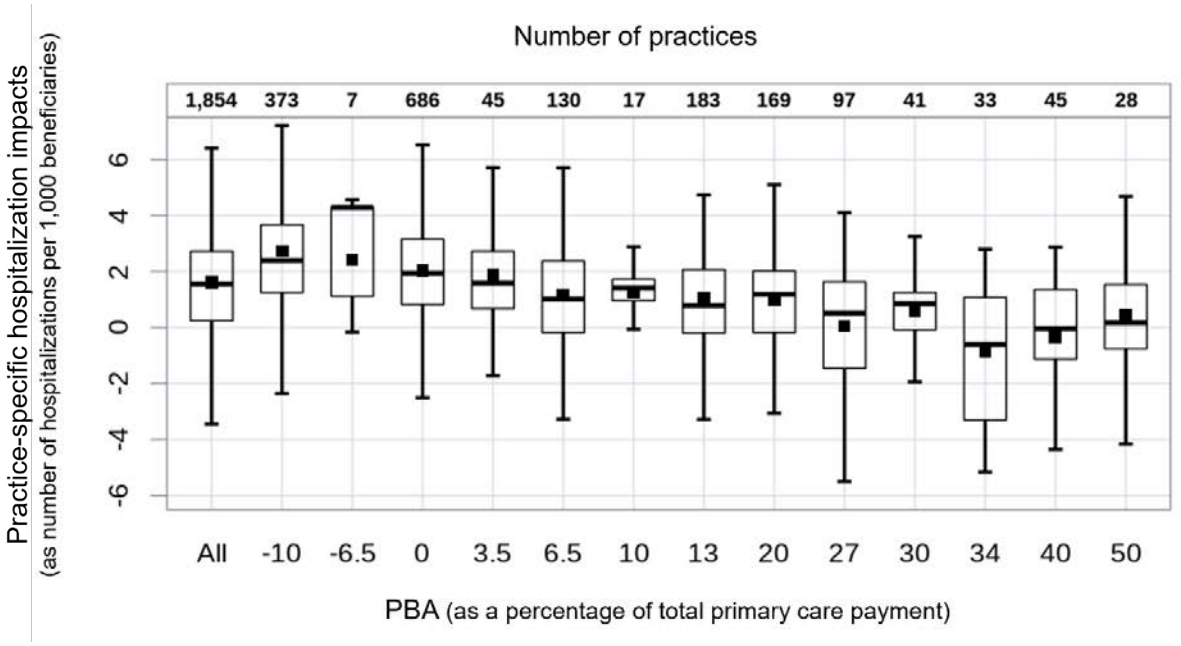
Source: Mathematica's analysis of 2023 Medicare claims and PCF payment data for quarter 2 of 2024.

Notes: The table shows weighted means of the practice-specific terms for performance year 2023 we estimated using the aBCF approach. $I_j^1 = \hat{\tau}_j$ and $I_j^2 = \hat{\tau}_j + \hat{u}_j$ are the bounds on the practice-specific impacts, $\hat{u}_j$ is the idiosyncratic part of a practice's counterfactual outcome, and $\hat{\mu}_j$ is estimate of the practice's counterfactual outcome (see Appendix A.2.8). These estimates are weighted by the number of assigned beneficiaries and calculated separately for each PBA percentage that PCF practices received in quarter 2 of performance year 2024. The bottom two rows of each panel show the number of practices and the total number of beneficiaries for each PBA percentage.

aBCF = aggregate Bayesian Causal Forest; n.a. = not applicable; PBA = performance-based adjustment; PCF = Primary Care First.

Exhibit B.8.2 shows the distribution of practice-specific impacts on the acute hospitalization rate by PBA percentage, similar to Exhibit 6.4 in Chapter 6. Although Exhibit 6.4 shows the distribution of the first measure of practice-specific impacts ($I_j^1 = \hat{\tau}_j$), Exhibit B.8.2 shows the distribution of the second measure of practice-specific impacts ($I_j^2 = \hat{\tau}_j + \hat{u}_j$). (See Appendix A.2.8 for the definition of these terms.)

Exhibit B.8.2. Box plots for practice-specific impacts on the acute hospitalization rate (alternative specification) by PBA percentage, performance year 2023



Source: Mathematica's analysis of 2023 Medicare claims and PCF payment data for quarter 2 of 2024.

Notes: The box plots show, for each PBA percentage that PCF practices received in quarter 2 of performance year 2024, the distribution of practice-specific impacts on the acute hospitalization rate per 1,000 beneficiaries as measured by one of the bounds on practice-specific impacts (specifically, the term $I_j^2 = \hat{\tau}_j + \hat{u}_j$; see Appendix A.2.8), weighted by the number of assigned beneficiaries. The bottom and top edges of each box denote the 25th and 75th percentiles, respectively. The thicker horizontal line denotes the median, and the square represents the mean. The whiskers denote the 25th percentile minus 1.5 times the IQR and the 75th percentile plus 1.5 times the IQR, respectively.

IQR = interquartile range; PBA = performance-based adjustment; PCF = Primary Care First.

Exhibits B.8.3 to B.8.5 contain outputs for the regressions of the PBA percentage on the two measures of practice-specific impacts, which represent the two bounds on practice-specific impacts obtained from the aBCF estimation and are defined as $I_j^1 = \hat{\tau}_j$ and $I_j^2 = \hat{\tau}_j + \hat{u}_j$. The regressions also include control terms obtained from the aBCF estimation, including the idiosyncratic part of a practice's counterfactual outcome ($\hat{u}_j$), the estimate of the practice's counterfactual outcome ($\hat{\mu}_j$), and the practice's residual ($\hat{\sigma}_j$). (See Appendix A.2.8 for a detailed definition of these terms.) Exhibit B.8.3 shows the overall regression output for all risk group 1 and 2 practices, Exhibit B.8.4 shows regression output by risk group, and Exhibit B.8.5 shows regression output by cohort.

