NORC at the University of Chicago

ANNUAL REPORT 1: APPENDICES

October 2023

Evaluation of the Global and Professional Direct Contracting Model

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This project was funded by the Centers for Medicare & Medicaid Services under contract no. 75FCMC19D0092, Task Order 75FCMC21F0002. The statements contained in this report are solely those of the authors and do not necessarily reflect the views or policies of the Centers for Medicare & Medicaid Services. NORC at the University of Chicago assumes responsibility for the accuracy and completeness of the information contained in this report.

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Appendix A: Provider Affiliation Types

The GPDC Model allows for two possible types of affiliations for providers with Direct Contracting Entities (DCEs): Participant or Preferred Providers.

Participant Providers are individual practitioners and facilities to which DCE beneficiaries are directly aligned and that the Centers for Medicare & Medicaid Services (CMS) considers to be usual sources of care. These providers are either alignment-eligible individual practitioners or facilities or suppliers. Beneficiaries are aligned to the DCE through the DC Participant Providers and these providers and suppliers are responsible for reporting quality through the DCE and committing to beneficiary care improvement. Participant Providers may include are not limited to:

- Physicians or other practitioners in group practice arrangements
- Networks of individual practices of physicians or other practitioners
- Hospitals employing physicians or other practitioners
- Federally Qualified Health Centers (FQHCs)
- Rural Health Clinics (RHCs)
- Critical Access Hospitals (CAHs)

Preferred Providers, on the other hand, may operate both within the GPDC Model across multiple DCEs as well with Medicare ACOs participating in the Medicare Shared Savings Program ("Shared Savings Program"). While DCEs are not required to have Preferred Providers, Preferred Providers enable a DCE to extend its network by supplementing and complementing the types of care that Participant Providers deliver to its aligned beneficiaries. Preferred Providers can be individual practitioners or facilities affiliated with provider organizations. In addition to the types of providers that can be Participant Providers, Preferred Providers may include the following:

- Physician practices
- Acute and long-term care hospitals (LTCH)
- Skilled nursing facilities (SNFs)
- Home health agencies (HHAs)
- Hospices
- Ambulatory surgery centers

Appendix B: Research Questions and Hypotheses

Exhibit B.1 and Exhibit B.2 outline our research questions, data sources, analytic methods, and hypotheses. These research questions reflect the high-level priorities of the GPDC Model evaluation and will provide an understanding of the Model's impact on utilization, cost, and quality measures as well as DCEs' organizational characteristics and implementation approaches.

Exhibit B.1. Research Questions, Data Sources, and Analytic Methods

Research Question	Data Sources	Quantitative Data Design	Qualitative Data Design
Utilization/Costs			
1. Did utilization patterns change under the model relative to a comparison group by DCE type? Did this vary by capitation level and risk level? 2. Did the model result in lower total Medicare spending (Parts A and B) relative to a comparison group by DCE type? Did this vary by capitation, risk level, setting, or individual DCEs? Did the model result in net savings to Medicare?	ADMIN PUBLIC AREA	• Descriptive analyses • Power analysis for DCE type and subgroups • Difference-in-differences (DID) • Serial cross-section (SC) for New Entrant and High Needs DCEs, with comparison groups in post-period for each DCE type, if DID is not feasible • DID and/or SC for nine subgroups of type/capitation/risk level combinations • DID and/or SC for individual DCEs • Net savings analysis including CMS incentive payments to DCEs and comparison group in performance and baseline years	Multi-case qualitative analyses
Quality of Care			
1. Did beneficiaries' experience of care, as measured through the DCE-administered Consumer Assessment of Healthcare Providers and Systems (CAHPS) survey data, improve, decline, or remain unchanged over time or relative to a comparison group?	CAHPS AREA	• Descriptive analyses • SC with comparison groups by DCE type	

Research Question	Data Sources	Quantitative Data Design	Qualitative Data Design
2. Did beneficiaries' quality of care—as measured by readmissions, mortality, and timely follow-up after acute exacerbations of chronic conditions—improve relative to a comparison group?	MODEL ADMIN	• Descriptive analyses • Power analysis by DCE type • DID for all DCE types • SC for New Entrant and High Needs DCEs, with type-specific comparison groups, if DID is not feasible	
Implementation			
1. What are the characteristics of DCEs? Do DCEs differ by organizational affiliation (type), capitation type, or risk level?	MODEL PROV PULSE	Descriptive and multivariate analysis of claims-based measures of benefit enhancement service use	Descriptive analysis of data extracted from applications, programmatic data, and DCE Pulse Check Survey responses
2. How did DCEs respond to financial and quality incentives and benefit enhancements?			
3. What implementation successes and/or challenges occurred?			
4. How did Participant Providers and Preferred Providers change their care delivery approaches in response to financial and quality incentives and benefit enhancements?	MODEL PROV ADMIN	Descriptive and multivariate analysis of claims-based measures of care delivery, including: benefit enhancement waiver-related services and leakage of care (for DCEs), and continuity of care and spillovers (for DCEs and comparison groups)	Thematic analysis of DCE and provider interviews Multi-case qualitative analyses

NOTES: *Data source categories: ADMIN = Medicare FFS claims and other administrative data; PUBLIC = Publicly available AREA = Publicly available area-level data, such as Area Deprivation Index; CAHPS = Consumer Assessment of Healthcare Providers and Systems survey data; MODEL = GPDC Model programmatic data from other CMS contractors; PROV = Interviews with DCE providers; PULSE = Pulse Check Survey administered to participating DCEs.*

Exhibit B.2. Evaluation Hypotheses Related to Research Questions

Utilization/Cost Research Question 1: Did utilization patterns change under the model relative to a comparison group, and did this vary by DCE type?

- Given the model's focus on enhanced primary care, services covered under PCC (for example, preventive primary care and chronic disease management) may increase at first, reflecting an effort to increase access to care for people who have been traditionally underserved. Use of office-based services and others in the outpatient setting may decrease over time as DCEs engage physicians with financial incentives through payment arrangements, provide feedback on their performance, and use staffing and technology supports to coordinate beneficiary care.
- Beneficiaries aligned to DCE providers may have fewer ED visits and acute care hospitalizations, shorter acute care lengths of stay, and fewer days in intensive PAC settings as DCEs shift beneficiaries toward less resource-intensive care settings such as urgent care or office-based care.
- The DCEs may establish partnerships with SNFs in their networks, to substitute SNF placements for IRF and LTCH placements. Reductions in hospitalization utilization and costs may grow over time, as DCEs become more adept at using data analytics to identify aligned beneficiaries at risk of hospitalization and

to engage them through care management, managing care transitions to prevent readmissions, and leveraging SNF BEs to avoid unnecessary hospitalizations.

Utilization/Cost Research Question 2: Did the model result in lower total Medicare spending (Parts A and B) relative to a comparison group by DCE type? Did the model result in net savings to Medicare?

- The DCE administrators may target complex populations, identifying compelling opportunities for savings through chronic disease management and preventive primary care.
- Beneficiaries aligned to DCE providers may show reductions in gross Medicare spending relative to those aligned to comparison providers, reflecting reduced utilization across key care settings. Beneficiaries aligned to DCE providers are expected to have reduced acute care hospital spending, reduced PAC spending, and declines in outpatient facility spending.
- Beneficiaries aligned to DCEs that elect Global/TCC options may see greater reductions—compared with DCEs that elect Professional risk-sharing and Global/PCC options—because the entities assume financial responsibility for all services under Medicare Parts A and B. The DCEs may have contractual relationships with high-value specialty care providers and facilities, for cost-saving specialty or facility care.
- The DCEs that elect PCC, which includes only primary care services, may focus on delivery system changes within the physician office setting, limiting chances for cost savings related to inpatient or PAC settings.
- The DCEs may show net Medicare savings in the later years of the model, after population management approaches are well-established.

Quality of Care Research Question 1: Did beneficiaries' quality of care—as measured by readmissions—improve relative to a comparison group?

- Historically, DCEs have worked to improve quality metrics in several ways, such as partnering with hospitals to implement discharge notifications to providers after a beneficiary has an inpatient stay. Another example would be by enhancing beneficiaries' access to providers (through telehealth or 24-hour phone-based nursing support) to prevent health conditions from escalating and requiring emergency services. Further, DCEs have used health IT and population health analysis to identify and manage high risk beneficiaries, for example, to support communication across the care team regarding care plans, to manage medications, to document clinical history, and to address SDOH. We expect DCEs to continue leveraging such practices to improve quality of care for their aligned beneficiaries.

Implementation Research Question 1: What are the characteristics of DCEs? Do DCEs differ by organizational affiliation (type), capitation type, or risk level?

- DCEs' organizational affiliation may be considered a proxy for their resources, infrastructure, and incentives (with respect to Medicare spending reductions) for accountable care. Regardless of organizational affiliation, DCEs will tend to focus on reducing spending in areas that do not directly impact their primary revenue streams. For example, hospital-affiliated DCEs have more control over the care provided in their inpatient and outpatient facilities. Physician practice DCEs are able to control the care provided in their offices and through referrals. Neither type of organizational affiliation has a clear incentive to reduce revenue associated within their own care settings.
- DCEs may select capitation type and risk level to optimize their performance in the model, subject to their organizational capacity and context. We expect that DCEs that take on more financial risk may be both less risk-averse and more likely to anticipate their future performance based on prior experience in delegated risk contracts.
- We anticipate DCEs that take on greater financial risk will generate more savings.

- DCEs that selected lower-risk or capitation levels may have less prior experience in value-based care and thus need more time to develop the infrastructure needed to transform care delivery. They may thus be slower to generate savings, relative to DCEs that selected higher risk and capitation options.

Implementation Research Question 2: How did DCEs respond to the model's financial and quality incentives and benefit enhancements?

- DCEs may respond to model features with investments in health information technology (IT) and data analytics for population health management, financial and non-financial support for providers, and diverse beneficiary engagement strategies.

Implementation Research Question 3: What implementation successes and/or challenges occurred?

- Individual DCEs' successes and challenges depend on the capacity and resources in place at the start of the model as well as the organization's and its providers' degree of experience with risk-sharing payment arrangements, particularly in other alternative payment models (APMs). More specifically, DCEs with years of prior Medicare ACO experience (for example, in the Shared Savings Program or Next Generation ACO Model [NGACO]) may have refined their population health management systems and the capacity to bear financial risk in value-based models over time. In particular, hospital participation in past ACO models is associated with prior experience with risk-based payment arrangements, advanced health IT, and location in higher-income and more competitive markets. Moreover, prior experience may facilitate health system integration, which both predicts DCE formation and offers a chance to maximize savings through improved care coordination and organized networks of referrals across specialty providers and facilities.

Implementation Research Question 4: How did Participant Providers and Preferred Providers change their care delivery approaches in response to financial and quality incentives and benefit enhancements?

- Providers' behavior under the model may be affected by their financial relationship with both the DCE and their degree of engagement with the model's goals. DCEs with providers that are more invested in the model (for example, by bearing financial risk) are more likely to improve care delivery and outcomes. Important factors in care delivery transformation among providers may include DCEs' control of provider behavior (for example employment vs. contracted providers), financial incentives (for example, capitation and shared savings), performance feedback, population health management systems, and infrastructure.

NOTES: The hypotheses in this exhibit are specific to the research questions addressed in Annual Report 1. Future Annual Reports will include updated hypotheses for the research questions reflected in this table as well as new research questions that are explored in future reports.

Appendix C: Qualitative and Survey Methods

This report draws on one qualitative and a quantitative survey data source: 1) model applications and 2) online questionnaires (Pulse Check Survey).

C.1 Document Review

From October 2021 through February 8, 2022, we systematically reviewed, extracted, and synthesized data from 2021 DCEs' model applications. In 2020, ACOs applied to the GPDC Model in response to a request for applications published on November 25, 2019. Once approved and participating in the model, these ACOs were referred to as DCEs. The application includes both categorical questions and open-ended questions.

We developed a document review tool that was designed to capture elements from participants' applications into a document review tool. The tool's domains are derived from the evaluation's conceptual framework (**Exhibit 1.4** in main report), which includes constructs from the Consolidated Framework for Implementation Research[1] and the evaluation team's subject matter expertise on how ACOs operate. The tool captures the elements and domains listed in **Exhibit C.1.**

Exhibit C.1. Document Review Tool's Variables for Application Analysis

Domain	Document Review Data Element
External Context	Geographic service area
	Rurality/urbanicity
DCE Structure and Features	Type of DCE organization
	DCE composition
	History of the applicant DCE organization and its major member organizations' business relationships and collaborations
DCE Model Features	Types of providers in model
	Participant Providers
	Preferred Providers
	Contractual and/or employment relationships among Participant Providers
	Contractual and/or employment relationships with other partners or entities
	Leadership team exclusive to the DCE
Risk-Sharing Experience	Risk-sharing experience under Medicare, Medicare Advantage (MA), Medicaid, and commercial plans
	General risk-sharing experience

[1] Consolidated Framework for Implementation Research. https://cfirguide.org/.

Domain	Document Review Data Element
	Business model financial strategies
	Business model non-financial strategies
	Market context (level of competition, market share, major competitors, past partnerships)
	History of collaboration
Financial Plan Information	How to fund ongoing DCE activities
	Plan to ensure payment to Medicare
	Plan to manage Part D
	Composition of DCE revenues
	Capitation payment mechanism
Voluntary Alignment (VA)	Alignment frequency
	Voluntary alignment activities
Care Management	Care management for dual-eligible beneficiaries and other subgroups
	Chronic care management and programs that target specific conditions and diseases
	Chronic care management and programs for non-disease and non-risk-level subgroups (for example, racial/ethnic minorities, behavioral health)
	Care management for social and behavioral needs
	Care team composition
	Post-acute care, transitional care, specialty care, and home health care activities
	Long-term services and supports
	Palliative care services
	Pharmacy services and medication management
	Telehealth services
	Risk stratification
Beneficiary Engagement	Beneficiary engagement strategies
Provider Engagement	Non-financial provider engagement
	Financial provider engagement
Quality Outcomes	Quality measures
Health Information Technology (Health IT)	Dominant electronic health record (EHR) system
	EHR interoperability and external/internal information-sharing
	Health information exchange (HIE)
	Real-time notifications (for example, discharges, hospitalizations)
	Health IT and data analytics

NOTES: DCE = Direct Contracting Entity; EHR = electronic health record; HIE = health information exchange; Health IT = health information technology.

A team of four reviewers piloted the document review tool with 10 DCEs' applications and refined it in two iterations. During this time, reviewers were also trained on the document review tool and held consensus-building discussions to come to agreement on interpretation of data and concepts, ensuring data capture was consistent across DCEs. After incorporating revisions from the piloting process, reviewers independently extracted data from 53 applications into the document review tool described above. As a quality assurance measure, a team lead concurrently conducted quality assurance/control checks on reviewers' work and delivered feedback on an ongoing basis. A team lead and three reviewers performed quality assurance/control checks on extracted data to ensure the data set was as complete as possible and come to agreement where data were unclear.

Measure Creation. The team created a list of categorical measures intended to capture key context, characteristics, and implementation approaches across DCEs (**Exhibit C.2**); this list enabled the team to harmonize data captured across multiple data sources. The team created a measures list deductively from the conceptual framework (**Exhibit 1.4** in main report) and research questions, then inductively refined this list based on other CMS documents and document review data, relevant gray and peer-reviewed literature, and our understanding of ACOs from previous model evaluations and current GPDC Model documentation. A team of six reviewers conducted two series of piloting the measures on two samples of DCEs on a staggered basis. The piloting team held weekly meetings to refine measures and their definitions. All piloting was conducted in pairs to ensure agreement and consistency of data synthesis and measure assignment. Following piloting, seven reviewers independently synthesized document review data into the categorical measures assigned to each DCE (**Exhibit C.2**). During this time, reviewers held consensus-building discussions to come to agreement on interpretation of data and concepts, ensuring data synthesis and measures were consistent across DCEs. Concurrently, the team lead and four reviewers led two rounds of quality checks and iteratively delivered feedback to reviewers, examined the categorical measures assigned to DCEs. The lead conducted one final review of the categorical measures for each DCE as a final quality check.

Exhibit C.2. Measure Domains, Categories, and Definition and Inclusion Criteria

Domain	Measure Category	Definition and Inclusion Criteria
External Context		
Market and Policy Context	Perceived Level of Market Competition	How dominant the DCE is in the market, who their main competitors are, and their estimated market share
DCE Structures and Features		
DCE Characteristics	Pre-Model Relationships/Partnerships with Provider Entities	Community-based organizations, safety net hospitals, behavioral health care providers, post-acute care providers, or other entities
	Contractual/Employment Relationships with Providers	Independent providers with pre-negotiated fee/contract, direct employees of the DCE, combination of independent providers and employees

Domain	Measure Category	Definition and Inclusion Criteria
	Past Experience with Risk-Sharing	Risk-sharing experience under MA and/or commercial plans, risk-sharing experience under Medicaid, previous experience with downside risk
	Past Experience with Capitated Payments	Total capitation, partial capitation, both, or unclear
Implementation Approaches of DCEs		
Financial Management	Plans to Fund Initial DCE Activities	Initial assets/operating funds, plan to use capitated payments to fund activities, both
VA	Outreach Activities to Beneficiaries for VA	In-person and on-site outreach, remote outreach, planned community-based events, marketing strategies, referrals from partners/Preferred Provider network, targeted subgroup outreach (for example, high need beneficiaries), targeted outreach to beneficiaries from previous models, and outreach materials tailored to specific communities
Health IT and Data Analytics	Health Information Sharing	Share health information with other providers in BOTH the DCE and outside of the DCE in other health systems; share health information with JUST providers in their DCE; share health information with JUST providers in other health systems; share health information, but it is unclear with which providers
	Admission, Discharge, and Transfer (ADT) Notifications	ADT notifications ONLY from DCE-affiliated facilities; ADT notifications ONLY from facilities OUTSIDE of the DCE; ADT notifications from BOTH DCE-affiliated facilities AND facilities outside of the DCE; ADT notifications, but it is unclear from which providers
	HIE – Access	Entire DCE participates in an HIE; some DCE providers participate in an HIE, but not the entire DCE; unclear what level of access the DCE and providers have to an HIE
	HIE – Data Types	Beneficiary demographics, personal/cultural data, diagnostic results and reports, vital signs, medications/medication allergies, administrative and medical records, staffing, other
	Data Analytic Tools or Strategies	Predictive analytics, financial modeling, population health management, other data analytic services to inform and support care management
	Data Analytic Tools or Strategies – Data Types	Clinical/medical data, social service encounters or other social determinants of health (SDOH) data, beneficiary-reported data, behavioral health data, other data types
Care Management for Subgroups (Pre-Existing or Unique to the Model)	Care Management for Dually Eligible Beneficiaries	Care management plans and processes specific to dually eligible beneficiaries
	Chronic Care Management	Chronic care management or care management for specific conditions/diseases (for example, diabetes, asthma, end-stage renal disease [ESRD])

Domain	Measure Category	Definition and Inclusion Criteria
	Care Management for Other Groups (Unrelated to Risk or Disease)	Frail/older adult beneficiaries, beneficiaries without a high school diploma/General Educational Development (GED) certification, rural beneficiaries, low-income beneficiaries, racial/ethnic minorities, gender subgroups, sexual orientation subgroups, and other groups
Care Management Services (Pre-Existing or Unique to the Model)	Long Term Services and Supports (LTSS)	LTSS (for example, personal care or assistance with activities of daily living [ADLs]; complex care, such as wound care; help with housekeeping, paying bills, and other ongoing social services)
	Post-Acute Care (PAC) and PAC Facilities	PAC and/or includes PAC facilities in their care management processes in the model
	Transitional Care	Transitional care in the model
	Transitional Care Manager	A designated staff member in charge of facilitating care transitions (for example, nurse, transitional care manager)
	Care Follow-Up	Process/method for following up with beneficiaries post-discharge (for example, requiring follow-up within 30 days of discharge, designated staff for follow-up)
	Home Health Care	Care in-home for beneficiaries (for example, at-home skilled nursing care, physical therapy, occupational therapy, or non-medical care such as medical social services or assistance with ADLs from a highly qualified home health care aide). Not including remote beneficiary monitoring or telehealth.
	Palliative/End-of-Life Care	Palliative care for beneficiaries near the end of their life
	Medication Management Services	Medication adherence, medication management or self-management, or medication alignment
	Telehealth Services	Visit-based telehealth services, not visit-based telehealth (for example, remote beneficiary monitoring, store-and-forward electronic transmission)
	Risk Stratification – Risk Groupings	Highly complex and/or high needs/risk, rising risk, both highly complex/high risk and rising risk
	Risk Stratification – Data	SDOH data (for example, social vulnerability index, if the beneficiary lives in an area with air pollution or in a food desert), provider-inputted clinical/medical data (for example, medical records, utilization data, diagnoses, medications), beneficiary-reported data (for example, beneficiary experience of care, beneficiary-reported outcomes, and beneficiary-reported needs), behavioral health data (for example, depression screenings/assessments), any other data types
	Risk Stratification – Responsibility	Risk stratification is conducted at the DCE-level, risk stratification is conducted at the level of individual Participant and Preferred Providers (that is, practices)

Domain	Measure Category	Definition and Inclusion Criteria
Social and/or Behavioral Health Needs	Behavioral Health Needs	Behavioral health and substance use disorder conditions, life stressors and crises, stress-related physical symptoms, and health behaviors. Could include references to providers such as therapists, psychiatric facilities, and other behavioral health providers; screening for behavioral health conditions or substance use disorders; etc.
	SDOH – Social Context	Addressing demographic needs, social networks and supports; social cohesion, racial/ethnic/religious/gender discrimination; community safety; criminal justice; and civil participation
	SDOH – Economic Context	Addressing employment, income, and poverty-specific needs
	SDOH – Education Context	Addressing non-health care adult education, non-health literacy, English proficiency, etc.
	SDOH – Physical Infrastructure	Addressing housing, transportation, workplace safety, food insecurity, recreational needs, environmental conditions, and sufficiency of social services
	SDOH Health Care Context	Increasing access to high-quality/culturally and linguistically appropriate and health literate care; access to health care coverage; health care laws; etc.
	SDOH – Any	Addressing specified or unspecified SDOH
Provider Engagement		
Financial Provider Engagement (including Provider Payments)	Types of Regular Payments Made to Participant and/or Preferred Providers	Capitated payments, adjusted fee-for-service (FFS), FFS with add-on payments, etc.
	Financial Rewards and Penalties	Compensation, rewards, or penalties to the provider for specific activities; what staff roles are eligible; and what activities are eligible for discrete payments or penalties
	Shared Savings/Losses	Distributed shared saving or losses with providers
Non-Financial Provider Engagement	Support for Practices to Improve or Adopt New Workflows and Practice Transformation Support	Treatment/clinical guidelines or evidence-based care or medicine, ADT notifications, disease registry(ies), referral tracking, identify beneficiaries with care gaps (for example, screenings for missing treatment/visits, medication refills), reminders to providers for beneficiaries with care gaps, training for new workflows or practice-specific consulting
	Performance Reports	The level of dissemination (for example, DCE-level, practice-level, individual physician-level), type(s) of data and information presented, and frequency of reporting
	Opportunities for Provider Relatedness	Whether providers have the opportunity to lead/champion DCE clinical initiatives or participate in workgroups/committees or peer-to-peer learning

Domain	Measure Category	Definition and Inclusion Criteria
Beneficiary Engagement and Access to Care		
Beneficiary Engagement and Access to Care	Beneficiary Engagement in the Model	Shared decision-making, advance care planning or care planning, surveys on beneficiary-reported satisfaction of care or experience of care, any other engagement activities
	Expanded Access to Care	Expanding care to address: structural barriers (impediments to medical care directly related to the number, type, concentration, location, or organizational configuration of health care providers), financial barriers (restrict access either by inhibiting the ability of beneficiaries to pay for needed medical services or by discouraging physicians and hospitals from treating beneficiaries of limited means), or personal or cultural barriers (inhibit people who need medical attention from seeking it or, once they obtain care, from following recommended posttreatment guidelines)

NOTES: DCE = Direct Contracting Entity; MA = Medicare Advantage; Health IT = health information technology; ADT = admission, discharge, transfer; HIE = health information exchange; SDOH = social determinants of health; ESRD = end-stage renal disease; GED = General Educational Development; LTSS = long term services and supports; PAC = post-acute care; FFS = fee-for-service; VA = voluntary alignment.

C.2 Pulse Check Survey

The primary goal of the first Pulse Check Survey, an online questionnaire, was to gather data on the status and evolution of the model-related activities that DCEs identified in their applications. The 2022 survey focused on motivation to participate in the model and implementation efforts to date, specifically around beneficiary engagement and provider engagement activities. The survey was fielded to all DCEs that were active in the GPDC Model during performance year (PY) 2022. Participation in the survey was a requirement for currently active DCEs and optional for five DCEs who were involuntarily terminated during PY 2022 prior to survey implementation. Respondents included all active DCEs that entered into the model in either PY 2021 or PY 2022. This report focuses on responses from the 2021 DCEs; responses from 2022 DCEs will be presented in our next annual report.

- **Timing.** The survey launched on October 20, 2022, and closed on December 7, 2022.
- **Population.** The survey was fielded to all DCEs participating in the GPDC Model during PY 2022 (required, n = 94; optional, n = 5). The total number of respondents was 95 DCEs, representing all of DCEs still participating in the GPDC Model at the time of survey fielding. Forty-nine 2021 DCEs and 46 2022 DCEs completed the survey.
- **Mode.** The online survey was fielded using Qualtrics. Each DCE received a unique link to the survey to enable tracking of DCE responses and follow-up with non-respondents. Respondents were able to exit and restart the survey where they left off.
- **Completion rates.** We received a completion rate of 100% from the 94 DCEs required to complete the survey, and one response from an optional respondent.

Instrument Development. The survey was developed deductively by focusing on topics and research questions connected to two domains of the evaluation's conceptual framework—*Model Features* and *Implementation Approaches*. The survey questions were organized into three sections and addressed topics listed in **Exhibit C.3**.

Exhibit C.3. Pulse Check Survey Sections and Domains of Inquiry

Survey Section	Domain of Inquiry
Background Information	Motivation to join the GPDC Model
	Activities related to model participation
Beneficiary Engagement	Beneficiary satisfaction
	Beneficiary engagement
	Access to care
	Collection of beneficiary data
	VA
	Benefit enhancements/Beneficiary engagement incentives
Provider Engagement	Participant Provider engagement activities
	Participant Provider payment
	Preferred Provider payment
	Financial risk-sharing

NOTES: GPDC = Global and Professional Direct Contracting; VA = voluntary alignment.

Building from the research questions, we refined the instrument using qualitative data from a content analysis of DCE applications. The instrument went through multiple rounds of internal revision and Center for Medicare & Medicaid Innovation (Innovation Center) review. This iterative process also included discussion around initial questions important to ask during evaluation as the first primary data collection effort versus during subsequent surveys.

To test whether question wording and content accurately measured the intended evaluation constructs, we carried out several cognitive interviews with members of the target population (five DCE representatives and one ACO affiliate not participating in the GPDC Model) using the draft survey instrument. NORC incorporated the feedback gathered during the cognitive interview process into the final survey instrument, which was ultimately approved by the Contracting Officer's Representative (COR). NORC also conducted usability testing to ensure correct functionality with respect to survey flow, question display logic, and other programmed features intended to enhance user experience.

Survey Outreach. NORC downloaded contact information for the DCEs from the Innovation Center's internal website, *4innovation* (*4i*). Since each DCE had multiple points of contact, NORC requested Innovation Center Regional Officers (ROs) identify the primary contact at each of their DCEs. In the initial survey invitation to the DCEs, NORC included an overview of the evaluation and language on the purpose of the survey. The initial

invitation also noted the estimated time to complete the survey and whom to contact for assistance, including NORC's Institutional Review Board, the NORC evaluation team, and the Innovation Center evaluation contract COR. NORC encouraged DCEs to share the survey link with others in the DCE to assist with completing it.

Two of the DCEs that participated in the cognitive interviews completed the initial survey during pre-testing. Instead of asking these DCEs to retake the revised survey in its entirety, these two DCEs were sent an abbreviated supplemental survey containing only the questions that were modified as a result of pre-tester feedback. This supplemental survey went through the same usability testing as the main Pulse Check Survey.

NORC used several methods to encourage participation in and raise awareness of the first Pulse Check Survey. First, NORC shared language about the survey with the Innovation Center to include in their weekly newsletter to all DCEs participating in the GPDC Model. Second, NORC also posted a PDF version of the survey on the Innovation Center internal website, *4i*, for the DCE's initial review and reference. Third, NORC sent customized outreach language to the survey respondents who were the primary contact for multiple DCEs, were involuntarily terminated from the model, or completed the pre-testing process for the survey. Survey respondents who had not started or completed the survey received a follow-up email on November 1, 2022, eight business days after the survey launch. Throughout the fielding of the survey, NORC sent reminder emails and conducted phone calls to those who had not yet completed the survey. NORC also reached out to CMS ROs to request they follow up with their DCEs who had not yet completed the survey. Lastly, NORC's survey team regularly monitored a help-desk email account to address questions from the DCEs.

Recoding, Cleaning, and Analytic File Preparation. NORC recoded the data collected during fielding to produce a final analytic file. During this process, text-based responses and Likert scale values were assigned numeric values to allow for more efficient data analysis. Respondent skips, as well as intentional question skips due to survey programming logic, were also assigned numeric values. NORC reviewed the recoded data to evaluate the appropriateness and completeness of responses. For example, NORC assessed the duration of each response to identify potential satisficing[2] or other erroneous response activity. Using the recoded data, NORC created summary tables for each survey question. The summary tables included counts for each response option as well as the percentage of respondents selecting a given response option. Counts and percentages were calculated across and within DCE type.

Data Dictionary. NORC developed a data dictionary to serve as a road map for those analyzing the survey data. The data dictionary included variable names for each question, variable type (for example, numeric or character), and the question wording. The data dictionary also provided a list of all response option labels and values associated with a given question.

Descriptive Statistical Analysis. Given that the Pulse Check Survey followed a census design with a 100 percent response rate for the required DCEs, survey weighting and imputation were not necessary. Means, standard

[2] Satisficing refers to when survey respondents provide quick or "good enough" responses when filling out a survey rather than more carefully thought-out and researched responses (optimizing).

deviations, and confidence intervals were calculated for numeric responses. For the purposes of this annual report, only responses from 2021 DCEs were analyzed. Descriptive percentages were calculated for ordinal and nominal responses along with their respective standard deviations and confidence intervals. Additional crosstabulations were generated to evaluate relationships between certain DCE characteristics (for example, DCE type, risk-sharing election, payment mechanism) and survey responses, and between multiple survey responses. Future qualitative, multi-case analyses and/or statistical modeling activities may incorporate Pulse Check Survey data as DCE-level variables.

Appendix D: Abbreviated 2022 Pulse Check Survey Instrument

The following is an abbreviated version of the 2022 Pulse Check Survey fielded to the 2021 DCEs. This abbreviated version just includes the questions presented in this annual report.

Welcome!

We sincerely appreciate your participation in the first Global and Professional Direct Contracting Model (GPDC) Pulse Check. Pulse Checks are annual surveys conducted as part of the independent evaluation of GPDC. The Centers for Medicare & Medicaid Services' (CMS's) Center for Medicare and Medicaid Innovation (Innovation Center) has contracted NORC at the University of Chicago to lead the evaluation of GPDC. NORC is conducting this Pulse Check with partners at L&M Policy Research.

Thank you very much for your assistance and cooperation on this important effort!

What is the purpose of this survey?

The purpose of the survey is to capture information about DCEs' early implementation experiences to help CMS and other audiences understand the different strategies DCEs undertake in the model. This Pulse Check primarily covers topics related to beneficiary and provider engagement.

How will survey results be used?

Survey data will be used for the purpose of model evaluation and to inform learning system needs. Responses will be analyzed in aggregate and at the DCE-level and presented in public reports of the model's results. At the end of the survey, you have the option of downloading a copy of your responses.

Survey results are for GPDC evaluation purposes and will not be used for auditing individual DCEs.

Who is responsible for responding to this survey?

Participation in evaluation activities, including this survey, is required of all GPDC participants. This survey is administered to all DCEs participating in GPDC at any time in the 2022 performance year. The survey link has been shared with the person identified as our primary contact regarding the survey. However, we anticipate that others in the DCE may have information needed to answer the questions. To facilitate consulting with

others, you may stop and save your responses to the survey and resume later. You may also share the link to the survey with others in the DCE to assist with completing it. You may also access a PDF version of the survey here.

How long will the survey take to complete? When is it due?

The survey is expected to take approximately 30 minutes to complete. To reduce your burden, please feel comfortable responding with your best estimate rather than producing additional reports to obtain precise figures. We ask that you submit your responses no later than November 11, 2022.

INSTRUCTIONS

Please use the “Continue” and “Previous” survey buttons **on the bottom of the screen** to navigate through the questions in the survey. You must use the "Continue" button on the screen after you have responded to a question for your answer to be saved. **Please do not use your browser buttons**.

To exit the survey at any time, simply close your internet browser window. Any responses you have entered before closing will be saved. Reopening the survey later will allow you to return to the same location and finish completing the survey. Please feel free to consult with others in the DCE who may have information needed to answer the questions. You can share the link to the survey with others in the DCE to assist with completing it.

Lastly, we have provided definitions on certain terms throughout the survey. When available, you can click the lightbulb icon next to the term for more information (e.g., Term).

Again, we greatly appreciate your time and participation. Let’s get started!

SECTION I: BACKGROUND INFORMATION

This survey will be asking about the functions and services performed by the **DCE itself as an entity or its parent company**.

When responding, please do not include functions that may be performed by some practices or providers participating in the DCE but were not initiated at the DCE level.

The following questions explore your DCE's motivations for participating in GPDC.

Motivation to join

1. To what extent were each of the following reasons a motivating factor for forming a DCE or transitioning to GPDC? Select one response per row.

	Not at all	Very little	Somewhat	To a great extent
To gain experience with capitated risk.				
To benefit from high shared savings potential				
To expand our value-based payment portfolio				
To increase primary care provider alignment.				
To increase specialist provider alignment.				
Other (please specify):				

2. To what extent did each of the following aspects of the model influence your DCE's (or its parent company's) decision to join GPDC? Select one response per row.

	Not at all	Very little	Somewhat	To a great extent
Lower attribution threshold for certain types of DCEs				
Beneficiary incentives and benefit enhancements				
Population-based payment or capitation				
Qualifies as Advanced Alternative Payment Model; exempt from Merit-Based Incentive Payment System				
Advanced Payment Option[1]				
Voluntary alignment				
To increase synergies with other lines of business				
Other (please specify):				

[1] **Advanced Payment Option (APO):** A supplemental payment mechanism available for selection by the DCE for a Performance Year if the DCE also has selected PCC Payment for that Performance Year. If the DCE selects the APO, CMS will make a prospective monthly APO payment to the DCE for APO Eligible Services furnished to aligned beneficiaries by those Participant Providers and Preferred Providers to opt into the APO arrangement.

Activities Related to Model Participation

3. Now we would like to know about different strategies that your DCE may or may not be focused on. For each of the items listed below, please select the response option that most accurately reflects the perspective of your DCE.

	Not a priority / Not applicable	Low priority	Medium priority	High priority
Investments in primary care capacity such as non-physician providers, after-hours care				
Investments in behavioral health capacity such as behavioral health professionals, telehealth appointments				
Initiatives to encourage referrals to high-quality or Preferred Providers				
Complex care management or population-specific care management programs				
Initiatives to reduce low value care				
Initiatives to reduce avoidable inpatient, emergency department, or post-acute care utilization				
Initiatives to address beneficiaries' social needs, such as food insecurity, housing, and transportation				
Emphasis on primary care touchpoints (e.g., annual wellness visits)				
Other (please specify):				

Access to care

7. How does your DCE support Participant and Preferred Provider practices to offer expanded access to care? Select all that apply.

	Participant Providers	Preferred Providers	DCE does not provide this type of support
DCE offers, funds, or supports centralized population health support staff (e.g., care managers, pharmacist, schedulers /administrative support)			
DCE directly provides or funds the provision of telehealth			
DCE offers, funds, or supports extended or weekend hours for practices			
DCE offers, funds, or supports urgent or extended care[2]			
DCE offers, funds, or provides other support for expanded access to care, (please specify):			

[2] Extended care refers to services offered by the DCE (not just select practices in the DCE) beyond those offered in a typical primary care practice. Examples include IV fluids, ultrasound, and x-rays.

Benefit Enhancements (BEs) and Beneficiary Engagement Incentives (BEIs)

10. Select the option that best reflects your DCE's implementation status for each BE or BEI[3]. Fully implemented and operational means that your DCE is offering BE/BEI services and billing for them to the extent they are used by beneficiaries.

	Select all that apply per row			
	Fully implemented and operational in PY 2021	Fully implemented and operational in PY 2022	Planning to implement in PY 2023	Decided not to implement
Telehealth expansion waiver	❍	❍	❍	❍
Three-day skilled nursing facility (SNF) rule waiver	❍	❍	❍	❍
Post-discharge home visit waiver	❍	❍	❍	❍
Care management home visit waiver	❍	❍	❍	❍
Home health homebound waiver	❍	❍	❍	❍
Concurrent care for beneficiaries that elect Medicare hospice benefit	❍	❍	❍	❍
Part B cost sharing support (cost sharing)	❍	❍	❍	❍
Chronic disease management reward (gift card)	❍	❍	❍	❍
Nurse practitioner services benefit enhancement*	❍	❍	❍	❍

***Tool Tip: Nurse Practitioner Services Benefit Enhancement**

Beginning in PY 2023, the ACO Realizing Equity, Access, and Community Health (REACH) Model plans to make available a new Benefit Enhancement to model participants to help reduce barriers to care access, particularly for beneficiaries in areas with limited access to physicians: The Nurse Practitioner Services Benefit Enhancement. This Benefit Enhancement is intended to allow ACOs to increase flexibility in care delivery and improve care coordination for their aligned beneficiary populations. Under this Benefit Enhancement and to the extent permitted under applicable state law, Nurse Practitioners will be able to assume certain responsibilities or furnish certain services that would otherwise require physician supervision under current Medicare law.

Specifically, CMS intends to issue waivers as necessary to test the ACO REACH Model to allow Nurse Practitioners:

- To certify a REACH Beneficiary's need for hospice care;
- To certify a REACH Beneficiary's need for diabetic shoes;
- To order and supervise cardiac rehabilitation for a REACH Beneficiary;
- To establish, review, sign, and date a REACH Beneficiary's home infusion therapy plan of care; and
- To refer a REACH Beneficiary for medical nutrition therapy.

[3] **Tool Tip**: DCEs may choose benefit enhancements (BEs) and beneficiary engagement incentives (BEIs) to implement and support their ability to manage the care of beneficiaries. BEs are conditional waivers of certain Medicare payment rules. BEIs permit DCE providers to give in-kind items or services to beneficiaries if certain conditions are satisfied.

11a. Does your DCE track BE/BEI utilization, performance, or outcomes?

Yes

No *(Skip to question 12)*

11c. *[IF 11a. = YES]* For each item listed below, indicate which, if any, challenges your DCE experiences in implementation. Please select "Yes" or "No" for each response option.

	Yes	No
Insufficient staff		
Complexity of requirements		
Lack of clarity about requirements		
Not offering the same benefit to all patients		
Other (please specify):		

SECTION III: PROVIDER ENGAGEMENT

The questions presented in this final section explore your DCE's efforts to engage providers.

When answering, please consider the provider engagement activities initiated by the **DCE itself as an entity.** Please do not include activities that may be initiated by practices and providers participating in the DCE. We understand there are a variety of different provider arrangements so some of these questions may be challenging to answer precisely. Please answer to the best of your ability.

Your responses should reflect only the functions or services that your DCE **currently** performs, not those the DCE plans to implement.

Provider engagement activities at the Participant Provider level

13a. As part of the DCE's efforts to engage Participant Providers, how important is each of the following practice support and improvement activities? Select one response per row.

Practice Support & Improvement				
	Not important	Somewhat important	Very important	DCE does not offer this activity
DCE provides or arranges for centralized population health support staff (e.g., care managers, pharmacist, schedulers/administrative support)				
DCE provides or arranges for staff embedded in practices (e.g., administrative, care manager, health educator/coach, social worker)				
DCE provides or arranges for investments in infrastructure at the practice level (Electronic Health Record software, hardware, data analytic support, care delivery tools [e.g., shared decision-making aids, patient survey instruments], and licenses to access tools)				
Coaching or one-on-one review of performance, quality and/or cost data				

Practice Support & Improvement				
	Not important	Somewhat important	Very important	DCE does not offer this activity
Data analysis support other than feedback reports on quality, utilization, or cost				
Regular meetings between DCE and individual practice leaders				
Action-oriented initiatives focusing on small-scale, discrete areas for improvement (e.g., improve completion rates for flu vaccine, increasing number of annual wellness visits)				
Training and education sessions				
Workflow redesign or optimization support				
Other practice support and improvement activities (please specify):				

14a. How important are each of the following information sharing activities for engaging your DCE's Participant Providers? Select one response per row.

Information Sharing				
	Not important	Somewhat important	Very important	DCE does not offer this activity
Feedback reports on quality, utilization, or cost with comparisons at the practice level				
Feedback reports on quality, utilization, or cost with comparisons at the individual clinician level				
Other information to help providers manage care (e.g., specialty and other service use)				
Real time data on emergency department (ED) and inpatient admissions, discharges, and transfers (ADTs)				
Other information sharing activities (please specify):				

14b. *[Drop down response options from question 14a that = 'VERY IMPORTANT']* Please estimate the portion of Participant Providers that use the DCE's information sharing activities listed below. Your best estimate is fine.

Information Sharing					
	None	Some	Most	All	Don't Know
Feedback reports on quality, utilization, or cost with comparisons at the practice level					
Feedback reports on quality, utilization, or cost with comparisons at the individual clinician level					
Real time data on emergency department (ED) and inpatient admissions, discharges, and transfers (ADTs)					
Other information sharing activities (please specify):					

15a. How important are each of the following incentives for engaging your DCE's Participant Providers? Select one response per row.

Incentives				
	Not important	Somewhat important	Very important	DCE does not offer this activity
Financial bonuses tied to performance				
Financial penalties tied to performance				
Non-financial awards or recognition tied to performance				
DCE provides upfront payments				
Other incentives (please specify):				

Participant Provider Payment

We are interested in understanding your DCE's payment arrangements with Participant Providers.

16. Which of the following methods does your DCE use to pay Participant Providers? Please select all that apply.
    - Partial fee-for-service
    - Fee-for-service

- Partial capitation
- Total capitation
- Payments tied to quality thresholds
- Other (please specify):

17. Not including any capitated payments the DCE may make to providers, does your DCE use financial rewards and/or penalties with its Participant Providers?

	Yes	No
DCE uses financial rewards		
DCE uses financial penalties		

18a. How many of your DCE's Participant Providers are employed directly by a health system or practice participating in the model?

- All
- Most
- Some
- Very few
- None *(Skip to question 19)*

18b. To what extent do you think your Participant Providers' behavior is influenced by GPDC performance incentives? Select one response per row.

	Not at all	Very little	Somewhat	To a great extent	Provider type not applicable
Employed Participant Providers					
Non-employed Participant Providers					

Preferred Provider Payment

The next question is about payment arrangements with your DCE's Preferred Providers.

19. Does your DCE use financial rewards and/or penalties with its Preferred Providers?

	Yes	No
DCE uses financial rewards		
DCE uses financial penalties		

Sharing Financial Risk

The next set of questions ask about financial risk sharing arrangements that your DCE may have with certain Participant Providers.

20a. Does your DCE share upside financial risk (savings) directly with the Participant Provider types listed below? Select one response per row.

	Total DCE savings	Service-specific savings	Provider type does not participate in DCE	Does not share savings with this type of provider
Individual practitioners who may be employed directly by a health system or practice participating in the model				
Physician groups / practices				
Networks of individual physician practices or other practitioners				
Independent or solo practitioners				
Acute care hospitals				
Skilled nursing facilities (SNFs)				
Home health agencies (HHAs)				
Long-term care hospitals (LTCHs) or inpatient rehabilitation facilities (IRFs)				
Other provider type (please specify):				

20b. *[IF 20a. = YES for "Total DCE Savings" and "Service-Specific Savings"]* For upside risk (savings), what portion is shared with each provider type? Select one response per row.

	1-5%	6-10%	11-30%	31-50%	More than 50%
Individual practitioners who may be employed directly by a health system or practice participating in the model					
Physician groups / practices					
Networks of individual physician practices or other practitioners					
Independent or solo practitioners					
Acute care hospitals					
Skilled nursing facilities (SNFs)					
Home health agencies					
Long-term care hospitals					

	1-5%	6-10%	11-30%	31-50%	More than 50%
(LTCHs) or inpatient rehabilitation facilities (IRFs)					
Other provider type (please specify):					

20c. Does your DCE share downside financial risk (losses) directly with the Participant Provider types listed below? Select one response per row.

	Total DCE losses	Service-specific losses	Does not share losses with this type of provider
Individual practitioners who may be employed directly by a health system or practice participating in the model			
Physician groups / practices			
Networks of individual physician practices or other practitioners			
Independent or solo practitioners			
Acute care hospitals			
Skilled nursing facilities (SNFs)			
Home health agencies (HHAs)			
Long-term care hospitals (LTCHs) or inpatient rehabilitation facilities (IRFs)			
Other provider type (please specify):			

20d. *[IF 20c. = YES for "Total DCE Losses" and "Service-Specific Losses"]* For downside risk (losses), what portion is shared with each provider type? Select one response per row.