Exhibit B.8.3. Estimated coefficients and standard errors from regressions of the PBA percentage on terms obtained from the aBCF estimation, full sample of risk group 1 and 2 practices, performance year 2023

	Model 1	Model 2
Practice-specific impact ($I_j^1 = \hat{\tau}_j$)	-0.43 *	
	(0.23)	
Practice-specific impact ($I_j^2 = \hat{\tau}_j + \hat{u}_j$)		-0.66 ***
		(0.14)
Idiosyncratic part of a practice's counterfactual outcome ($\hat{u}_j$)	-0.85 ***	
	(0.20)	
Estimate of the practice's counterfactual outcome ($\hat{\mu}_j$)	0.14 ***	0.14 ***
	(0.01)	(0.01)
Practice's residual ($\hat{\sigma}_j$)	-0.14 ***	-0.15 ***
	(0.01)	(0.01)
Number of observations	1,854	1,854
R^2	0.20	0.20

Source: Mathematica's analysis of 2023 Medicare claims and PCF payment data for quarter 2 of 2024.

Notes: The table shows estimated regression coefficients with heteroskedasticity robust standard errors for regressions of the PBA percentage on terms derived from the aBCF method, which we describe in Appendix A.2.8.

* Significantly different from zero at the .10 level, two-tailed test.
** Significantly different from zero at the .05 level, two-tailed test.
*** Significantly different from zero at the .01 level, two-tailed test.

aBCF = aggregate Bayesian Causal Forest; PBA = performance-based adjustment; PCF = Primary Care First.

Exhibit B.8.4. Estimated coefficients and standard errors from regressions of the PBA percentage on terms obtained from the aBCF estimation, by practice cohort, performance year 2023

	Cohort 1		Cohort 2	
	Model 1	Model 2	Model 1	Model 2
Practice-specific impact ($I_j^1 = \hat{\tau}_j$)	-0.66		-0.53 *	
	(0.51)		(0.28)	
Practice-specific impact ($I_j^2 = \hat{\tau}_j + \hat{u}_j$)		-0.53 ***		-1.09 ***
		(0.19)		(0.28)
Idiosyncratic part of a practice's counterfactual outcome ($\hat{u}_j$)	-0.49 **		-2.92 ***	
	(0.22)		(0.72)	
Estimate of the practice's counterfactual outcome ($\hat{\mu}_j$)	0.09 ***	0.09 ***	0.17 ***	0.16 ***
	(0.02)	(0.02)	(0.02)	(0.02)
Practice's residual ($\hat{\sigma}_j$)	-0.12 ***	-0.12 ***	-0.10 ***	-0.15 ***
	(0.02)	(0.02)	(0.02)	(0.01)
Number of observations	433	433	1,421	1,421
R^2	0.18	0.18	0.22	0.20

Source: Mathematica's analysis of 2023 Medicare claims and PCF payment data for quarter 2 of 2024.

Notes: The table shows estimated regression coefficients with heteroskedasticity robust standard errors for regressions of the PBA percentage on terms derived from the aBCF method, which we describe in Appendix A.2.8, separately for practices in Cohorts 1 and 2 (former CPC+ participants).

* Significantly different from zero at the .10 level, two-tailed test.
** Significantly different from zero at the .05 level, two-tailed test.
*** Significantly different from zero at the .01 level, two-tailed test.

aBCF = aggregate Bayesian Causal Forest; CPC+ = Comprehensive Primary Care Plus; PBA = performance-based adjustment; PCF = Primary Care First.

Exhibit B.8.5. Estimated coefficients and standard errors from regressions of the PBA percentage on terms obtained from the aBCF estimation, by risk group, performance year 2023

	Risk group 1		Risk group 2	
	Model 1	Model 2	Model 1	Model 2
Practice-specific impact ($I_j^1 = \hat{\tau}_j$)	-0.48 *		0.00	
	(0.25)		(0.66)	
Practice-specific impact ($I_j^2 = \hat{\tau}_j + \hat{u}_j$)		-0.69 ***		-0.36
		(0.15)		(0.43)
Idiosyncratic part of a practice's counterfactual outcome ($\hat{u}_j$)	-0.85 ***		-0.77	
	(0.20)		(0.72, p = 0.28)	
Estimate of the practice's counterfactual outcome ($\hat{\mu}_j$)	0.15 ***	0.15 ***	0.11 **	0.10 ***
	(0.01)	(0.01)	(0.04)	(0.04)
Practice's residual ($\hat{\sigma}_j$)	-0.15 ***	-0.15 ***	-0.12 ***	-0.14 ***
	(0.01)	(0.01)	(0.04)	(0.03)
Number of observations	1,699	1,699	155	155
R^2	0.20	0.20	0.19	0.18

Source: Mathematica's analysis of 2023 Medicare claims and PCF payment data for quarter 2 of 2024.

Notes: The table shows estimated regression coefficients with heteroskedasticity robust standard errors for regressions of the PBA percentage on terms derived from the aBCF method, which we describe in Appendix A.2.8, separately for risk group 1 and 2 practices.

* Significantly different from zero at the .10 level, two-tailed test.
** Significantly different from zero at the .05 level, two-tailed test.
*** Significantly different from zero at the .01 level, two-tailed test.

aBCF = aggregate Bayesian Causal Forest; PBA = performance-based adjustment; PCF = Primary Care First.

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