	1-5%	6-10%	11-30%	31-50%	More than 50%
Individual practitioners who may be employed directly by a health system or practice participating in the model					
Physician groups / practices					
Networks of individual physician practices or other practitioners					
Independent or solo practitioners					
Acute care hospitals					
Skilled nursing facilities (SNFs)					
Home health agencies					
Long-term care hospitals (LTCHs) or inpatient rehabilitation facilities (IRFs)					
Other provider type (please specify):					

We thank you for your time spent taking this survey. Your response has been recorded. (Your respondent's response summary will appear here).

Appendix E: Exhibits to Support Chapter 2

This Appendix includes supplemental exhibits that provide summary tables of GPDC Model application data and responses to our 2022 Pulse Check Survey by DCE type (Standard and New Entrant DCEs) and/or risk-sharing election where there is relevant variation. The exhibits support the summary discussion presented in Chapter 2 and are as follows:

- **Descriptive Characteristics of DCEs from an Analysis of GPDC Model Applications**
  - DCE Characteristics (**Exhibit E.1**)
- **Descriptive Characteristics of DCEs from 2022 Pulse Check Survey**
  - Motivations for Participating in the GPDC Model (**Exhibits E.2-E.3**)
  - DCE Implementation Strategies (**Exhibit E.4**)
  - DCE Providers and Provider Engagement (**Exhibits E.5-E.9**)

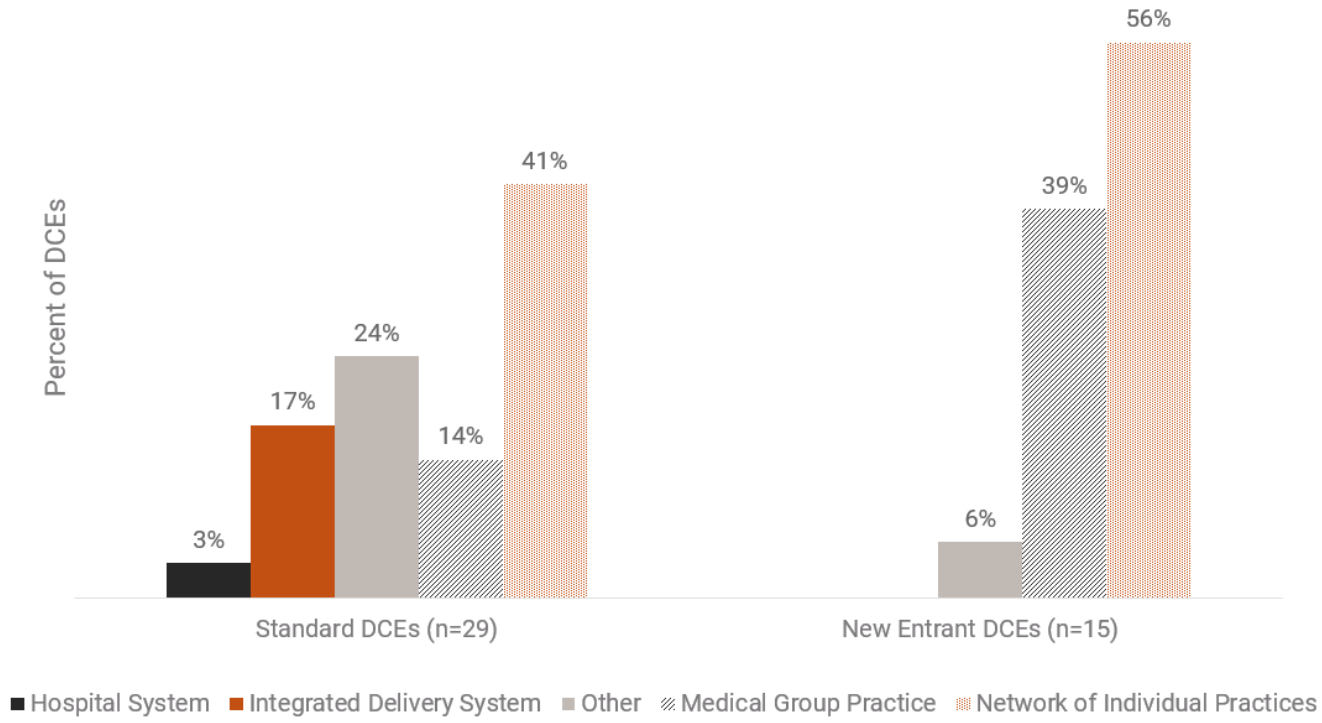
Methods for these analyses can be found in **Appendix C**.

E.1 DCE Characteristics

Exhibit E.1 provides a summary of DCEs' organizational type for Standard and New Entrant DCEs. An overall breakdown for all DCEs can be found in **Chapter 2** of the main report. For additional details on the methodology used for these analyses, see **Appendix C Section C.1.**

Organizational Type

Exhibit E.1. Breakdown of DCEs by Organizational Type and DCE Type, PY 2021



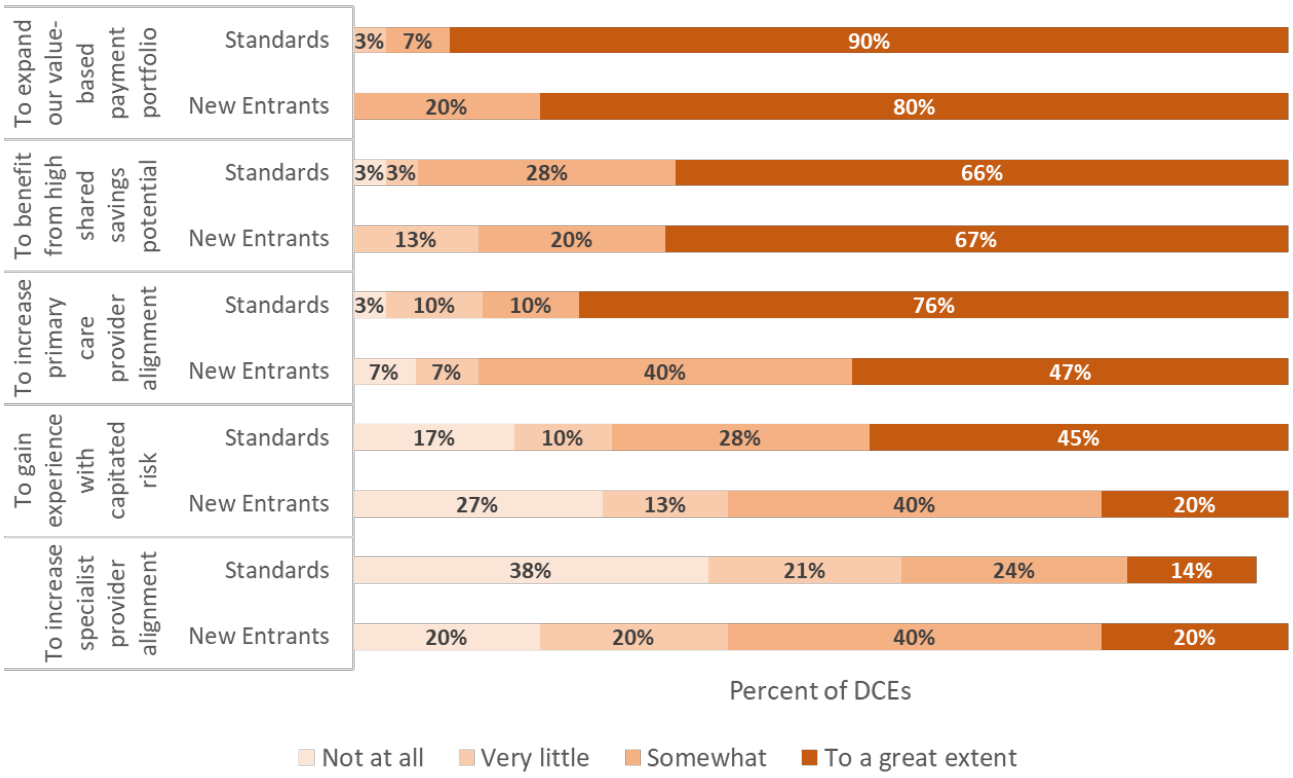
SOURCE: 2022 GPDC Pulse Check Survey (n= 29 Standard DCEs; n=15 New Entrant DCEs).
NOTES: DCE = Direct Contracting Entity.

E.2 Motivations for Participating in the GPDC Model

Exhibits E.2-E.3 provide descriptive statistics on the motivating factors and model aspects that most influenced DCEs' decisions to form a DCE or transition to the GPDC Model, for Standard and New Entrant DCEs. Descriptive statistics for all DCEs can be found in **Chapter 2** of the main report. For additional details on the methodology used to collect these data, see **Appendix C Section C.2.**

Motivating Factors

Exhibit E.2. Motivating Factors for Forming a DCE or Transitioning to the GPDC Model for New Entrant and Standard DCEs

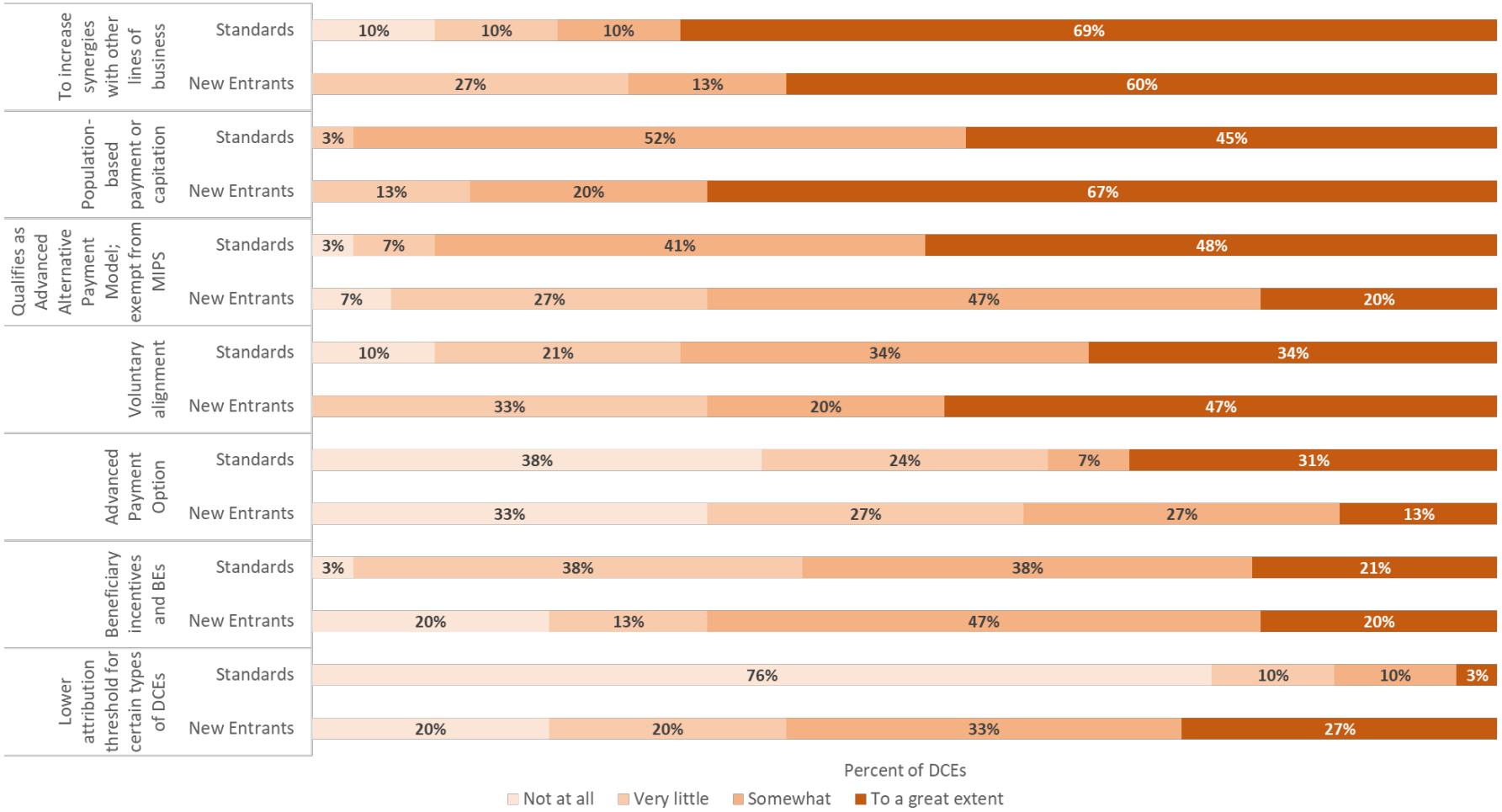


SOURCE: 2022 GPDC Pulse Check Survey (n= 29 Standard DCEs; n=15 New Entrant DCEs).

NOTES: DCE = Direct Contracting Entity. Values for "To increase specialist provider alignment" for Standard DCEs do not sum to 100% as one respondent did not answer this question.

Model Aspects

Exhibit E.3. Model Aspects that Influenced DCE Decision to Join the GPDC Model for New Entrant and Standard DCEs



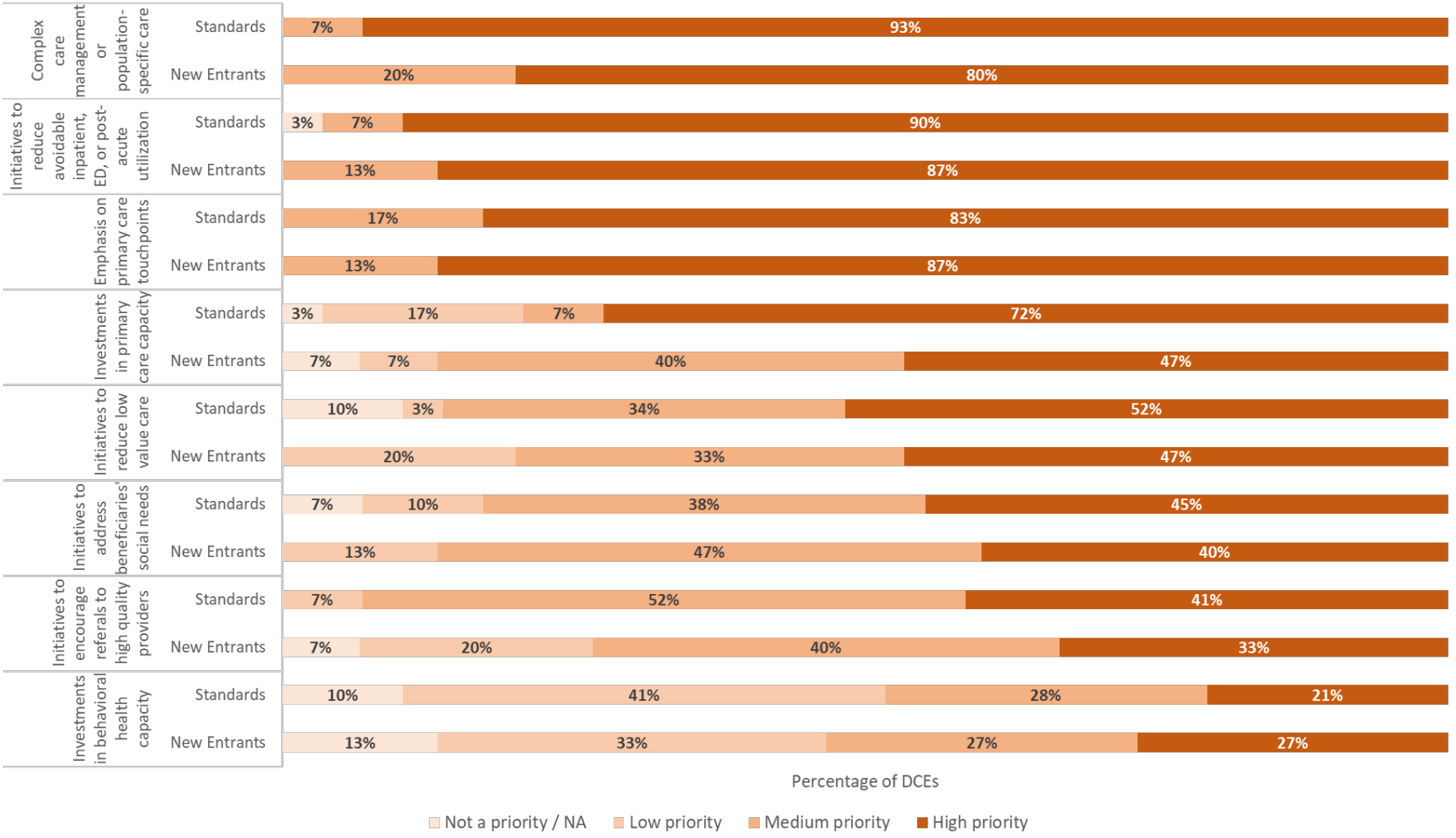
SOURCE: 2022 GPDC Pulse Check Survey (n= 29 Standard DCEs; n= 15 New Entrant DCEs)

NOTES: DCE = Direct Contracting Entity; MIPS = Merit-based Incentive Payment System.

E.3 DCE Implementation Strategies

Exhibit E.4 summarizes Standard and New Entrant DCEs' prioritization of implementation activities. Descriptive statistics for all DCEs is in **Chapter 2** of the main report. For additional details on the methodology used to collect these data, see **Appendix C Section C.2.**

Exhibit E.4. DCE Prioritization of Model-Related Implementation Activities for New Entrant and Standard DCEs



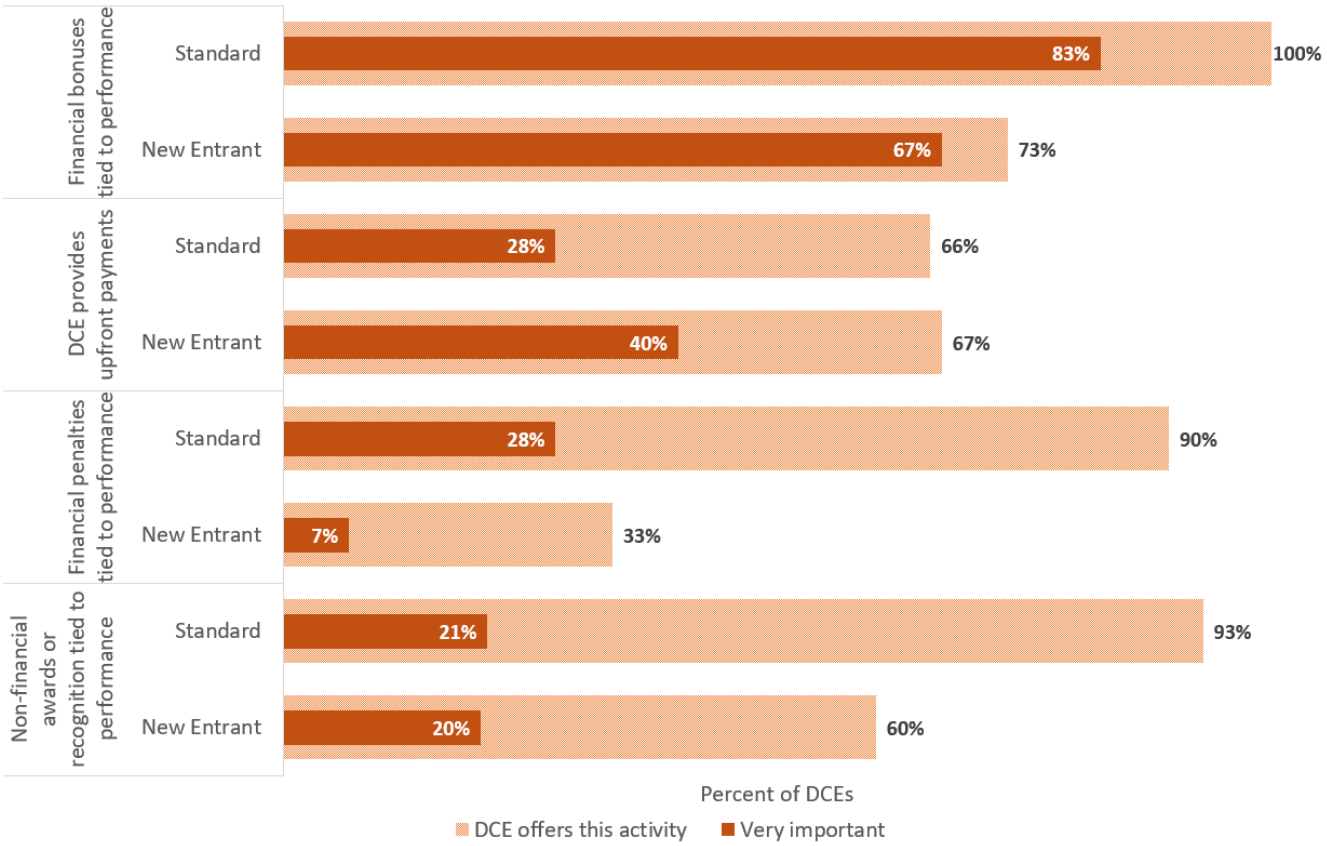
SOURCE: 2022 GPDC Pulse Check Survey (n= 29 Standard DCEs; n= 15 New Entrant DCEs)

NOTES: DCE = Direct Contracting Entity.

E.4 DCE Providers and Provider Engagement

Exhibits E.5-E.9 provides descriptive statistics on financial and non-financial provider engagement incentives and supported used by Standard and New Entrant DCEs. Descriptive statistics for all DCEs can be found in **Chapter 2** of the main report. For additional details on the methodology used to collect these data, see **Appendix C Section C.2.**

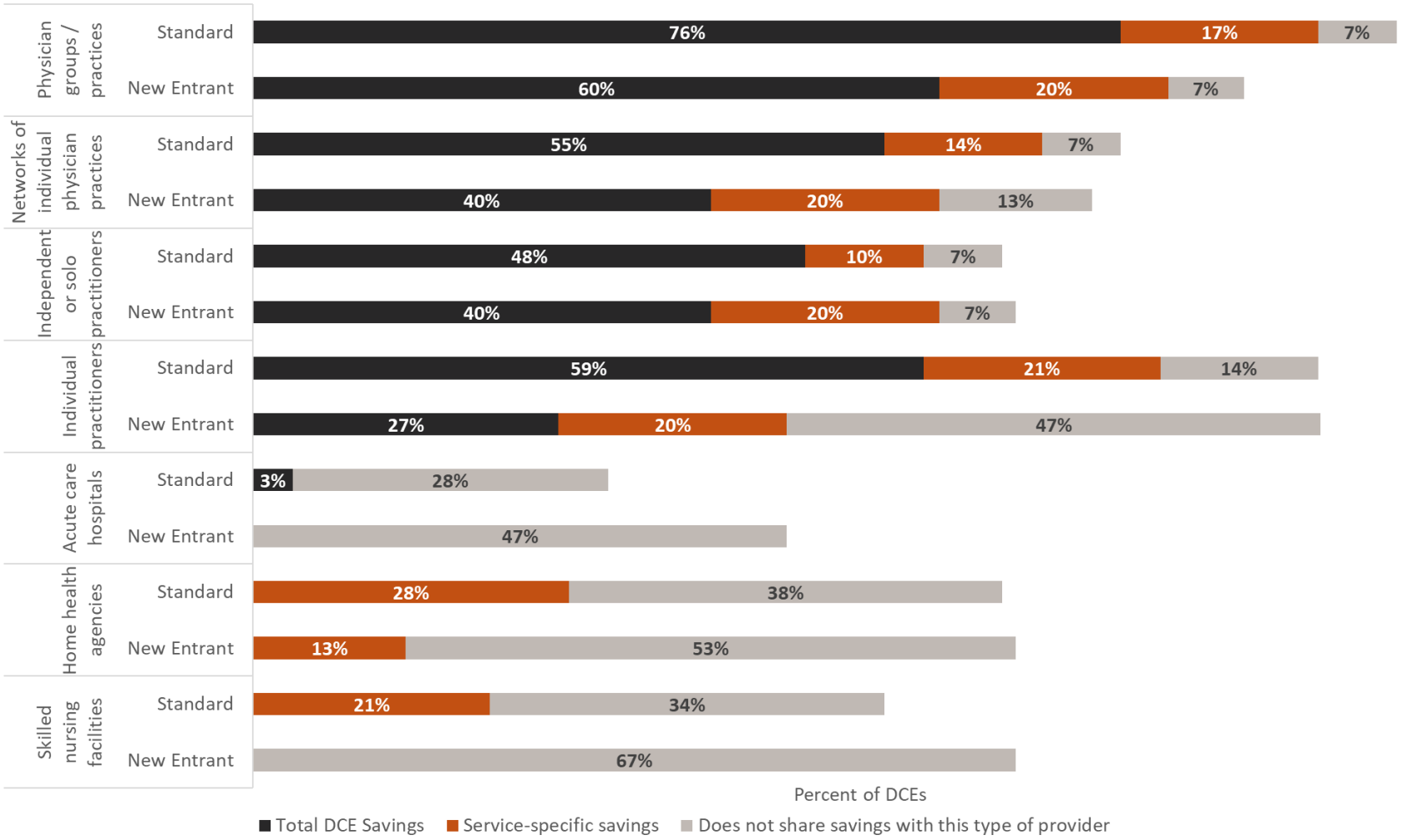
Exhibit E.5. Provider Incentives Offered by DCEs in the Model, and Importance of Each Incentive for Engaging Participant Providers for Standard and New Entrant DCEs



SOURCE: 2022 GPDC Pulse Check Survey (n= 29 Standard DCEs; n= 15 New Entrant DCEs)

NOTES: DCE = Direct Contracting Entity

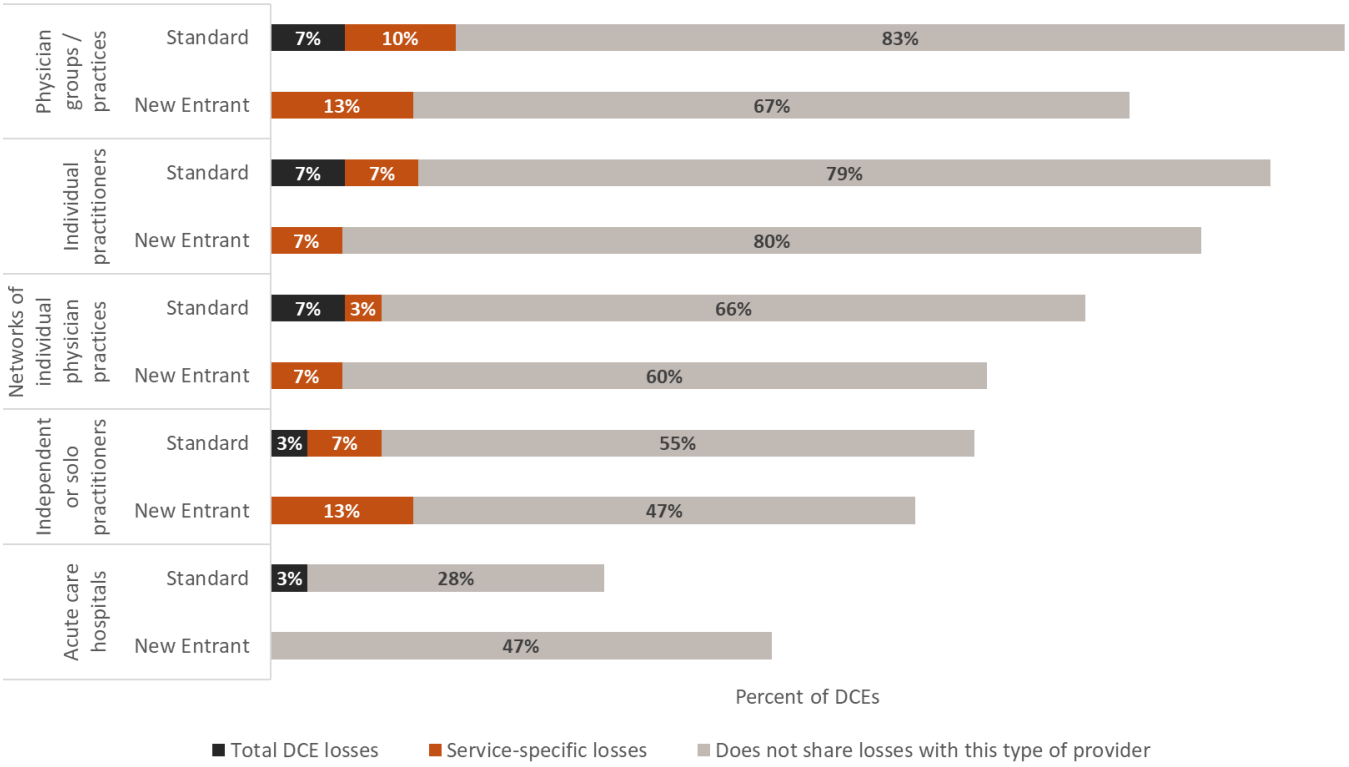
Exhibit E.6. DCE Shared Savings (Total DCE and Service-Specific) by Participant Provider Types for Standard and New Entrant DCEs



SOURCE: 2022 GPDC Pulse Check Survey (n= 29 Standard DCEs; n= 15 New Entrant DCEs)

NOTES: Exhibit does not include following survey responses: "Provider type does not participate in DCE" and "Does not share savings with this type of provider". Exhibit also does not include responses for long-term care hospitals (LTCHs) or inpatient rehabilitation facilities (IRFs) since all DCEs either skipped this item or reported that they do not share savings with this the of provider. DCE = Direct Contracting Entity

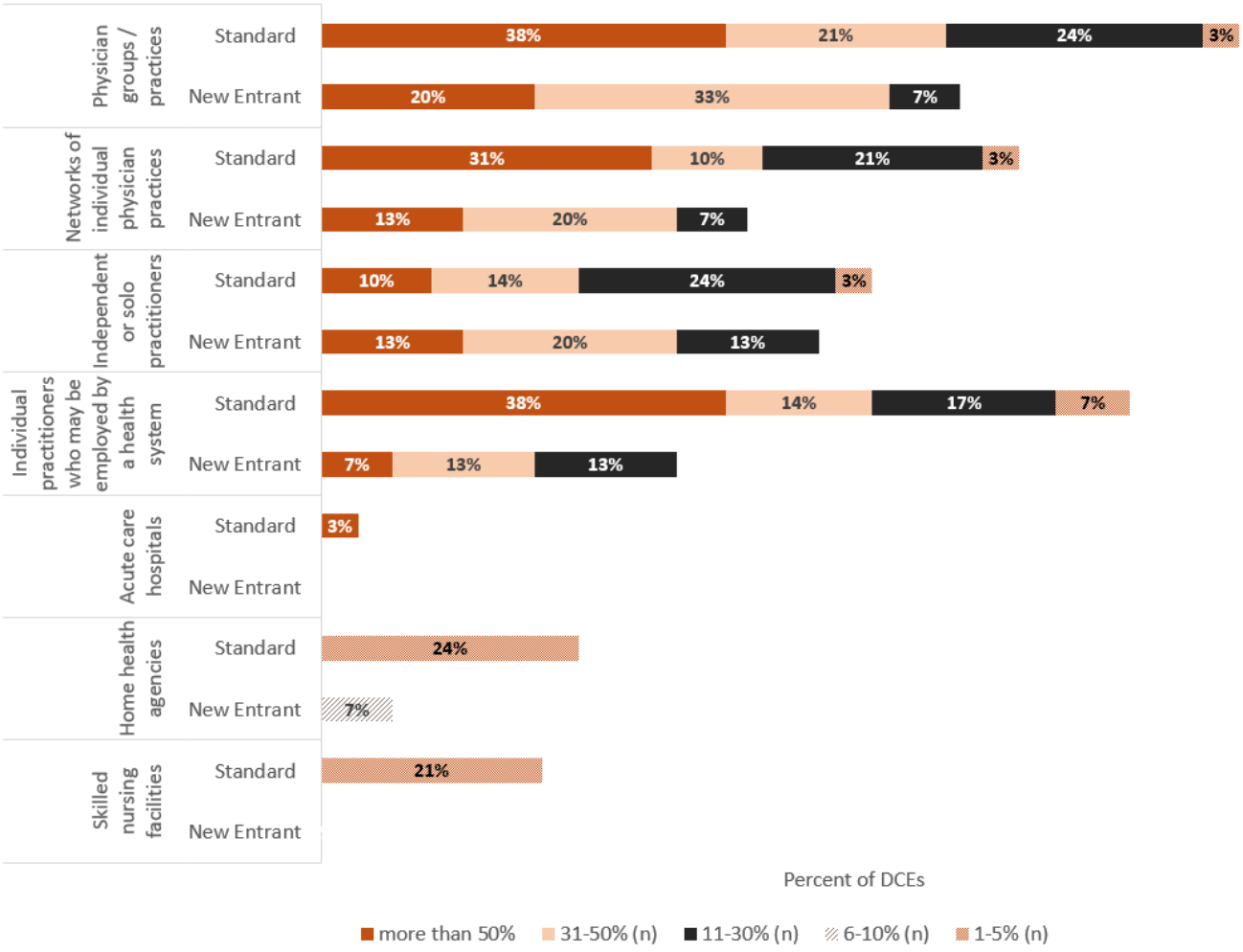
Exhibit E.7. DCE Shared Losses (Total DCE and Service-Specific) by Participant Provider Types for Standard and New Entrant DCEs



SOURCE: 2022 GPDC Pulse Check Survey (n= 29 Standard DCEs; n= 15 New Entrant DCEs)

NOTES: Exhibit does not include following survey responses: "Provider type does not participate in DCE" and "Does not share losses with this type of provider". Exhibit also does not include responses for long-term care hospitals (LTCHs) or inpatient rehabilitation facilities (IRFs); skilled nursing facilities (SNFs); or home health agencies (HHAs) since all DCEs either skipped this item or reported that they do not share savings with this the of provider. DCE = Direct Contracting Entity.

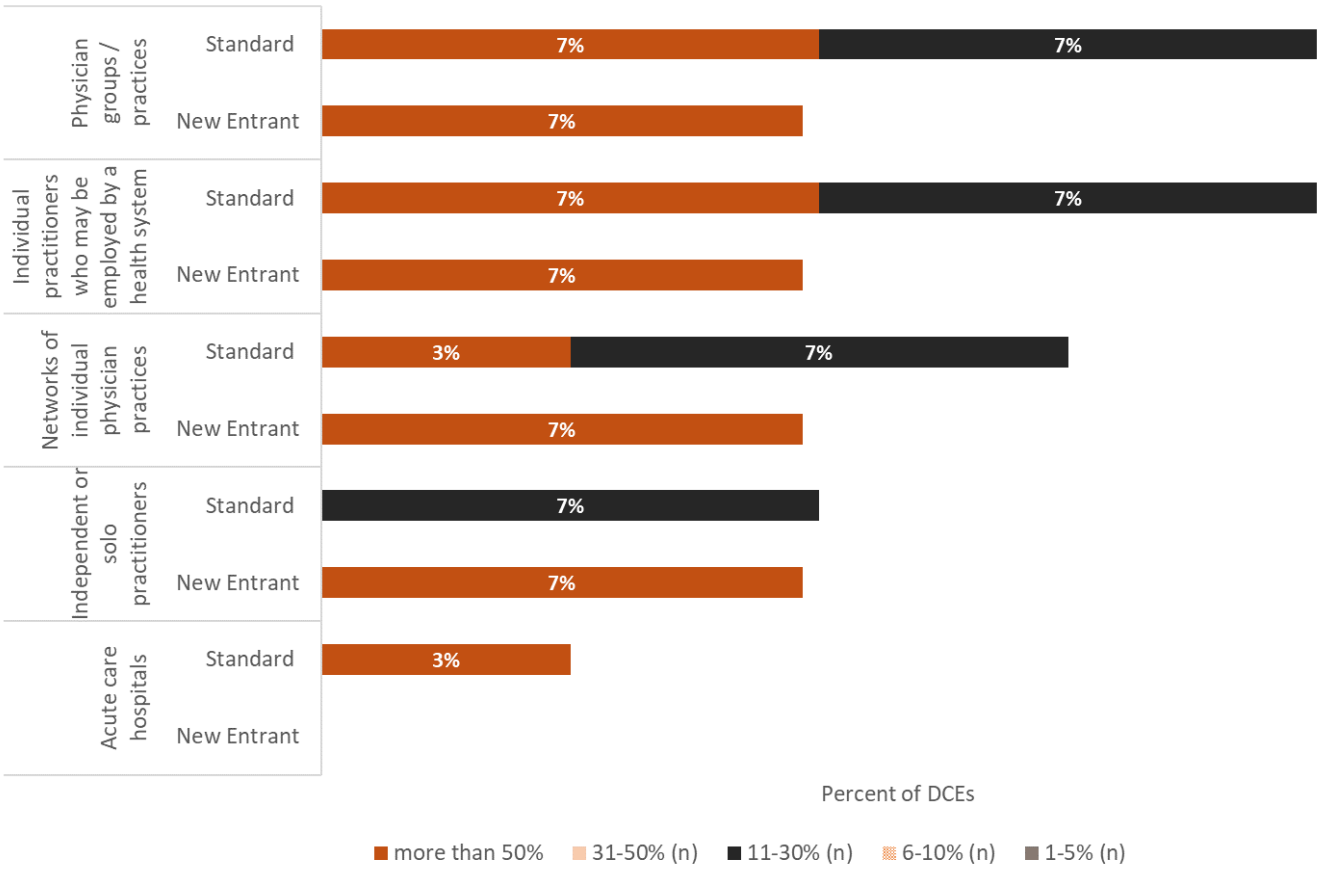
Exhibit E.8. DCE Shared Savings (Percentages Shared with Providers) by Participant Provider Types for Standard and New Entrant DCEs



SOURCE: 2022 GPDC Pulse Check Survey (n= 29 Standard DCEs; n= 15 New Entrant DCEs)

NOTES: Exhibit does not include responses for long-term care hospitals (LTCHs) or inpatient rehabilitation facilities (IRFs) since all DCEs either skipped this item or reported that they do not share savings with this the of provider. DCE = Direct Contracting Entity. Eight Standard DCEs and 4 New Entrant DCEs did not answer this survey question.

Exhibit E.9. DCE Shared Losses (Percentages Shared with Providers) by Participant Provider and Risk-Sharing Election



SOURCE: 2022 GPDC Pulse Check Survey (n= 29 Standard DCEs; n= 15 New Entrant DCEs)

NOTES: Exhibit does not include responses for long-term care hospitals (LTCHs) or inpatient rehabilitation facilities (IRFs); skilled nursing facilities (SNFs); or home health agencies (HHAs) since all DCEs either skipped this item or reported that they do not share savings with this the of provider. DCE = Direct Contracting Entity. Twenty-four Standard DCEs and 11 New Entrant DCEs did not answer this survey question.

Appendix F: Data Sources for Quantitative Analyses

Exhibit F.1 describes the data files used for the construction of the GPDC intervention and comparison groups and the evaluation's quantitative analyses.

Exhibit F.1. Data Sources for Claims-Based Analyses

Data File	File Description, Source, and Evaluation Uses
Central Repository of Alignment Files	These files include the PY 2021 DCE Participant Provider list, DCE Preferred Provider list, DCE trigger file, payment reductions on the claims (capitation or the advanced payment option [APO] percentage reduction), and benefit enhancements elected by DCE Participant and Preferred Providers. They were created by the Innovation Center's GPDC payment analysis and operational support contractor. These lists were used to align beneficiaries prospectively to DCE Participant Providers in each performance year and select comparison groups (i.e., beneficiaries prospectively aligned to eligible non-DCE participant/preferred providers). Some of the data also were used to create measures included in the descriptive analyses.
CM/CMMI Central Repository Payment File	This file includes capitated payment amounts for beneficiaries in each DCE in PY 2021. They were created by the Model's payment analysis and operational support contractor. They were used to apportion capitated payments for care furnished to GPDC beneficiaries in PY 2021 to calculate total gross Medicare Parts A & B spending, which included capitation.
Medicare FFS Claims	These files contain carrier claims, durable medical equipment claims, home health agency claims, hospice claims, inpatient claims, outpatient claims, SNF claims for CY 2017-2022. They were obtained from the CCW. These files were used to create claims-based outcomes for GPDC and comparison group beneficiaries.
Master Beneficiary Summary Files	These files contain coverage, demographic, and chronic/potentially disabling condition flags for Medicare beneficiaries for CY 2017-2022. They were obtained from the CCW. These files were used to identify beneficiaries enrolled in FFS each year to perform claim-based alignment and to create measures included in the descriptive and impacts analyses.
Master Data Management Files	These files contain beneficiary- and provider-level information for CY 2018-CY 2021 pertaining to alignment to GPDC and other APMs. They were obtained from the CCW.
Medicare Data on Physician Practice and Specialty (MD-PPAS)	These files contain data on provider-level information such as specialty, TIN practice assignment, etc. They were obtained from the CCW for CY 2018-CY 2021. These files were used to create market-level physician practice characteristics.
National Plan and Provider Enumeration System (NPPES)	These files contain provider specialties for CY 2018-CY 2021 which are used to determine the subset of providers who are eligible for alignment. They were obtained from the CCW.[3]

[3] National Plan and Provider Enumeration System (NPPES). Also available at: https://download.cms.gov/nppes/NPI_Files.html

Data File	File Description, Source, and Evaluation Uses
Medicare FFS Public Provider Enrollment File	These files are populated from Medicare Provider Enrollment, Chain, and Ownership System (PECOS) and contain provider specialties which are used to determine the subset of providers who are eligible for alignment. They were obtained from the CMS website as of Q3 CY 2021.[4]
Provider of Services (POS) File	These files contain bed counts and number of Medicare discharges from acute care hospitals, SNFs, and other LTC facilities for CY 2017-CY 2020. They were obtained from the CCW.[5]
American Hospital Association (AHA) Annual Surveys	These files contain health system information for acute care hospitals that were used in creating market-level variables. They were obtained from the AHA.
Area Health Resources File	These files contain the Health Professional Shortage Area variables for the lagged year (CY 2017-CY 2020) used in risk adjustment. They were obtained from the Health Resources & Services Administration (HRSA).[6]
Rural-Urban Commuting Area (RUCA) Code	These files contain the 2010 ZIP-based rural-urban commuting area codes used in comparison group construction (make the comparison group similar to the treatment group regarding rurality of beneficiary residence) and regression models. They were obtained from the United States Department of Agriculture, Economic Research Service (USDA-ERS).[7]
COVID-19 Pandemic Vulnerability Index	These files contain county-level CY 2020-CY 2021 COVID measures including infection rate, mortality rate, and case fatality used for descriptive analyses. They were obtained from the National Institute of Environmental Health Sciences.[8]
COVID-19 Community Vulnerability Index	These files contain county-level CY 2020-CY 2021 COVID-19 community vulnerability index data used for the descriptive analyses. They were obtained from Surgo Ventures.[9]
Area Deprivation Index	These files contain 2020-2021 rankings of neighborhood socioeconomic disadvantage used for the descriptive analyses. They were obtained from the CCW from the Geographic Based Indices of Health.
HRR-ZIP Code Crosswalk	These files contain a crosswalk for ZIP codes to Hospital Referral Regions (HRR) and are used for alignment. They were obtained from the Dartmouth Atlas Data website.[10]
Direct Contracting/ Kidney Care Choices Rate Book	These files contain PY 2021 county-level payment rates that are used to balance county-level differences in the entropy balancing. They were obtained from the Innovation Center website.[11]

[4] Medicare Fee-for-service Public Provider Enrollment File (PPEF). Available at: https://data.cms.gov/provider-characteristics/medicare-provider-supplier-enrollment/medicare-fee-for-service-public-provider-enrollment

[5] Provider of Services File (POS) – Hospital & Non-hospital Facilities. Also available at: https://data.cms.gov/provider-characteristics/hospitals-and-other-facilities/provider-of-services-file-hospital-non-hospital-facilities

[6] Area Health Resources Files (AHRF). Available at: https://data.hrsa.gov/data/download

[7] Rural-Urban Commuting Area Codes (RUCA). Available at: https://www.ers.usda.gov/data-products/rural-urban-commuting-area-codes/

[8] COVID-19 Pandemic Vulnerability Index (PVI). Information available at: https://www.niehs.nih.gov/research/resources/databases/covid19pvi/index.cfm and data available at: https://github.com/COVID19PVI/data

[9] COVID-19 Community Vulnerability Index (CCVI). Information available at: https://precisionforcovid.org/ccvi and data available at: https://covid-static-assets.s3.amazonaws.com/US-CCVI/surgo_ccvi.zip

[10] HRR-ZIP Code Crosswalk. Available at: https://data.dartmouthatlas.org/supplemental/

[11] Direct Contracting/Kidney Care Choices (DC/KCC) Rate Book. Available at: https://www.cms.gov/priorities/innovation/media/document/dckcc-rate-book-dec2020

Data File	File Description, Source, and Evaluation Uses
5-year American Community Survey (ACS) Estimates	These files contain the 5-year (2016-2020) ZIP code tabulation area (ZCTA) level estimates from the ACS. The following tables were downloaded: B03002, B19013, C27006, S1501, S1701, S1703, S2701, B01001, B11003, B15003, B23001, B25003, B25004, B25044, and S2301. They were obtained from the U.S. Census Bureau website.[12]
Participation in the Comprehensive Care for Joint Replacement (CJR) Model	These files contain beneficiary level flags for participation in the CJR model for CY 2018-CY 2021. They were obtained from the CMS CJR Contractor.
Participation in the Bundled Payments for Care Improvement Advanced (BPCI-A) Model	These files contain beneficiary level flags for participation in the BPCI-A model for CY 2018-CY 2021. They were obtained from the CMS BPCI-A Contractor.
Participation in the Oncology Care Model (OCM)	These files contain beneficiary level flags for participation in the OCM model for CY 2018-CY 2021. They were obtained from the CMS OCM Contractor.
Central Repository of High Needs Files	These files contain detailed information for high needs eligibility including concurrent and prospective Hierarchical Condition Category (HCC) Scores among all FFS beneficiaries for CY 2018-CY 2021. They were obtained from program contractor.
PY 2021 GPDC Financial Results	This file contain financial results for PY 2021 DCEs and was used to calculate the net impact of Medicare spending. It was obtained from the Innovation Center website.[13]

NOTES: CM/CMMI = Center for Medicare/Center for Medicare & Medicaid Innovation (Innovation Center); CCW = Chronic Conditions Data Warehouse; SNF = skilled nursing facility; LTC = long-term care facility.

[12] 5-year American Community Survey (ACS) Estimates. Available at: https://data.census.gov/

[13] PY 2021 GPDC Financial Results. Available at: https://www.cms.gov/priorities/innovation/media/document/gpdc-py2021-financial-results

Appendix G: Quantitative Methods and Results

This appendix:

- Explains the process for creating GPDC Model treatment and comparison groups for the evaluation,
- Describes the descriptive analyses conducted on the treatment and comparison groups for the Standard, New Entrant, and High-Needs DCEs, and
- Describes the difference-in-differences design and analytic methodology used to assess the GPDC Model's impacts on key outcomes for Standard and New Entrant DCEs in PY 2021.

Given the low number of High Needs DCEs (six) and their smaller beneficiary populations in PY 2021, we did not perform impact analyses for High Needs DCEs. Impact estimates for High Need DCEs will be included in a future evaluation report if we are able to achieve statistical power.

G.1 Defining GPDC Model Treatment and Comparison Groups for the Evaluation

Our approach to defining the treatment and comparison groups for the evaluation is summarized in **Exhibit G.1**. Using the GPDC Model's alignment rules, we defined the GPDC DCE group in the evaluation as FFS Medicare beneficiaries prospectively aligned to the GPDC DCE Participant Providers in the performance year (intervention period treatment group) and baseline years (pre-intervention period treatment group). Specifically, in PY 2021, we used the GPDC DCEs' PY 2021 Participant Provider panel to identify treatment group beneficiaries prospectively aligned to these providers in the PY (2021) and in the baseline years (2018-2020), using the model's alignment rules.

Using the same alignment rules, we defined the evaluation's comparison group as FFS Medicare beneficiaries in GPDC DCE market areas who could be prospectively aligned to non-GPDC providers[14] using the model's alignment rules) in the performance year (intervention period comparison group) and baseline years (pre-intervention period comparison group).[15] Specifically, we identified comparison group beneficiaries as those able to be prospectively aligned to the PY 2021 non-GPDC provider panel in PY (2021) and baseline years (2018-2020).

This section briefly describes the claims-based alignment process before describing in more detail how the treatment and comparison groups were derived. See **Exhibit G.2** for summary definitions.

[14] Non-GPDC DCE providers are unaffiliated with GPDC DCEs (that is, not a GPDC DCE Participant or Preferred Provider).

[15] Our evaluation approach aligns with the model's rules for alignment, wherein beneficiaries are aligned to the model through Primary Care Qualified Evaluation and Management (PQEM) visits to Participant Providers. Preferred Providers are an extension of the Participant Providers' networks and provide necessary services to model beneficiaries but are *unable to align beneficiaries to the model.* Thus, services from Preferred Providers are not captured when we construct the treatment and comparison beneficiary populations; however, these services will be captured via claims-based measures (for example, SNF stays, use of benefit enhancements).

Exhibit G.1. GPDC DCE and Comparison Groups to Evaluate Impact in a Performance Year

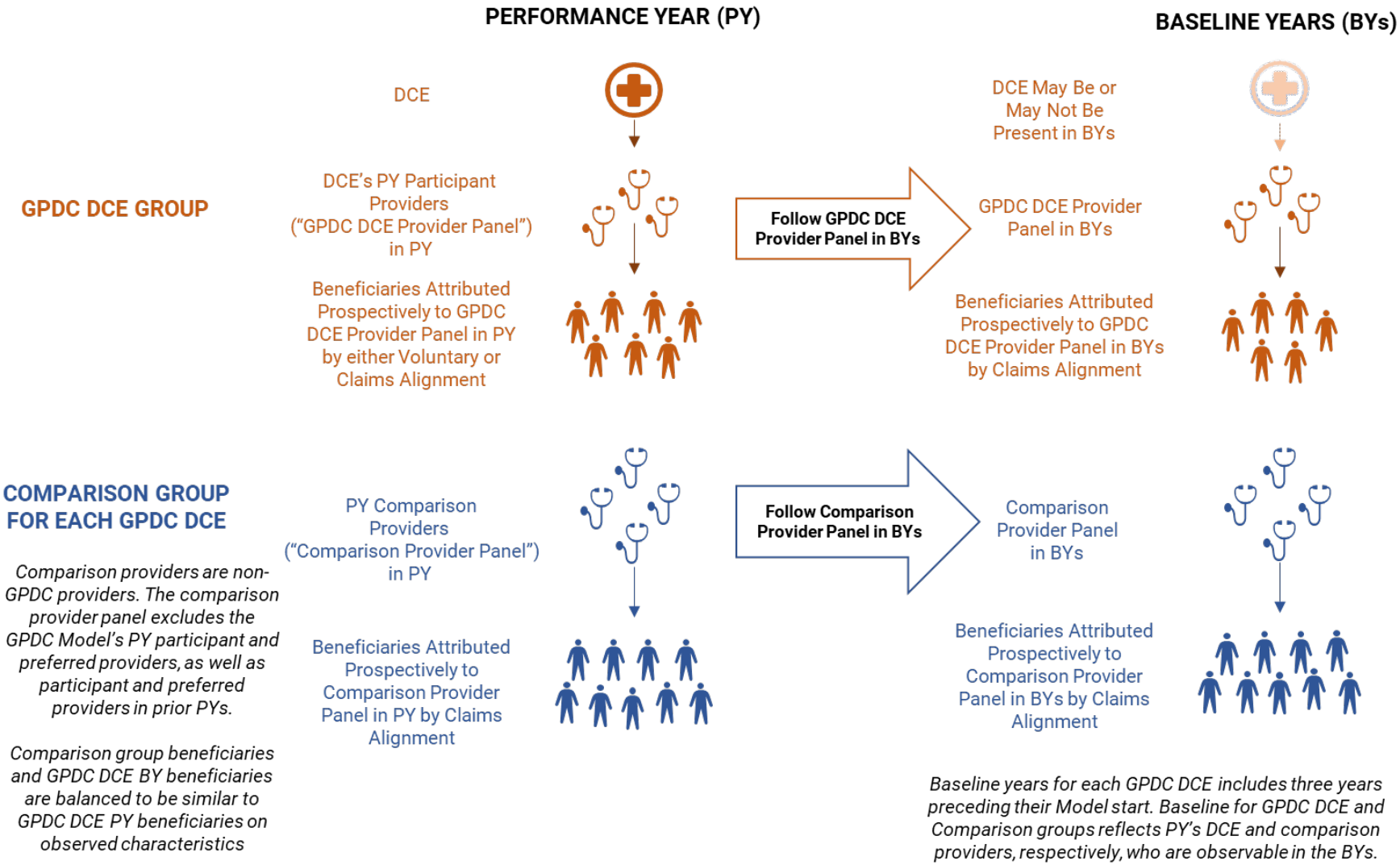


Exhibit G.2. Definition of GPDC DCE Treatment and Comparison Groups, in Performance and Baseline Years

	Baseline Years	Performance Year
Treatment Group		
Standard and New Entrant DCEs	Alignment-eligible beneficiaries residing in DCE market areas in the baseline years who are prospectively aligned to providers in the GPDC DCE's Participant Provider panel from a given performance year using the model's alignment rules, and aligned for at least 30 days in the year	Alignment-eligible beneficiaries prospectively aligned to GPDC DCE Participant Providers in a given PY using the model's alignment rules, situated in DCE market areas, and aligned for at least 30 days in the year. Following the model's rules, we included all prospective VA beneficiaries in this group but excluded Prospective Plus VA beneficiaries.
High Needs DCEs	N/A[16]	Alignment-eligible beneficiaries **with high needs**[17] prospectively aligned to GPDC DCE Participant Providers in a given PY using the model's alignment rules, situated in DCE market areas, and aligned for at least 30 days in the year. Following the model's rules, we included all prospective VA beneficiaries in this group but excluded Prospective Plus VA beneficiaries.
Comparison Group		
Standard and New Entrant DCEs	Alignment-eligible beneficiaries residing in DCE market areas in the baseline years who are prospectively aligned to providers from the non-GPDC provider panel during the given performance year using the model's alignment rules. Beneficiaries must be aligned for at least 30 days in the year.	Alignment-eligible beneficiaries residing in DCE market areas prospectively aligned to non-GPDC providers during the PY using model's alignment rules and aligned for at least 30 days in the year.
High Needs DCEs	N/A	Beneficiaries **with high needs**[17] residing in DCE market areas prospectively aligned to non-GPDC providers during the PY using model's alignment rules and aligned for at least 30 days in the year

NOTES: Non-GPDC providers exclude GPDC DCE Participant Providers and GPDC DCE Preferred Providers in the PY. We used a provider panel design to construct a non-GPDC provider list for the performance year (similar to the DCE Participant Provider list) by also requiring the non-GPDC providers to furnish at least one Primary Care Qualified Evaluation and Management (PQEM)[18] claim to the comparison group beneficiaries during the PY. We excluded Prospective Plus VA beneficiaries from the GPDC group because these beneficiaries started their alignment to the model not from the beginning of PY and may potentially exacerbate imbalance with the comparison group, who started their alignment to the comparison group from the beginning of PY. See "Voluntary Alignment" section in Section G.1.1. A representative sample of non-GPDC DCE beneficiaries in DCE markets was drawn to create the comparison group and maintain computationally feasible sample sizes. GPDC = Global and Professional Direct Contracting; DCE = Direct Contracting Entity; DID = difference-in-differences; VA = voluntary alignment; BY = baseline year; PY = performance year.

[16] Given the low number of High Needs DCEs (six) and their smaller beneficiary populations in PY 2021, we did not perform DID analysis for High Needs DCEs and, therefore, did not create a baseline group for the results presented in this report. If statistical power allows, future reports will include DID analysis after establishing a baseline for High Needs DCEs.

[17] High needs beneficiaries were identified using the model eligibility rules for PY 2021 in the Global and Professional Direct Contracting Model Financial Operating Guide: Overview; this definition will be reviewed and updated each year as needed to ensure agreement with the model's operating procedures.

[18] A PQEM claim was defined as a claim for a primary care service furnished by a primary care specialist or a selected non-primary care specialist. A primary care service was identified by the Healthcare Common Procedure Coding System (HCPCS) code appearing on the claim line. In the case of claims submitted by a federally qualified health center (FQHC) or rural health clinic (RHC), all services were considered as primary care services. HCPCS codes for primary care services and provider specialty type codes for primary care specialists and selected non-primary care specialists can be found in Appendix Tables B.6.3, B.6.4, and B.6.5, respectively, from the PY 2021 GPDC financial operating guide: https://innovation.cms.gov/media/document/dc-financial-op-guide-overview.

G.1.1 Alignment Approach

The alignment approach used for the evaluation captures both prospectively claims-aligned and prospectively voluntarily-aligned beneficiaries for the GPDC and comparison groups through the process detailed below.

Because such an alignment process does not exist for the comparison group, successful replication of the claims-based alignment process is essential in constructing a comparison group. We describe our process below to operationalize the claims-alignment algorithm in the evaluation for the comparison group, which involves aligning eligible beneficiaries to non-DCE alignment-eligible providers using the same alignment algorithm as the GPDC treatment group.

Claims-based alignment. We used final action claims on the Chronic Conditions Data Warehouse (CCW) and followed the GPDC Model's alignment algorithm to prospectively align eligible beneficiaries to treatment and comparison groups. In accordance with the model's rules, beneficiary alignment for a given baseline or performance year was based on Medicare claims from a preceding 24-month alignment period ending June 30th prior to the start of the year. The alignment algorithm was used to align beneficiaries to a DCE's Participant Providers or to comparison providers in each BY or PY based on providers that rendered the largest share of dollars for beneficiaries' primary care qualified evaluation and management (PQEM) visits in the alignment period. The following steps detail the beneficiary alignment process used by the Innovation Center's GPDC payment analysis and operational support contractor.[19]

Step 1: Identify GPDC DCE Participant Providers and alignment-eligible providers

For PY 2021, we obtained the list of GPDC DCE Participant Providers in the first quarter after the PY ended, including taxpayer identification numbers (TINs), CMS certification numbers (CCNs), and national provider identifiers (NPIs) of GPDC DCE practices, facilities, and practitioners, from the Innovation Center's GPDC payment analysis and operational support contractor. Alignment-eligible providers include primary care specialists[20] or selected non-primary care specialists.[21]

Step 2: Identify alignment-eligible beneficiaries

For all three DCE types, several beneficiary alignment requirements were applied for both the GPDC and comparison groups. For our analyses, alignment-eligible beneficiaries must be living, be enrolled in both Medicare Parts A and B, not be enrolled in Medicare Advantage (MA) or another managed care plan, have Medicare as the primary payer, and be a U.S. resident, measured as of January 1st in the baseline year or performance year. An aligned beneficiary ended alignment and could not be aligned again during the BY/PY

[19] For more details on the beneficiary alignment procedures, see Appendix B in the Global and Professional Direct Contracting Model Financial Operating Guide: Overview.

[20] Global and Professional Direct Contracting Model Financial Operating Guide: Overview. Appendix B. Table B.6.4 "Specialty Codes Used to Identify Primary Care Specialists".

[21] Global and Professional Direct Contracting Model Financial Operating Guide: Overview. Appendix B. Table B.6.5 "Specialty Codes Used to Identify Selected Non-Primary Care Specialists".

once they failed to meet all of the above conditions, and only the aligned period contributed to the analysis. We defined the GPDC and the comparison beneficiaries in the evaluation to be residing at the beginning of the year in the DCEs' market area, defined as Hospital Referral Regions (HRRs) with a threshold (that is, >=1 percent) of a DCE's aligned beneficiaries.[22]

In addition to meeting the above requirements, alignment-eligible beneficiaries for High Needs DCEs also had to meet *at least one* of the following conditions, per the model's definition of High Needs beneficiaries: 1) had conditions that impaired their mobility based on ICD-10 codes;[23] 2) had a CMS-Hierarchical Condition Categories (HCC) risk score of 3.0 or greater for beneficiaries eligible for Medicare due to age or disability (0.35 or greater for beneficiaries eligible due to end-stage renal disease [ESRD]); 3) had a CMS-HCC risk score greater than 2.0 and less than 3.0 for beneficiaries eligible due to age or disability (0.24 to 0.25 for beneficiaries eligible due to ESRD) *and* two or more unplanned hospital admissions in the previous 12 months; or 4) demonstrated signs of frailty based on claims.[24] Once a beneficiary met the High Needs eligibility criteria and was aligned to a DCE, that beneficiary was considered High Needs eligible for the remaining performance years as long as the beneficiary was alignment-eligible for the GPDC Model in general. We used this same logic to determine our analytic sample of beneficiaries for High Needs DCEs.

Step 3: Pull primary care qualified evaluation and management (PQEM) claims furnished by alignment-eligible providers during the alignment period and calculate weighted charges

We pulled all carrier and outpatient claims with PQEM services (identified by HCPCS codes)[25] provided by alignment-eligible providers for the two-year alignment period (**Exhibit G.3**).[26] Provider specialty was determined by line specialty codes for carrier claims and Medicare Provider Enrollment, Chain, and Ownership System (PECOS) or National Plan and Provider Enumeration System (NPPES) database for outpatient claims based on the provider NPI. In the case of claims furnished by FQHCs or RHCs, all services were considered as primary care services (that is, not restricted to those furnished by alignment-eligible providers). We linked the DCE Participant Provider file and flagged claims furnished by DCE and non-DCE alignment-eligible providers (**Exhibit G.4**). Beneficiaries with no paid claims for PQEM services during the two-year alignment

[22] We did not use the model's eligibility criteria of "reside in a county that is included in the DCE service areas" because we defined the DCE market area for the evaluation as a collection of HRRs, which are based on ZIP code, rather than using a county-based definition. We used HRR because HRR is a larger geographic area than county, which allows us to minimize the thread of spillover, which might mitigate any impacts of the GPDC model.

[23] Global and Professional Direct Contracting Model Financial Operating Guide: Overview. Appendix B. Table B.6.1 "Mobility Impairment Codes for High Needs Population DCEs".

[24] Global and Professional Direct Contracting Model Financial Operating Guide: Overview. Appendix B. Table B.6.2 "Frailty codes used to Determine Eligibility for Alignment to a High Needs Population DCE".

[25] Global and Professional Direct Contracting Model Financial Operating Guide: Overview. Appendix B. Table B.6.3 "Evaluation & Management Services".

[26] Global and Professional Direct Contracting Model Financial Operating Guide: Overview. Appendix B. Table B.2.1 "Alignment Years for Each Performance Year and Base Year".

period were eliminated from further consideration for claims-based alignment. Weighted allowable charges on paid PQEM services were calculated for each beneficiary during the alignment period.[27]

Exhibit G.3. Alignment Period for PY 2021 and each BY

BY/PY	Period	Alignment Year One	Alignment Year Two
BY 3	CY 2018	7/1/2015–6/30/2016	7/1/2016–6/30/2017
BY 2	CY 2019	7/1/2016–6/30/2017	7/1/2017–6/30/2018
BY 1	CY 2020	7/1/2017–6/30/2018	7/1/2018–6/30/2019
PY 2021	CY 2021	7/1/2018–6/30/2019	7/1/2019–6/30/2020

NOTES: While the model PY 2021 is from 4/1/2021 to 12/31/2021, the model evaluation uses the CY 2021 for alignment. BY = baseline year; PY = performance year; CY = calendar year.

Step 4: Align eligible beneficiaries based on plurality of PQEM services

Alignment-eligible beneficiaries were aligned to a DCE or comparison group based on which entity provided the plurality of the PQEM services to the beneficiary over the two-year alignment period (**Exhibit G.4**). We summed the weighted allowable charges of PQEM services for each beneficiary at each DCE and non-DCE practice/facility (that is, TIN/CCNs that were not GPDC DCE Participant or Preferred Providers) provided by primary care providers or by selected non-primary care specialists over the two-year alignment period and determined the percent of the charges for PQEM services provided by primary care providers. Beneficiaries were aligned to the DCE or non-DCE practice/facility based on the two-track algorithm[28] and tie-breaker rules[29] of the Innovation Center's GPDC payment analysis and operational support contractor's alignment algorithm.

In Step 3 and Step 4, we tested six approaches by identifying and aggregating PQEM claims differently from each other. Since a PY TIN-NPI combination may not exist in baseline years,[30] using NPIs or TINs/CCNs to identify PQEM claims would allow us to maximize the sample size of the baseline, which is necessary for difference-in-differences (DID) analysis used in estimating model impact. However, using NPIs or TINs/CCNs may also align many additional beneficiaries in the performance year beyond the model's list of prospectively aligned beneficiaries. PQEM claims were aggregated into TIN/CCN or each DCE as one group other than individual NPI

[27] Weighted Allowable Charges: Global and Professional Direct Contracting Model Financial Operating Guide: Overview. Appendix B.2.2 Claim-Based Alignment Process. The allowable charge for PQEM Services provided during the first (earlier) alignment year will be weighted by a factor of one-third. The allowable charge for PQEM Services provided during the second (later, or more recent) alignment year will be weighted by a factor of two-thirds.

[28] Two-Track Algorithm: Global and Professional Direct Contracting Model Financial Operating Guide: Overview. Appendix B.2.2 Claim-Based Alignment Process. If 10 percent or more of the charges were provided by primary care providers, then beneficiaries were aligned to the DCE or non-DCE practice/facility based on which entity was responsible for the most weighted allowable charges of PQEM services provided by primary care providers; else beneficiaries were aligned based on who was responsible for the most weighted allowable charges of PQEM services provided by selected non-primary care specialists.

[29] Tie-Breaker Rules: Global and Professional Direct Contracting Model Financial Operating Guide: Overview. Appendix B.2.2 Claim-Based Alignment Process. If there was a tie, then alignment was based on who provided the most recent PQEM service to the beneficiary during the two-year alignment period. A beneficiary was considered unaligned if there was still a tie when using the most recent PQEM service date.

[30] Although legacy TINs (a NPI's former TIN) were reported during application, only a few DCEs presented legacy TINs in the GPDC Participant Provider list. We examined claims billed from Participant Provider NPIs from 2015 to 2019 and captured a sufficient amount of TINs billed by these NPIs but not reported in the provider list.

because the model implementation is at the DCE or practice/facility level. We summarized in **Exhibit G.4** for the variation in identifying and aggregating PQEM claims to DCE and non-DCE providers by different approaches. After testing different alternatives, for our main approach we aligned beneficiaries either to a DCE through their participant NPIs or CCNs (for FQHCs and RHCs), or to a non-DCE TIN/CCN, to determine the DCE and comparison groups, respectively. This approach allowed us to align an adequate number of beneficiaries in baseline years while not aligning many additional beneficiaries in the performance year beyond the model's list of prospectively aligned beneficiaries.

Exhibit G.4. Identification and Aggregation of PQEM Claims by Alignment Approaches

	Identification of PQEM claims (Step 3)		Aggregation of PQEM claims (Step 4)	
	DCE group	Comparison group	DCE group	Comparison group
Main approach	DCE participant NPIs/participant CCN for FQHCs/RHCs	Non-participant alignment eligible NPIs/non-participant CCN for FQHCs/RHCs	Each DCE as one group	Non-DCE TIN/CCN
Tested Approach 1	DCE participant NPIs	Non-participant alignment eligible NPIs	Each DCE as one group	Non-DCE TIN/CCN
Tested Approach 2a	DCE participant TIN-NPIs/all alignment eligible NPIs within participant CCN	Non-participant alignment eligible TIN-NPIs/all alignment eligible NPIs within non-participant CCN	DCE TIN/CCN	Non-DCE TIN/CCN
Tested Approach 2b			Each DCE as one group	Non-DCE TIN/CCN
Tested Approach 3a	All alignment eligible NPIs within DCE participant TIN/CCN	All alignment eligible NPIs within non-participant TIN/CCN	DCE TIN/CCN	Non-DCE TIN/CCN
Tested Approach 3b			Each DCE as one group	Non-DCE TIN/CCN

NOTES: DCE = Direct Contracting Entity; PQEM = primary care qualified evaluation and management; NPI = national provider identifier; CCN = CMS certification number; TIN = taxpayer identification number; FQHC = federally qualified health center; RHC = rural health clinic.

Step 5: Add prospective voluntarily-aligned beneficiaries and drop Prospective Plus voluntarily aligned beneficiaries (GPDC group in PY only)

We included all prospective voluntarily-aligned beneficiaries to DCEs in our analysis. Voluntary alignment (VA) was given precedence over claims-based alignment. For instance, if a beneficiary was claims-aligned to a non-DCE provider (defined as a primary care specialist or selected non-primary care specialist who was not a Participant or Preferred Provider for any GPDC DCE in the PY), but was voluntarily aligned to a DCE, then this beneficiary was added to the DCE voluntarily selected by the beneficiary and removed from the comparison group. We excluded Prospective Plus voluntarily aligned beneficiaries within a given PY from the GPDC group because their alignment process was not replicable in the comparison group.

Step 6: Check the evaluation's alignment match rate with the model's operational list of prospectively aligned beneficiaries (GPDC group in PY only)

We checked the match rate between the evaluation's list of aligned GPDC beneficiaries (claims-aligned and prospective voluntarily aligned beneficiaries) and the list of aligned beneficiaries used for model operations for

each alignment approach tested in Step 4. Based on the match rate against the model's operational list of aligned beneficiaries in PY 2021 and the feasibility to construct an adequate baseline (**Exhibit G.5**), we used the main approach as described in **Exhibit G.4**. The overall match rate is 99.4% among model operationally aligned beneficiaries and 84.4% among our aligned beneficiaries[31].

Exhibit G.5. Match Rate and Baseline Assessment by Alignment Approaches

	Standard DCEs		New Entrant DCEs		# Standard and New Entrant DCEs that lack adequate baseline	High needs DCEs[32]
	Match rate against model operationally aligned beneficiaries	Match rate against our aligned beneficiaries	Match rate against model operationally aligned beneficiaries	Match rate against our aligned beneficiaries		Match rate against model operationally aligned beneficiaries
Main	99.5%	86.2%	99.3%	81.4%	2[33]	98.2%
Test 1	99.5%	80.5%	99.3%	74.5%	2	94.6%
Test 2a	99.2%	92.9%	99.1%	92.6%	4	97.7%
Test 2b	99.5%	92.9%	99.3%	92.6%	4	98.1%
Test 3a	99.3%	77.8%	99.2%	65.1%	1	97.7%
Test 3b	99.5%	77.8%	99.3%	65.1%	1	98.1%

NOTES: DCE = Direct Contracting Entity.

Step 7: Exclude beneficiaries and determine the ending date for alignment

We ended the alignment of an aligned DCE or comparison group beneficiary once they were not alignment-eligible based on the model exclusion criteria. A beneficiary was aligned to a DCE or comparison group for all months of the reference year until they met any of the following criteria: death, loss of Medicare Part A or Part B coverage, transition to MA or other managed care, residence in non-U.S. locations, or having Medicare as a secondary payer.[34] For the PY 2021 DCE group only, a beneficiary also lost alignment eligibility and was excluded from the analytic sample if they were enrolled in other APMs which took precedence over GPDC for beneficiary

[31] We observed a lower match rate among our list of aligned beneficiaries because we used NPI alignment, which aligned more beneficiaries to the model and allowed us to capture beneficiaries in baseline years.

[32] When choosing among approaches, we did not apply the High Needs DCE eligibility criteria for our aligned beneficiaries; therefore, we did not present the match rate against our aligned beneficiaries. After applying the High Needs eligibility rules for our aligned beneficiaries, the match rate against model operationally aligned beneficiaries became 97.4% for the main approach. We did not further examine the match rate of other approaches for High Needs DCEs.

[33] Two new entrant DCEs did not have an adequate baseline because there were not enough beneficiaries aligned to the participant provider NPIs during the base year alignment period. In addition to these two new entrant DCEs lack of adequate baseline as noted here, one additional new entrant DCE also lacked adequate baseline after we limited the sample to their market area, resulting in three New Entrant DCEs dropped from DID analysis.

[34] We did not include the criteria for "reside in a county that is included in the DCE service areas" and defined DCE market area as a collection of HRRs because choosing a large geographic area to define the market would allow us to minimize the thread of spillover, which might downward bias results.

alignment per the GPDC Financial Operating Guide.[35] We used both claims and model operational data (for the GPDC group in the PY only) to determine the date of alignment ending based on the earliest date of exclusions due to the above reasons or the last day of the year if a beneficiary was not excluded for any reason. For each BY/PY, a beneficiary was aligned to the DCE or comparison group from the first day of the year to the alignment end date. We specifically excluded beneficiaries in statewide health care transformation models (Vermont All-Payer ACO Model, Maryland Total Cost of Care Model) from all analyses to remove any effects these regional models would have on mitigating estimated impacts of the GPDC Model.

In addition, to replicate the alignment process using the model's logic, we also made three modifications, described below, to define the GPDC group for the evaluation.

Identification and aggregation of PQEM claims. As mentioned in earlier steps, we used Participant Provider/non-Participant Provider alignment-eligible NPIs to identify PQEM claims furnished by GPDC or non-GPDC providers. This approach allowed us to establish an adequate baseline for all but two Standard and New Entrant DCEs. After identifying PQEM claims through NPIs, we aggregated total allowable PQEMs charges to each DCE[36] or each non-GPDC practice[37] to align beneficiaries to GPDC and comparison group, respectively. We discuss this further in the following section "GPDC and Comparison Group Providers Used to Determine Beneficiary Alignment".

Identification of alignment-eligible beneficiaries. Several exclusions on eligibility were applied to beneficiary alignment for both the treatment and comparison groups. For our analyses, alignment-eligible beneficiaries at the beginning of a PY or BY must be living; be enrolled in both Medicare Parts A and B, without MA or other managed care; have Medicare as the primary payer; and be a U.S. resident. As described above, alignment-eligible beneficiaries for High Needs DCEs also had to meet at least one of four additional criteria indicating need based on mobility, risk score, utilization, and frailty. We did not apply the model's logic to require beneficiaries to reside in a county included in the DCE's service area because a small geographic area may pose larger spillover effect (i.e., comparison beneficiaries receiving care from GPDC providers). Instead, we defined a DCE's market area as the collection of HRRs in which the majority of aligned DCE beneficiaries reside. We limited our analytic sample for both GPDC and comparison groups in the baseline and performance years to the identified market area for each DCE to eliminate the risk of exogenous time-varying differences that cannot be captured by the DID model. Although our definition of DCE market area comprises a larger geographic area than that used in the model's logic, it would cover the model's DCE service area identified by counties because each DCE's market area was assessed using the matched sample between the model's operational list and our list of aligned

[35] Global and Professional Direct Contracting Model Financial Operating Guide: Overview. Appendix B. Table B.6.6 "Initiatives for Which Beneficiary Overlap with GPDC Is Prohibited".

[36] As each DCE includes a range of practices or sets of providers, this set pools all PQEM charges across participating providers affiliated within each DCE.

[37] Non-GPDC practices were defined as TINs and CCNs since an alternative organization of NPIs was unknown. Charges were pooled across all providers that contributed towards alignment for each comparison group practice TIN or CCN.

beneficiaries. We discuss this further in the subsection below titled "GPDC Market Areas for Evaluation of the GPDC Model".

Voluntary alignment (VA). VA is an intervention feature only available in the performance year for GPDC DCEs and indicates beneficiaries who designate a qualifying DCE Participant Provider as their primary source of care. We identified prospective VA beneficiaries from the model's operational list, using this list as a reference for comparing with claims-aligned beneficiaries. Because VA strategies will vary by individual DCEs, the process cannot be replicated on claims, which is not a problem for prospective VA beneficiaries who are also claims-aligned. To accommodate beneficiaries who are not claims-aligned, we allowed prospective VA to take precedence over claims alignment for GPDC DCEs, consistent with the model's alignment rules. In future reports, we will descriptively examine how VA-only beneficiaries' demographic characteristics, overall health status (for example, prevalence of chronic conditions), and health care utilization differ from claim-aligned beneficiaries in the performance year.

For the evaluation, we included GPDC DCE beneficiaries prospectively aligned to DCE providers by either claims alignment or VA at the start of PY 2021, but excluded Prospective Plus VA beneficiaries[38] from the GPDC group because Prospective Plus VA beneficiaries may substantively differ from other prospectively aligned beneficiaries (either through claims alignment or VA) in the type of partial years they contribute to the study. First, Prospective Plus VA beneficiaries could never be aligned for the entire performance year because their alignment did not start at the beginning of the PY. Second, the year-end partial years for the Prospective Plus VA beneficiaries would systematically differ from the early-year partial years for claims-aligned and prospective VA beneficiaries, even if they aligned to the GPDC group for the same length of time (for example, Prospective Plus VA beneficiaries aligned between 7/1/2021 and 12/31/2021 versus prospective VA beneficiaries aligned between 4/1/2021 and 10/31/2021). Therefore, inclusion of Prospective Plus VA beneficiaries would potentially exacerbate imbalance between the GPDC and comparison groups, as well as the imbalance between the GPDC PY and the GPDC BY groups because comparison beneficiaries and GPDC beneficiaries in the baseline were only claim-aligned effective at the beginning of BY or PY.

This approach allowed us to assess the impact of the GPDC DCEs on their prospectively claims- and voluntarily-aligned populations, relative to the comparison group's prospectively claims-aligned population, although it excluded the small proportion of Prospective Plus VA beneficiaries (3.8% in PY 2021 across all DCEs) and does not capture the full scale of impacts from Prospective Plus VA for GPDC DCEs. Consistent with the model's financial methodology and with our approach to identify the comparison group, we limited the baseline treatment group to only claims-aligned beneficiaries. To ensure comparability in key covariates among these groups, we weighted the comparison group in baseline and performance years and the GPDC group in the

[38] Prospective Plus VA beneficiaries are prospectively aligned to a DCE Participant Provider in the second, third, and fourth calendar quarters of the performance year (third and fourth calendar quarters for PY 2021 since the model started in 4/1/2021), either electronically or via the paper-based VA form. This differs from prospective VA beneficiaries who are aligned *prior to the performance year* and are aligned for the entire performance year.

baseline years (claims-aligned only) to resemble the GPDC performance year (claims-aligned and prospective VA beneficiaries) using entropy balancing, as detailed below.

GPDC and Comparison Group Providers Used to Determine Beneficiary Alignment

Our primary approach for identifying GPDC DCE beneficiaries in the performance year was via claims-based and prospective VA to DCE Participant Providers in the performance year. We employed the same strategy to construct treatment and comparison groups across all GPDC DCE types using a claims-based approach. We expect DCEs to change their mix of Participant Providers across performance years by adding and dropping providers. Therefore, we created a unique baseline corresponding to the PY to ensure the baseline and performance years are comprised of beneficiaries aligned to the same panel of Participant Providers that participated in the respective performance year. Specifically, we identified PY 2021 Participant Providers in the corresponding baseline years (2018-2020). Beneficiaries aligned to these providers in the baseline years comprised the baseline treatment group.

We aligned eligible Medicare beneficiaries to a DCE through either claims-based alignment (described above) or VA (aligned beneficiaries designating a qualifying DCE Participant Provider as their primary source of care), with preference for VA, as applicable. Beneficiaries were aligned to DCEs until the end of the year or until they became ineligible based on the alignment eligibility rules described above (see "**Step 2: Identify alignment-eligible beneficiaries**" above).

Different from the model's alignment logic of identifying Participant Providers via TIN-NPI combination and aligning beneficiaries based on DCE TINs or CCNs (see **Exhibit G.4** and **Exhibit G.5**), we defined Participant Providers as NPIs and aligned beneficiaries to each DCE as one group (i.e., group of Participant Providers) for two reasons. First, it may comprehensively capture their baseline, wherein some TIN-NPI combinations from the PY may not be present in baseline years. Second, it approximates the model's alignment approach in the PY where GPDC Participant Providers collaborate collectively.[39] A limitation of aligning beneficiaries to the group of GPDC DCE NPIs in the baseline and performance years is that they could also bill visits to non-GPDC TINs, and this approach would consider those claims as furnished by GPDC providers. The upside of this approach is that it gives us a more comprehensive pool of beneficiaries in the baseline years who were prospectively claims-aligned to the group of GPDC DCE NPIs.

Comparison beneficiaries were aligned to non-GPDC practices (defined as TINs and CCNs since an alternative organization of NPIs was unknown) through their alignment-eligible practitioners (defined by NPIs; see **Exhibit G.4**). As mentioned earlier, since a NPI can bill under both GPDC TIN/CCN and non-GPDC TIN/CCN, we further removed comparison beneficiaries aligned to GPDC Participant or Preferred Provider TINs/CCNs after alignment. We considered comparison providers as a pool of alignment-eligible non-GPDC NPIs billed under non-GPDC

[39] When defining GPDC Participant Providers by NPIs and then aligning beneficiaries based on DCE TINs, we would still need to use TIN-NPI combinations. This may cause issues in the baseline years (see **Exhibits G.4** and **G.5**) and the alignment would be either through individual NPI or individual DCE as one group. Between these two options, aligning beneficiaries to an individual DCE as one group better reflects that GPDC Participant Providers collaborate collectively.

TINs/CCNs who furnished at least one PQEM claim to aligned comparison beneficiaries in the PY, and used this group of providers to align comparison beneficiaries in the baseline years. Comparison group providers could have been in FFS alone or in Medicare ACO initiatives like Next Generation ACO (NGACO) or the Shared Savings Program; ESRD-focused ACO initiatives like Comprehensive ESRD Care (CEC) or Kidney Care Choices (KCC); or primary care initiatives like Comprehensive Primary Care Plus (CPC+) or Primary Care First (PCF). Beneficiaries aligned to comparison providers were further limited to GPDC DCE market areas (see subsection below titled "GPDC Market Areas for Evaluation of the GPDC Model") and sampled within the HRR for each BY or PY (see subsection below titled "Sampling Comparison Beneficiaries from GPDC Markets").

We recognize that GPDC DCE and non-GPDC providers may differ on observed or unobserved characteristics that motivate the former group to organize into DCEs. Accordingly, in future reports, we will characterize providers based on several variables, including Medicare FFS, MA, and ACO experience; health-system affiliation; and participation in other Innovation Center initiatives. We did not control for differences in provider characteristics in our estimation of the GPDC Model's impact, because these characteristics could potentially be mediators, or moderators, or even time-varying confounders. We account for invariant differences between DCE and comparison providers though the DCE fixed effect in our DID regression models.

GPDC Market Areas for Evaluation of the GPDC Model

Our approach of drawing DCEs and comparison groups from the same market areas recognizes the dynamic nature of these entities, with changes possible in their markets from one PY to the next. It is important that DCE and comparison groups be drawn from the same markets so that they are exposed in similar ways to key time-varying market factors that influence outcomes, such as provider supply and competition, overlapping area-level Innovation Center initiatives, and common shocks, such as the COVID-19 public health emergency (PHE).

We examined the geographic distribution of providers and beneficiaries for each DCE and across DCE type, cohort, and model, to identify the markets in which DCEs operate and determine if comparison groups can be drawn from the same markets. We defined a DCE's market area as the HRR(s) in which a meaningful percentage (that is, >= 1 percent) of its aligned beneficiaries reside; we chose this threshold as it allowed us to capture the majority of a DCE's aligned beneficiaries (>95% except for one DCE) while offering a sizable comparison group.

Comparison group beneficiaries in the same HRRs as DCEs may receive care from DCE providers (direct spillover) or may become GPDC beneficiaries in future years. Recognizing this, we will quantify the extent of direct spillover from the comparison group for each DCE in both the performance and baseline years (for example, proportions of comparison beneficiaries' Medicare spending or PQEM visits from GPDC providers) and conduct sensitivity analyses in future reports to assess how spillover affects our impact estimates.[40]

[40] In this sensitivity check, we will estimate the GPDC Model's impact on Medicare spending after excluding beneficiaries from the comparison group receiving the majority of their care from GPDC providers in the performance year. If there are favorable effects from direct spillover of the GPDC Model, the model's impacts would become larger after excluding beneficiaries experiencing direct spillovers from the comparison group.

Sampling Comparison Beneficiaries from GPDC Markets

Due to the large geographic areas that HRRs cover, including *all* non-GPDC DCE beneficiaries in GPDC DCEs was computationally challenging due to large file sizes. To ensure computational feasibility, we reduced the size of the final comparison group prior to conducting entropy balancing by choosing a random sample of comparison beneficiaries aligned to non-DCE providers in the DCE HRRs. We randomly selected 10 comparison beneficiaries for each GPDC DCE-aligned beneficiary in the HRR in order to have enough beneficiaries to potentially balance the groups well while creating files small enough to be computationally feasible for analysis. In HRRs where the ratio of comparison beneficiaries to GPDC DCE-aligned beneficiaries was less than 10:1, all comparison beneficiaries in the HRR were included in the comparison group.[41]

We completed the sampling using simple random samples with replacement to ensure that each beneficiary had equal probability to be selected in the sample.[42] Each HRR-DCE-reference year combination was sampled separately to keep these strata mutually exclusive. Because we conducted DCE-level analyses and estimated impacts for each DCE separately, sampling the comparison group in each market reflected the markets in which the DCEs were operating. Thus, selecting the comparison beneficiaries independently (without removing overlapping beneficiaries) for each DCE is the correct theoretical approach. In PY 2021, when sampling the comparison group with replacement for each DCE, we observed approximately six to seven percent of comparison beneficiaries overlapping across DCEs in each baseline or performance year. However, each DCE-level impact estimate is independent in the pooled analyses because the comparison group is sampled independently for each DCE from all available comparison beneficiaries in its markets.

Outcomes for GPDC and comparison group aligned beneficiaries in a given year reflect the performance of GPDC DCE and comparison providers in that specific year, respectively. Beneficiaries in our study can be aligned to GPDC providers in a year, and to comparison providers in the following year, and vice versa. We expect beneficiaries to switch groups during the model, or between the baseline and performance years, based on how they seek care from providers as well as providers entering and exiting the model. Our evaluation design accommodates this common occurrence in FFS Medicare where beneficiaries have freedom to seek care without restrictions among Medicare FFS providers. It is also consistent with how DCEs have financial responsibility to manage their prospectively aligned populations based on the set of providers participating in a given performance year.

[41] This occurred in six HRRs across all PY 2021 Standard and New Entrant DCEs.

[42] We successfully used a similar sampling approach in the Vermont All-Payer ACO Model evaluation to create a comparison group of manageable size. See the VT All-Payer ACO Model – Second Evaluation Report Appendices for more details on that approach.

G.1.2 Entropy Balancing

The following sections describe how entropy balancing (EB) was used in the evaluation, including our rationale for using EB, our approach to EB, variables used in EB, and the results from EB for Standards and New Entrants DCEs.

Rationale. We conducted EB to ensure the comparability of baseline and comparison beneficiaries in our analytic sample with PY 2021 GPDC beneficiaries. We ruled out more traditional propensity score (PS) approaches for balancing covariates (for example, regression, generalized boosted models, covariate balancing propensity methods) because slight misspecifications of the PS model can bias treatment effects. Instead, we used EB because it bypasses the propensity score estimation by using a maximum entropy reweighting scheme that directly incorporates covariate balance into the weight function. Thus, EB avoids both the iterative process of testing the PS model and the potential for misspecification.

The greatest advantage in using EB is that, unlike other weighting methods including covariate-balancing propensity scores, ensuring balance between groups is the primary objective of the model. Researchers can specify the desired balance on first, second, or third moments (that is, mean, variance, or skewness) for each covariate between treatment and comparison groups. The EB method also reweights units smoothly to achieve balance so that the weights will be as close as possible to the base weights (one for every unit in unweighted sample), so that as much information can be retained as possible.

A special consideration in applying balancing methods in the context of the DID design for GPDC is that there are **four** groups to consider:

1) GPDC beneficiaries in the performance year
2) GPDC beneficiaries in the baseline years
3) Comparison beneficiaries in the performance year
4) Comparison beneficiaries in the baseline years

Both voluntarily aligned and claims-aligned beneficiaries are in the treatment group in the performance year, while *only* claims-aligned beneficiaries are in the remaining three groups. Because voluntarily aligned beneficiaries exist only in the PY 2021 GPDC group, we used that group as a reference and weighted beneficiaries in each year and treatment/comparison group combination to be similar to those beneficiaries. As the beneficiary populations served by GPDC and non-GPDC providers may change over time, this approach helps to ensure balance or comparability across all four groups and performance years.

Approach. Beneficiaries in the GPDC Model may be systematically different from those in comparison groups due to observed and unobserved differences in characteristics of beneficiaries or of providers to whom they are aligned. Our DID evaluation design accounts for time-invariant differences between the two groups (that is, characteristics that do not change over time, such as location, whether observable or unobservable). However, DID does not account for differences that may be time-varying (for example, if the composition of the treatment and comparison groups differentially change over time). To ensure a comparison group that is similar to the

treatment group on key characteristics, we used entropy balancing to weight the DCE and comparison groups based on observed beneficiary, provider, community, and market characteristics.[43]

We used the Stata package *ebalance* to employ the entropy balancing method.[44] To ensure computational feasibility, we reduced the size of the final comparison group prior to conducting EB by choosing a random sample of comparison beneficiaries aligned to non-DCE providers in the DCE HRRs (see "Sampling Comparison Beneficiaries from GPDC Markets" in **Section G.1.1**). We then used EB to reweight the comparison beneficiaries using the variables described below. Comparison group beneficiaries were weighted to the entire treatment group in the performance year, which includes both beneficiaries aligned prospectively through claims as well as voluntarily aligned beneficiaries. We checked the balance between the treatment group in the baseline and performance years, to subsequently weight the baseline treatment group to be balanced with the performance year treatment group, recognizing that there might be differences as VA is allowed in the performance year but not in the baseline. The comparison group in the baseline and performance years was also balanced with the treatment group in the performance year. **Exhibit G.6** below provides the count and proportion of beneficiaries for Standard and New Entrant DCEs by GPDC or comparison group in the performance and baseline years, as well as the distribution of voluntarily aligned beneficiaries in the performance year GPDC group. The comparison group reflected stratified randomly sampled Medicare FFS beneficiaries who were aligned to comparison providers using the GPDC alignment algorithm and resided in the same market as the DCE (that is, a collection of HRRs that comprises at least one percent of aligned GPDC beneficiaries). Because we aimed to sample 10 comparison beneficiaries for each GPDC beneficiary, the size of the comparison group is about 10 times that of the GDPC group.

Exhibit G.6. Distribution of Beneficiaries in Standard and New Entrant DCEs

	PY 2021				BYs 2018-2020	
	GPDC Group			Comparison Group	GPDC Group	Comparison Group
	Total	Percent of All Voluntarily Aligned Beneficiaries	Percent of Beneficiaries Aligned through VA Only	Total	Total	Total
Standard DCEs	297,613	2.53%	1.12%	2,812,057	1,058,155	9,959,157
New Entrant DCEs	26,172	16.80%	11.71%	268,399	91,511	915,209

NOTES: Three New Entrant DCEs (D0013, D0027, and D0098) were excluded from analysis due to having insufficient data in the BYs. GPDC = global and professional direct contracting. DCE = Direct Contracting Entity; VA = voluntary alignment.

[43] We ruled out more traditional propensity score (PS) approaches for balancing covariates (for example, logistic or generalized boosted models) because slight misspecifications of the PS model can bias treatment effects.

[44] Hainmueller J, Xu Y. ebalance: A Stata package for entropy balancing. *Journal of Statistical Software*. 2013;1(54):7.

Variables Selected for Entropy Balancing. We created variables for each baseline year (2018-2020) and performance year (2021). The variables we used in our EB models fell into the following domains (**Appendix H** gives a complete list of all variables included in EB models):

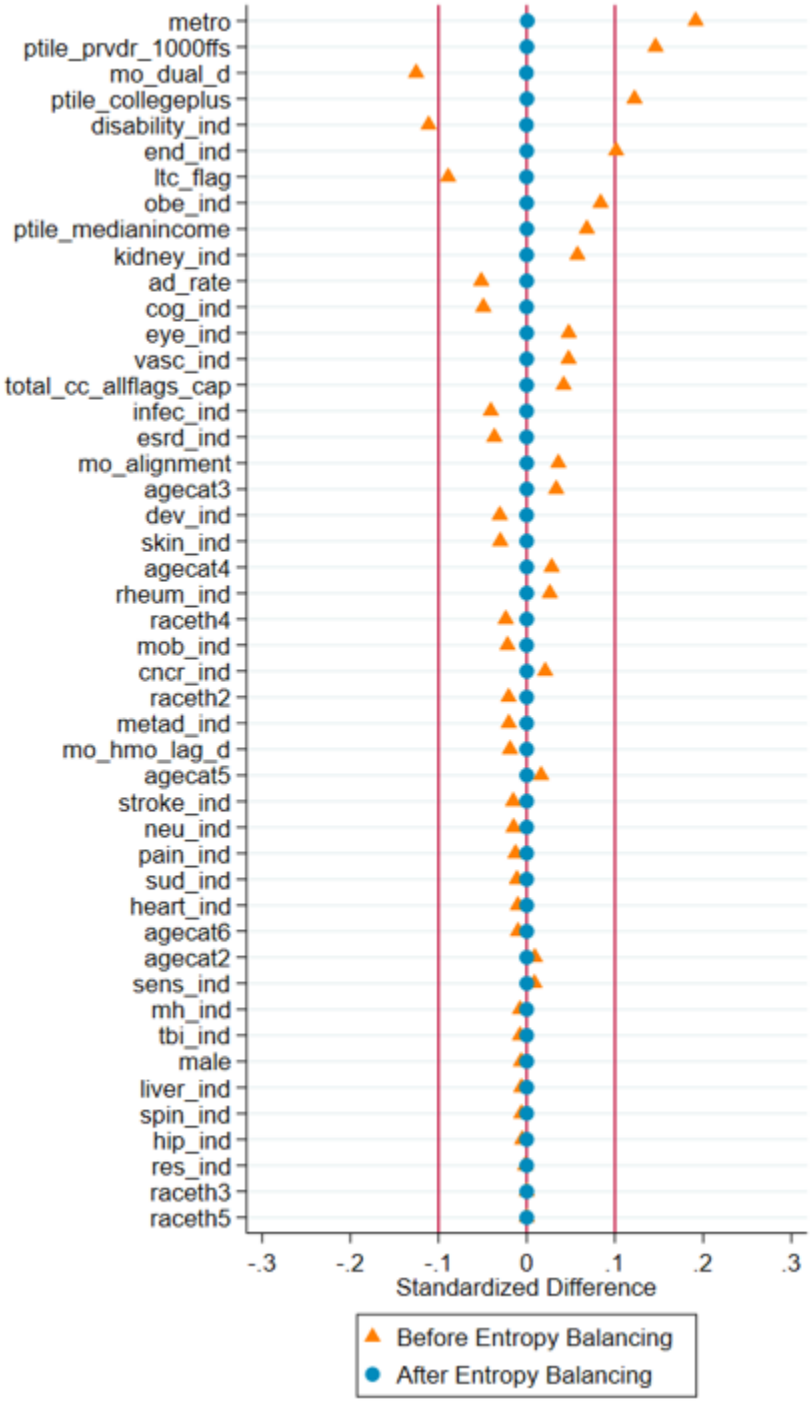
- **Demographics** (beneficiary-level). Beneficiaries' health care needs may vary by demographic characteristics. Depending on the outcome measured, demographic characteristics may reflect determinants of health (factors that drive the outcome), confounders (factors that affect both the exposure and outcome, thereby causing a spurious association), or effect modifiers (factors that change the association between the exposure and outcome).
- **Clinical** (beneficiary-level). Beneficiaries' clinical characteristics and number of chronic conditions will drive cost and utilization patterns. A beneficiary's chronic conditions and disease burden will typically be associated with their level and intensity of health care spending and utilization during the year.
- **Market** (ZIP code tabulation area or market area). Access to health care services and providers, as well as SDOH, vary across regions, affecting beneficiary access to care and, potentially, health outcomes.

Results. The following exhibits show the covariate balance before and after EB for Standard (**Exhibits G.7 through G.9**) and New Entrant (**Exhibits G.10 through G.12**) DCEs. Three comparisons are shown for Standard and New Entrant DCEs separately, with the PY 2021 GPDC group as the reference for each:

- PY 2021 GPDC group and PY 2021 comparison group
- PY 2021 GPDC group and each baseline GPDC group
- PY 2021 GPDC group and each baseline comparison group

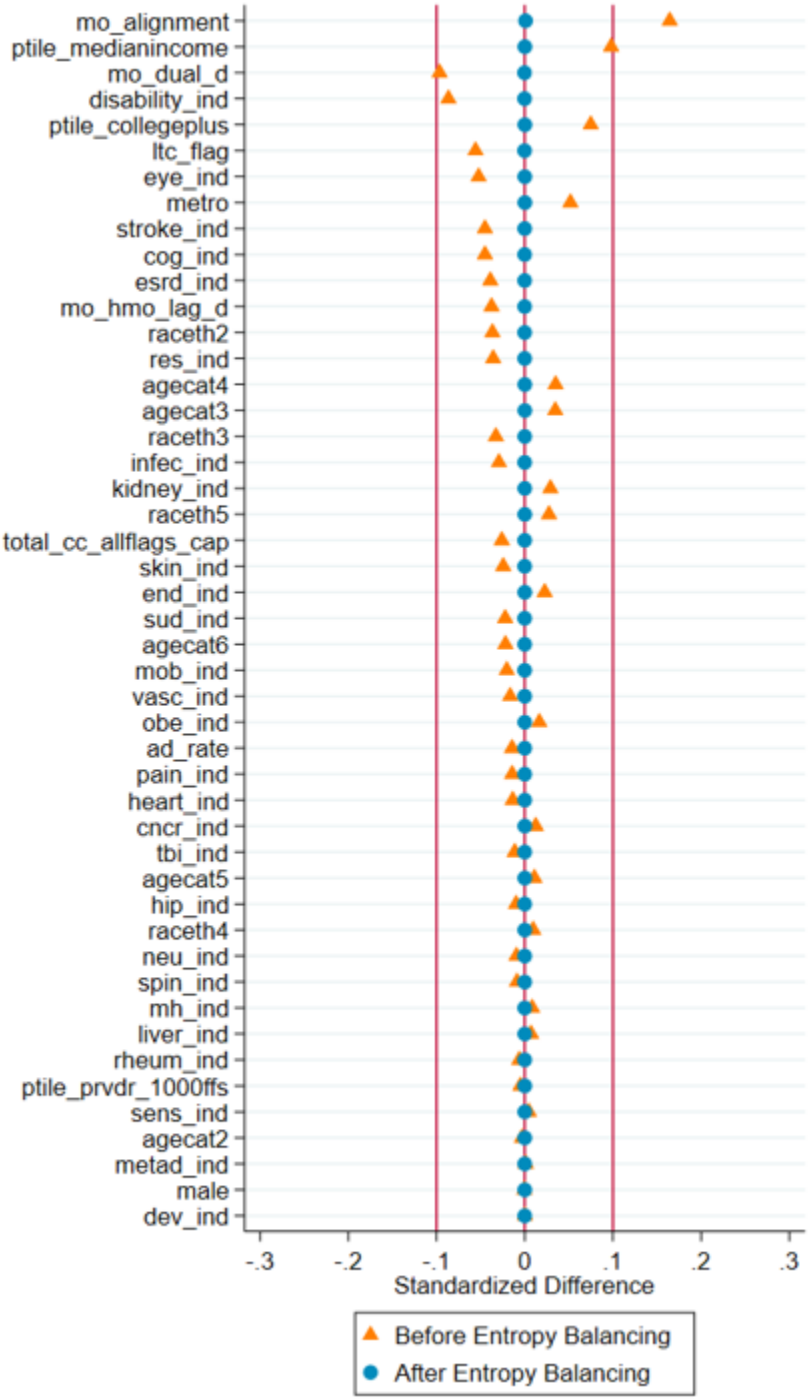
The exhibits show the standardized difference in covariates between the reference (PY 2021 GPDC group) and other group before EB (orange triangle) and after EB (blue circle). The red lines present cut-off values for ±0.1 standardized differences, a threshold that is commonly used in assessing variable balance. In all cases for Standard and New Entrant DCEs, EB brought imbalanced variables closer to the PY 2021 GPDC group and achieved <0.0015 standardized differences between the treatment and weighted comparison group for all variables, representing little to no differences after balancing.

Exhibit G.7. Covariate Balance, Standard DCEs: PY 2021 GPDC Group and PY 2021 Comparison Group



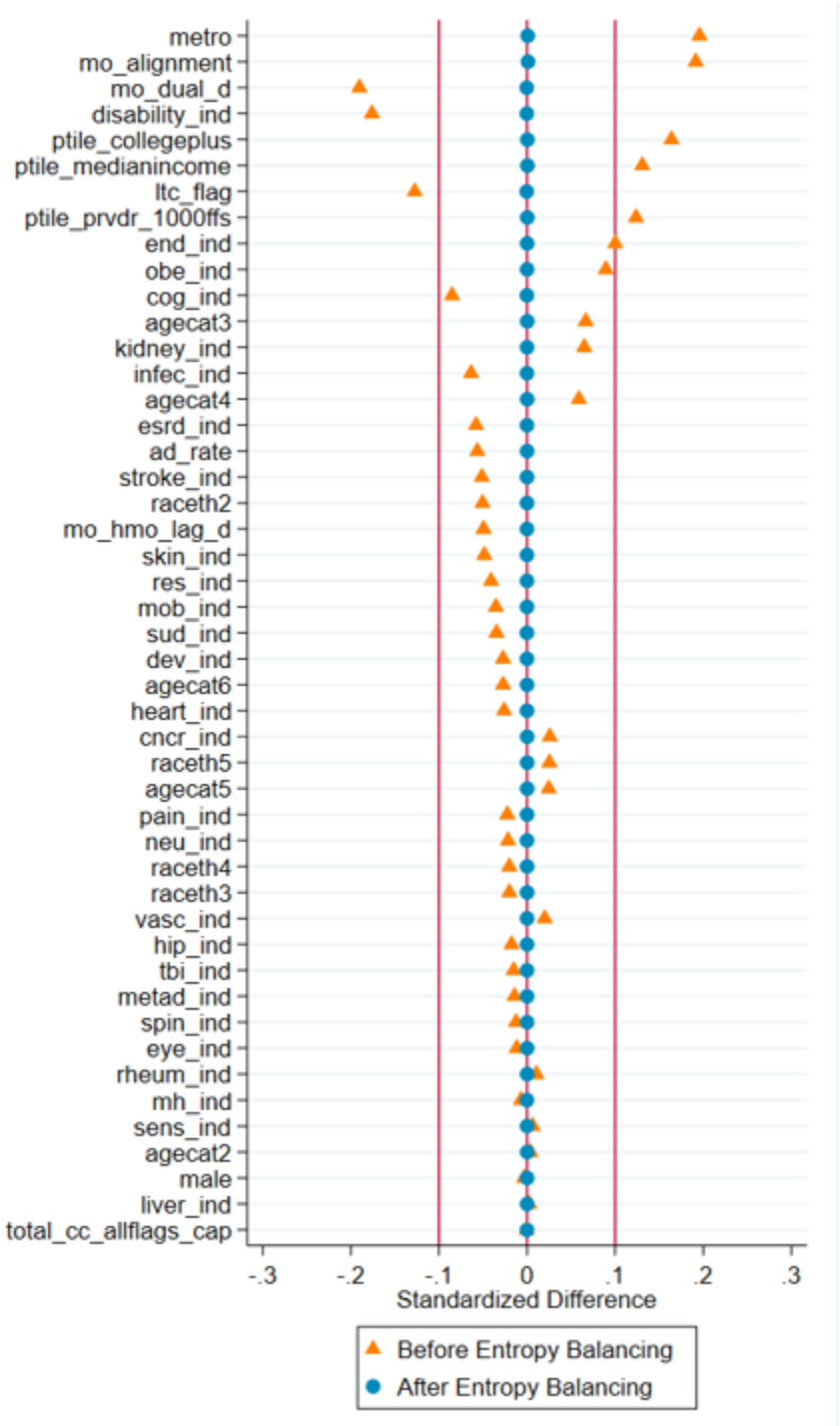
SOURCE: NORC analysis of Medicare demographic, clinical, and market data.

Exhibit G.8. Covariate Balance, Standard DCEs: PY 2021 GPDC Group and Baseline GPDC Group



SOURCE: NORC analysis of Medicare demographic, clinical, and market data.

Exhibit G.9. Covariate Balance, Standard DCEs: PY 2021 GPDC Group and Baseline Comparison Group



SOURCE: NORC analysis of Medicare demographic, clinical, and market data.

Exhibit G.10. Covariate Balance, New Entrant DCEs: PY 2021 GPDC Group and PY 2021 Comparison Group

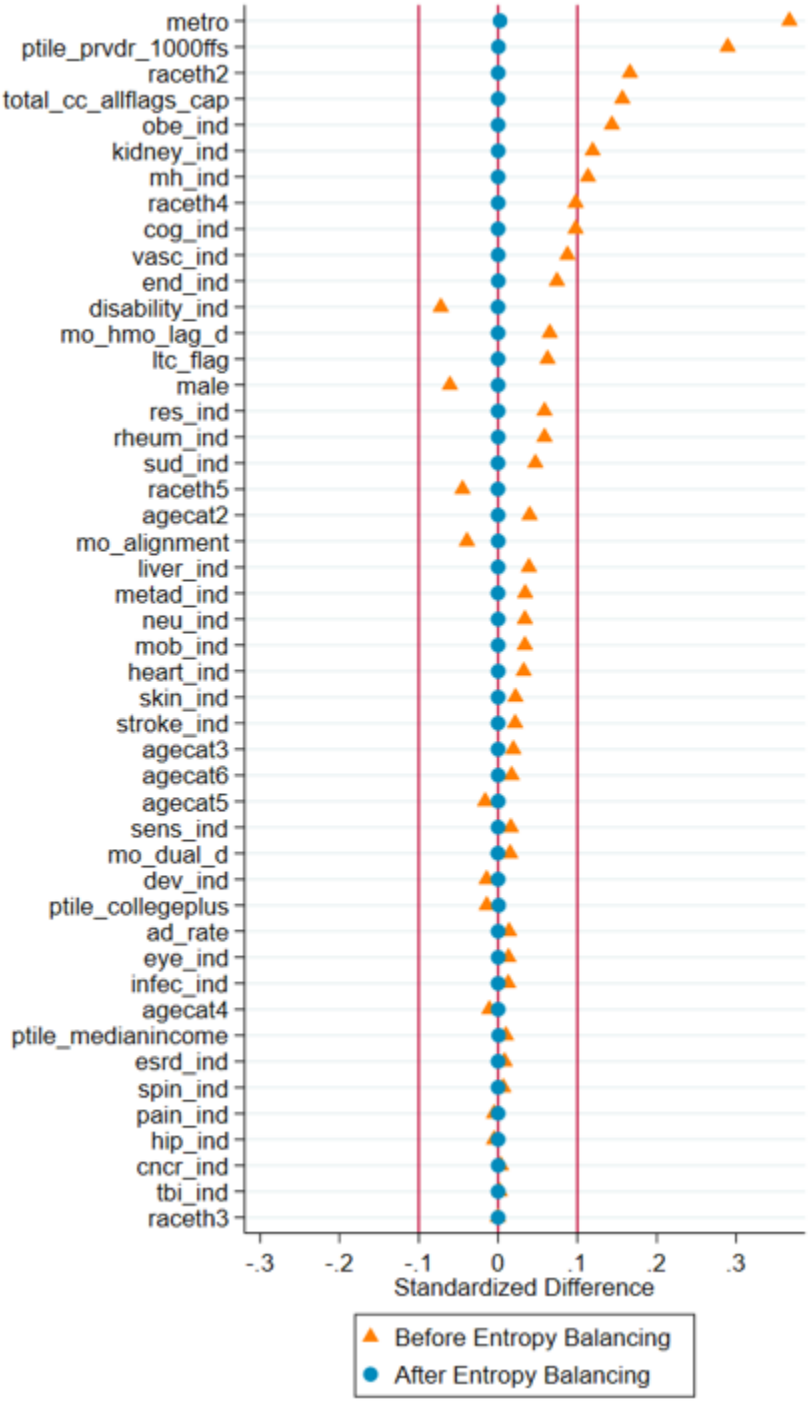


Exhibit G.11. Covariate Balance, New Entrant DCEs: PY 2021 GPDC Group and Baseline GPDC Group

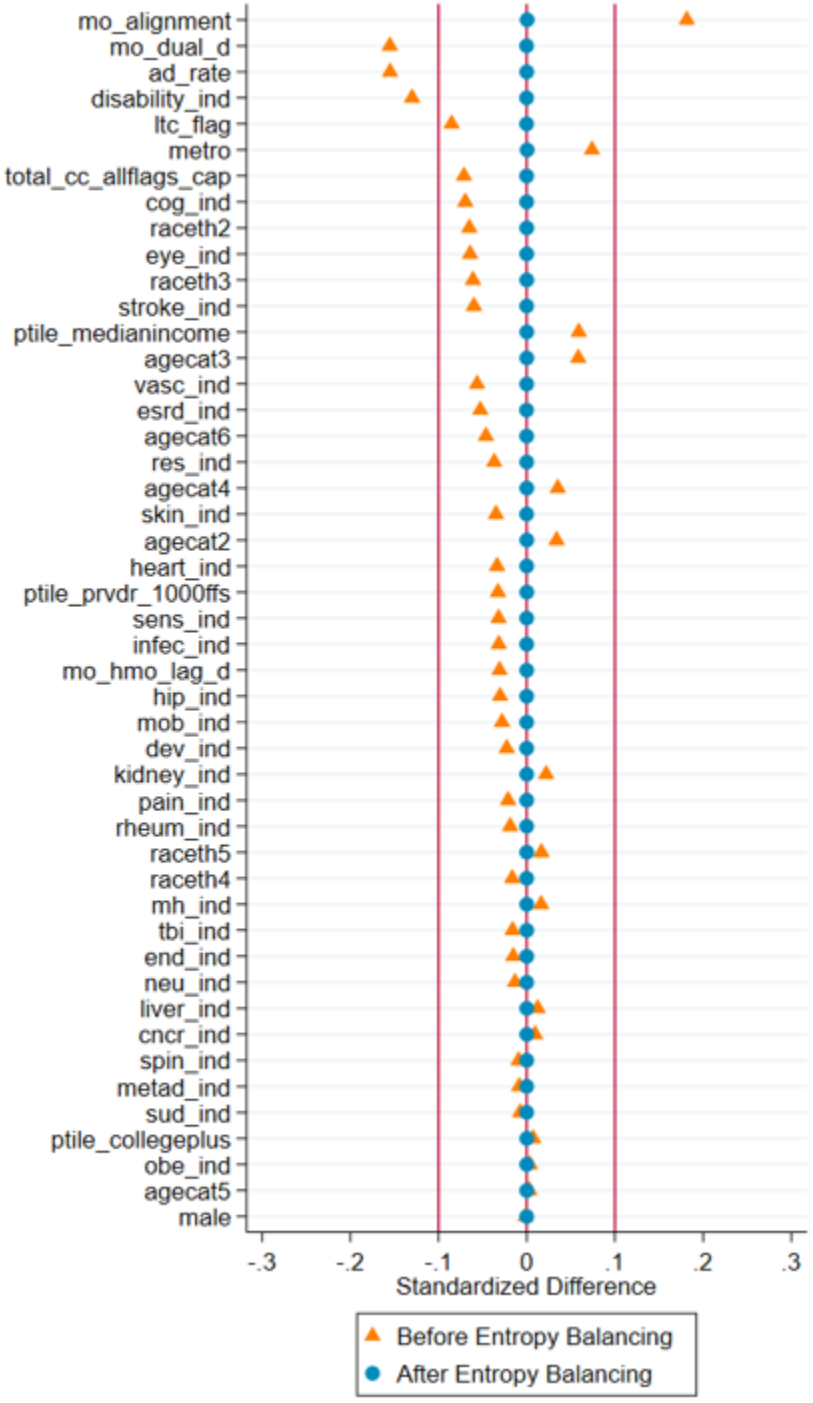


Exhibit G.12. Covariate Balance, New Entrant DCEs: PY 2021 GPDC Group and Baseline Comparison Group

G.2 Analytic Approach for Descriptive Analyses

For all three DCE types, we assessed descriptive characteristics of beneficiaries aligned to DCEs in PY 2021, including beneficiaries' demographic characteristics, enrollment/coverage information, clinical characteristics, and community characteristics (**Exhibit 3.2** in main report). We used percentages to describe categorial and dichotomous variables and used means and standard deviations to describe continuous variables. For High Needs DCEs, we expand on variables presented in Exhibit 3.2 providing characteristics relevant to their status as High Needs beneficiaries in PY 2021, including common clinical conditions, and criteria used to determine High Needs eligibility (for full eligibility criteria, see "Step 2: Identify alignment-eligible beneficiaries" in **Section G.1.1**),[45,46] including a claim-based index measuring beneficiary frailty (**Exhibit G.13**).[47]

For Standard and New Entrant DCEs, we also assessed descriptive characteristics for beneficiaries in the baseline period (2018-2020) and comparison group (**Exhibits G.14** and **G.15**) to better understand the population prior to regressions. Additionally, we assessed overlap with other alternative payment models, receipt of beneficiary care for COVID-19, and county-level COVID-19 infection rates, fatality rates, and vaccination status. Differential change with significance level was also reported for each characteristic; differential change is similar to the difference-in-differences and was calculated as changes of differences between GPDC and comparison groups from baseline years to performance year; significance level was based on the comparison between the differential changes and zero.

Additionally, we also descriptively assessed outcomes before regression adjustment for Standard and New Entrant DCEs (**Exhibits G.16** and **G.17**). Because these are descriptive analyses and do not account for differences between the GPDC and comparison groups on key sociodemographic, clinical, and market-level factors, we do not conduct sensitivity testing on differences between groups; these estimates should not be interpreted as causal for the GPDC Model. It should be noted that Medicare spending categories do not sum to total Medicare spending; spending categories reflect what Medicare would have paid absent capitation, while total Medicare spending includes capitation.

[45] Global and Professional Direct Contracting (GPDC) and Kidney Care Choices Models Risk Adjustment. Available at: https://innovation.cms.gov/media/document/gpdc-kcc-risk-adjustment

[46] Global and Professional Direct Contracting Model Financial Operating Guide: Overview. Available at: https://innovation.cms.gov/media/document/dc-financial-op-guide-overview

[47] Kim DH, Schneeweiss S, Glynn RJ, Lipsitz LA, Rockwood K, Avorn J. Measuring frailty in Medicare data: development and validation of a claims-based frailty index. The Journals of Gerontology: Series A. 2018 Jun 14;73(7):980-7.

Exhibit G.13. Descriptive Characteristics of Beneficiaries Aligned to High Needs DCEs, PY 2021

	GPDC (PY 2021)
Number of beneficiaries	2,018
Demographics	
Age (mean ± SD)	72.3 (14.6)
Sex (%)	
Female	54.6
Male	45.4
Race/Ethnicity (%)[a]	
White	60.5
Black/African-American	27.5
Hispanic	7.5
Asian/Pacific Islander	2.9
Other/Unknown	1.7
Health Care Coverage (%)	
Disabled without ESRD	25.4
Any dual eligibility	68.1
Any Part D coverage	87.8
Received Part D low-income drug subsidy	69.3
Clinical Characteristics[b]	
Number of chronic conditions (mean ± SD)	12.6 (4.7)
Vascular disease (%)	93.6
Endocrine conditions (%)	87.4
Behavioral health conditions (%)	74.1
Rheumatoid conditions (%)	63.0
Cardiac conditions (%)	62.9
Respiratory conditions (%)	56.4
Cognitive disorders (%)	44.7

	GPDC (PY 2021)
Chronic kidney disease (%)	44.3
Chronic pain disorders (%)	41.3
Substance use disorders (%)	38.2
Had long-term care stay in prior year (%)	47.6
Prospective CMS-HCC Risk Score[c] (mean ± SD)	3.5 (2.0)
Nursing Home Stay of >100 Days in Prior Year (%)	47.6
GPDC High Needs Flag (%)	100
Community Characteristics	
Census Region (%)	
Northeast	0.0
Midwest	24.7
South	40.1
West	35.0
Rurality (%)	
Rural ZIP Code	1.4
Urban ZIP Code	98.6
Area Deprivation Index (ADI; %)	
Percent of aligned beneficiaries with ADI score of 1-25 (lowest socioeconomic disadvantage)	22.1
Percent of aligned beneficiaries with ADI score of 26-50	21.4
Percent of aligned beneficiaries with ADI score of 51-75	23.6
Percent of aligned beneficiaries with ADI score of 76-100 (highest socioeconomic disadvantage)	29.3
Percent of population living below the poverty line at ZCTA level (mean ± SD)	15.0 (9.1)
Percent of population ages 25+ with a college degree at ZCTA level (mean ± SD)	30.8 (17.1)

	GPDC (PY 2021)
Claims-Based Frailty Index (%)[48]	
0-≤0.15 (Non-Frail)	3.5
>0.15-≤0.25 (Pre-Frail)	27.8
>0.25-≤0.35 (Mildly Frail)	42.6
>0.35-≤0.45 (Moderately Frail)	21.1
>0.45 (Severely Frail)	5.0

SOURCE: NORC team analysis of 2021 Medicare claims and enrollment data.

NOTES: Categories may not add to 100% due to rounding and missing/suppressed data. [a]All race/ethnicity groups except Hispanic include only non-Hispanic beneficiaries. [b]Clinical conditions listed in this table represent the ten most common diagnosed chronic conditions in PY 2021 High Needs beneficiaries. [c]The CMS-HCC risk score is one of the criteria used to determine eligibility for High Needs DCEs. SD = standard deviation; ESRD = end-stage renal disease; HCC = Hierarchical Condition Category.

Exhibit G.14. Descriptive Characteristics of Beneficiaries Aligned to Standard DCEs, 2018-2021

	Baseline Years (2018-2020)		Performance Year (2021)		Differential Change[a]
	GPDC	Comparison	GPDC	Comparison	
Number of beneficiaries	844,766	844,767	281,589	281,589	-
Total person-months	9,961,557	9,961,511	3,320,884	3,320,865	-
Months of alignment (mean ± SD)	11.8 ± 1.2	11.8 ± 1.2	11.8 ± 1.1	11.8 ± 1.1	-
Demographics					
Age (mean ± SD)	74.5 ± 9.8	74.5 ± 9.9	74.5 ± 9.8	74.5 ± 9.9	0.001
Sex (%)					
Female	56.9	56.9	56.9	56.9	0.000
Male	43.1	43.1	43.1	43.1	0.000
Race/Ethnicity (%)					
White	81.7	81.7	81.7	81.7	0.002
Black/African-American	6.3	6.3	6.3	6.3	0.000
Hispanic	6.5	6.5	6.5	6.5	-0.001
Asian/Pacific Islander	2.2	2.2	2.2	2.2	0.000

[48] Kim DH, Schneeweiss S, Glynn RJ, Lipsitz LA, Rockwood K, Avorn J. Measuring frailty in Medicare data: development and validation of a claims-based frailty index. The Journals of Gerontology: Series A. 2018 Jun 14;73(7):980-7.

	Baseline Years (2018-2020)		Performance Year (2021)		Differential Change[a]
	GPDC	Comparison	GPDC	Comparison	
Other/Unknown	3.3	3.3	3.3	3.3	0.000
Health Care Coverage (%)					
Disabled with or without ESRD	7.8	7.8	7.8	7.8	-0.001
Any dual eligibility	12.4	12.4	12.4	12.4	-0.001
Any Part D coverage	74.3	74.1	76.2	75.7	0.240*
Previously enrolled in MA	0.6	0.6	0.6	0.6	0.000
Clinical Characteristics					
Number of chronic conditions (mean ± SD)	6.1 ± 3.6	6.1 ± 3.7	6.1 ± 3.6	6.1 ± 3.6	-0.001
Endocrine conditions (%)	85.4	85.4	85.4	85.4	0.002
Vascular disease (%)	75.0	75.0	75.0	75.0	0.001
Rheumatoid conditions (%)	44.6	44.6	44.6	44.6	0.001
Eye conditions (%)	37.0	37.1	37.1	37.1	0.000
Cardiac conditions (%)	32.1	32.1	32.1	32.1	0.001
Behavioral health conditions (%)	29.7	29.7	29.7	29.7	0.002
Obesity (%)	25.5	25.5	25.5	25.5	0.002
Chronic pain disorders (%)	22.9	22.9	22.9	22.9	-0.001
Respiratory conditions (%)	21.2	21.2	21.2	21.2	0.000
Chronic kidney disease (%)	19.8	19.8	19.8	19.8	0.001
Had long-term care stay in prior year (%)	1.7	1.7	1.7	1.7	0.001
Community Characteristics					
Census Region (%)					
Northeast	44.2	43.8	44.5	44.9	-0.753***
Midwest	20.7	21.6	19.9	20.5	0.292**
South	28.6	27.7	29.0	27.8	0.383***
West	5.1	5.1	5.2	5.1	0.072
Rurality (%)	3.7	5.2	3.5	5.2	-0.156***
Area Deprivation Index (ADI; %)					
Percent of aligned beneficiaries with ADI score of 1-25 (lowest socioeconomic disadvantage)	29.0 ± 45.4	29.9 ± 45.8	29.5 ± 45.6	30.4 ± 46.0	0.001
Percent of aligned beneficiaries with ADI score of 26-50	33.1 ± 47.1	32.1 ± 46.7	33.3 ± 47.1	32.1 ± 46.7	0.001
Percent of aligned beneficiaries with ADI score of 51-75	21.6 ± 41.1	20.6 ± 40.4	22.4 ± 41.7	21.8 ± 41.3	-0.004***
Percent of aligned beneficiaries with ADI score of 76-100 (highest socioeconomic disadvantage)	13.1 ± 33.7	0.138 ± 0.345	13.8 ± 34.5	14.6 ± 35.3	0.000

	Baseline Years (2018-2020)		Performance Year (2021)		Differential Change[a]
	GPDC	Comparison	GPDC	Comparison	
Percent below poverty line (mean ± SD)	11.8 ± 7.4	11.9 ± 7.5	11.0 ± 6.8	11.0 ± 6.9	0.005
Percent population aged 25+ with college or higher degree (mean ± SD)	34.3 ± 16.0	34.5 ± 16.8	35.7 ± 16.4	35.9 ± 16.8	0.050
Participation in Other Alternative Payment Models (%)					
BPCI or BPCI Advanced Initiatives	2.3	2.2	0.5	1.9	-1.485***
CJR Model	0.4	0.4	0.2	0.2	0.005
CEC Model	0.1	0.1	0.0	0.1	-0.055***
CPC+ or PCF Model	15.1	12.8	14.0	14.8	-3.148***
FAI	0.4	0.2	0.4	0.2	-0.020
IAH Demonstration	0.0	0.0	0.0	0.0	0.000
NGACO Model	5.0	4.2	0.0	3.1	-4.011***
OCM	0.8	0.9	0.5	0.6	0.041*
Shared Savings Program	44.5	40.4	0.0	40.3	-44.354***
COVID-19 Beneficiary Care					
Outpatient COVID-19 diagnosis (%)	1.1	1.1	5.8	5.9	0.004
Acute care hospital admission for COVID-19 diagnosis (%)	0.2	0.2	0.7	0.8	-0.040*
ICU admission for COVID-19 diagnosis (%)	0.2	0.2	0.7	0.7	-0.064***
COVID-19 Community Characteristics					
COVID-19 case rate (mean ± SD)	6.2 ± 9.8	6.2 ± 9.6	29.5 ± 6.6	29.5 ± 6.7	-0.055**
COVID-19 mortality rate (mean ± SD)	0.1 ± 0.2	0.1 ± 0.2	0.4 ± 0.2	0.4 ± 0.2	0.001*
COVID-19 case-fatality rate (mean ± SD)	1.1 ± 1.9	1.1 ± 2.0	1.7 ± 0.7	1.7 ± 0.7	-0.005
COVID vaccination rate (mean ± SD)	N/A	N/A	38.9 ± 7.5	38.8 ± 7.3	0.128***
COVID Community Vulnerability Index (mean ± SD)	0.2 ± 0.3	0.2 ± 0.3	0.6 ± 0.2	0.6 ± 0.2	-0.002**

SOURCE: NORC analysis of 2018-2021 Medicare claims and enrollment data, American Community Survey data, Pandemic Vulnerability Index data, Area Health Resources File data, Rural Urban Commuting Area Codes, American Hospital Association annual surveys.

NOTES: *p<0.10; **p<0.05; ***p<0.01. SD = standard deviation; ESRD = end-stage renal disease; ICU = intensive care unit; HPSA = health professional shortage area; BPCI = Bundled Payments for Care Improvement; MA = Medicare Advantage; CPC+ = Comprehensive Primary Care Plus; PCF = Primary Care First; FAI = Financial Alignment Initiative; IAH = Independence at Home; CJR = Comprehensive Care for Joint Replacement; NGACO = Next Generation ACO; CEC = Comprehensive ESRD Care; OCM = Oncology Care Model. [a] The change between GPDC and comparison groups and baseline to performance years.

Exhibit G.15. Descriptive Characteristics of Beneficiaries Aligned to New Entrant DCEs, 2018-2021

	Baseline Years (2018-2020)		Performance Year (2021)		Differential Change[a]
	GPDC	Comparison	GPDC	Comparison	
Number of beneficiaries	126,588	126,588	42,196	42,196	-
Total person-months	1,484,228	1,484,269	494,770	494,767	-
Months of alignment (mean ± SD)	11.7 ± 1.0	11.7 ± 1.4	11.7 ± 1.2	11.7 ± 1.2	-
Demographics					
Age (mean ± SD)	74.5 ± 9.0	74.4 ± 9.9	74.5 ± 9.7	74.5 ± 9.9	-0.029
Sex (%)					
Female	60.0	60.0	60.0	60.0	-0.001
Male	40.5	40.5	40.5	40.5	-0.001
Race/Ethnicity (%)					
White	74.0	74.0	74.0	74.0	0.003
Black/African-American	10.6	10.6	10.6	10.6	0.001
Hispanic	7.8	7.8	7.8	7.8	0.000
Asian/Pacific Islander	4.7	4.7	4.7	4.7	-0.001
Other/Unknown	2.9	2.9	2.9	2.9	-0.003
Health Care Coverage (%)					
Disabled with or without ESRD	7.6	7.6	7.6	7.6	-0.002
Any dual eligibility	16.9	16.9	16.8	16.9	-0.006
Any Part D coverage	73.9	74.4	75.5	75.3	0.763*
Previously enrolled in MA	1.5	1.5	1.5	1.5	0.000
Clinical Characteristics					
Number of chronic conditions (mean ± SD)	6.4 ± 3.0	6.4 ± 3.8	6.4 ± 3.8	6.4 ± 3.8	0.002
Endocrine conditions (%)	84.5	84.5	84.5	84.5	0.003
Vascular disease (%)	75.3	75.3	75.3	75.3	-0.001
Rheumatoid conditions (%)	46.7	46.7	46.7	46.7	0.002
Eye conditions, (%)	35.2	35.2	35.2	35.2	0.002
Cardiac conditions (%)	33.4	33.4	33.4	33.4	0.003
Behavioral health conditions (%)	32.6	32.6	32.6	32.6	-0.001
Obesity (%)	27.7	27.7	27.7	27.7	0.002
Chronic pain disorders (%)	24.2	24.2	24.2	24.2	0.000
Respiratory conditions (%)	23.9	23.9	23.9	23.9	0.000

	Baseline Years (2018-2020)		Performance Year (2021)		Differential Change[a]
	GPDC	Comparison	GPDC	Comparison	
Chronic kidney disease (%)	23.7	23.7	23.7	23.7	0.000
Had long-term care stay in prior year (%)	3.2	3.2	3.2	3.2	0.000
Community Characteristics					
Census Region (%)					
Northeast	11.5	13.1	11.5	13.1	-0.013
Midwest	37.8	36.5	38.1	37.7	-0.957**
South	41.3	41.4	39.7	39.4	0.374
West	4.0	3.7	5.5	4.6	0.436**
Rurality (%)	1.8	1.3	1.8	1.3	-0.003
Area Deprivation Index (ADI; %)					
Percent of aligned beneficiaries with ADI score of 1-25 (lowest socioeconomic disadvantage)	30.2 ± 45.9	31.8 ± 46.6	29.2 ± 45.5	31.6 ± 46.5	-0.008*
Percent of aligned beneficiaries with ADI score of 26-50	35.8 ± 47.9	34.1 ± 47.4	37.5 ± 48.4	35.5 ± 47.9	0.002
Percent of aligned beneficiaries with ADI score of 51-75	18.4 ± 38.7	18.0 ± 38.4	19.8 ± 39.9	18.9 ± 39.2	0.005
Percent of aligned beneficiaries with ADI score of 76-100 highest socioeconomic disadvantage)	11.9 ± 32.3	12.0 ± 32.6	12.6 ± 33.2	12.7 ± 33.3	0.001
Percent below poverty line (mean ± SD)	13.2 ± 8.0	13.4 ± 8.5	11.9 ± 7.2	12.2 ± 7.7	-0.116*
Percent population aged 25+ with college or higher degree (mean ± SD)	31.2 ± 15.0	32.2 ± 17.3	31.9 ± 14.7	33.2 ± 17.0	-0.226*
Participation in Other Alternative Payment Models (%)					
BPCI or BPCI Advanced Initiative	1.8	2.0	0.43	2.2	-1.592***
CJR Model	1.0	2.0	0.4	2.2	-0.006
CEC Model	0.0	0.2	0.0	0.2	-0.192***
CPC+ or PCF Model	2.0	2.8	0.0	4.9	-3.047***
FAI	0.0	0.0	0.0	0.0	-0.006
IAH Demonstration	0.0	0.0	0.0	0.0	0.000
NGACO Model	14.0	8.7	0.0	5.7	0.000
OCM	1.3	1.3	0.9	0.9	-0.028
Shared Savings Program	30.0	35.8	0.0	37.7	0.000

	Baseline Years (2018-2020)		Performance Year (2021)		Differential Change[a]
	GPDC	Comparison	GPDC	Comparison	
COVID-19 Beneficiary Care (%)					
Outpatient COVID-19 diagnosis	1.4	1.4	6.4	5.8	0.561***
Acute care hospital admission for COVID-19 diagnosis	0.2	0.2	0.7	0.7	0.033
ICU admission for COVID-19 diagnosis	0.3	0.3	1.0	1.0	-0.035
COVID-19 Community Characteristics					
COVID-19 case rate (mean ± SD)	6.5 ± 9.0	6.6 ± 9.9	30.1 ± 6.7	30.0 ± 6.7	0.140**
COVID-19 mortality rate (mean ± SD)	0.1 ± 0.0	0.1 ± 0.2	0.4 ± 0.2	0.4 ± 0.2	-0.013***
COVID-19 case-fatality rate (mean ± SD)	1.0 ± 1.0	1.0 ± 1.7	1.7 ± 0.5	1.7 ± 0.6	-0.030***
COVID vaccination rate (mean ± SD)	0.0 ± 0.0	0.0 ± 0.0	36.4 ± 6.9	37.0 ± 6.1	-0.573***
COVID Community Vulnerability Index (mean ± SD)	0.3 ± 0.0	0.3 ± 0.4	0.8 ± 0.2	0.8 ± 0.2	0.005**

SOURCE: NORC analysis of 2018-2021 Medicare claims and enrollment data, American Community Survey data, Pandemic Vulnerability Index data, Area Health Resources File data, Rural Urban Commuting Area Codes, American Hospital Association annual surveys.

NOTES: *p<0.10; **p<0.05; ***p<0.01. SD = standard deviation; ESRD = end-stage renal disease; ICU = intensive care unit; HPSA = health professional shortage area; BPCI = Bundled Payments for Care Improvement; MA = Medicare Advantage; CPC+ = Comprehensive Primary Care Plus; PCF = Primary Care First; FAI = Financial Alignment Initiative; IAH = Independence at Home; CJR = Comprehensive Care for Joint Replacement; NGACO = Next Generation ACO; CEC = Comprehensive ESRD Care; OCM = Oncology Care Model. [a] The change between GPDC and comparison groups and baseline to performance years.

Exhibit G.16. Unadjusted Spending, Utilization, and Quality of Care Outcomes for Standard DCEs, 2018-2021

	Baseline Years (2018-2020)				Performance Year (2021)			
	GPDC		Comparison		GPDC		Comparison	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Spending ($ PBPY)[a]								
Total Medicare spending (Parts A and B)	$11,244	$23,111	$11,734	$23,962	$11,953	$24,175	$12,490	$25,249
Acute care setting	$3,054	$11,258	$3,195	$11,767	$3,070	$12,066	$3,265	$12,677
OP facility	$1,586	$4,968	$1,753	$5,394	$1,783	$5,589	$1,981	$6,073
SNF	$751	$4,757	$803	$5,042	$731	$4,816	$801	$5,249
IRF and LTCH	$370	$4,079	$375	$4,046	$381	$4,190	$400	$4,283
Professional services	$3,010	$6,106	$2,999	$6,209	$3,252	$6,638	$3,232	$6,670
Primary care visits	$527	$796	$532	$834	$614	$838	$609	$890
Specialty care visits	$200	$362	$211	$378	$230	$414	$242	$428

	Baseline Years (2018-2020)				Performance Year (2021)			
	GPDC		Comparison		GPDC		Comparison	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Home health	$578	$2,310	$613	$2,406	$547	$2,207	$597	$2,352
Hospice	$313	$3,267	$328	$3,375	$370	$3,550	$377	$3,627
Utilization (per 1,000 BPY)								
Acute care hospitalizations	202	648	213	676	190	619	202	650
Acute care length of stay (days)	1226	4899	1304	5242	1240	5330	1319	5397
ED visits and observation stays	371	1026	401	1141	341	970	373	1119
IRF and LTCH days	215	2388	221	2442	211	2345	222	2427
SNF days	1418	9103	1492	9375	1306	8651	1399	9056
Home health episodes[b]	307	1242	331	1310	294	1195	325	1289
Continuous hospice days prior to death[c]	24	56	25	57	26	60	25	59
Quality of Care (per 1,000 BPY)								
All-condition readmissions[d]	156	363	162	369	162	368	171	376
Mortality	24	152	24	152	29	167	28	166
ACSC hospitalizations	24	153	25	155	18	131	19	136
Timely follow-up[e]	822	383	805	396	816	387	794	405

SOURCE: NORC team analysis of 2018-2021 Medicare claims and enrollment data.

NOTES: **Estimates in this table are weighted using entropy balance weights but not regression-adjusted.** [a]Total spending and all spending categories are top coded at 99.9th percentile by DCE market and year. [b]Home health episodes are top coded at 14. [c]Continuous hospice days prior to death is presented as PBPY for DID estimates and 90% CI. Eligible population for continuous hospice days prior to death are decedents only. [d] Eligible population for all-condition readmissions are beneficiaries with index hospitalizations. [e]Eligible population for timely follow-up are beneficiaries with one or more acute events related to one of six chronic conditions (hypertension, asthma, heart failure, coronary artery disease, chronic obstructive pulmonary disease, diabetes). PBPY = per beneficiary per year; BPY = beneficiaries per year; SD = standard deviation; ED = emergency department; ACSC = ambulatory care sensitive condition; SNF = skilled nursing facility; IRF = inpatient rehabilitation facility; LTCH = long-term care hospital; OP = outpatient.

Exhibit G.17. Unadjusted Spending, Utilization, and Quality of Care Outcomes for New Entrant DCEs, 2018-2021

	Baseline Years (2018-2020)				Performance Year (2021)			
	GPDC		Comparison		GPDC		Comparison	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Spending ($ PBPY) [a]								
Total Medicare spending (Parts A and B)	$12,555	$25,021	$12,910	$25,717	$13,187	$25,371	$13,708	$26,512
Acute care setting	$3,333	$12,332	$3,580	$13,009	$3,284	$12,718	$3,621	$13,535
OP facility	$1,512	$4,977	$1,699	$5,336	$1,628	$5,438	$1,865	$5,822
SNF	$856	$5,267	$913	$5,490	$853	$5,456	$947	$5,826
IRF and LTCH	$344	$3,801	$379	$4,095	$337	$3,769	$368	$4,119
Professional services	$3,302	$6,576	$3,275	$6,540	$3,646	$7,169	$3,619	$7,369
Primary care visits	$593	$861	$596	$880	$651	$893	$670	$931
Specialty care visits	$213	$367	$222	$379	$236	$400	$248	$415
Home health	$717	$2,679	$701	$2,581	$731	$2,753	$688	$2,581
Hospice	$667	$5,184	$499	$4,286	$743	$5,461	$582	$4,772
Utilization (per 1,000 BPY)								
Acute care hospitalizations	223	709	235	732	209	677	225	700
Acute care length of stay (days)	1369	5371	1456	5570	1364	5536	1479	5838
ED visits and observation stays	425	1348	436	1234	368	993	399	1096
IRF and LTCH days	199	2242	220	2482	181	1988	202	2318
SNF days	1541	9358	1655	9866	1472	9241	1612	9732
Home health episodes[b]	373	1387	375	1394	376	1392	361	1346
Continuous hospice days prior to death[c]	35	69	28	62	35	72	32	70
Quality of Care (per 1,000 BPY)								
All-condition readmissions[d]	163	369	170	376	168	374	177	381
Mortality	30	172	30	171	35	183	37	188
ACSC hospitalizations	26	159	28	165	20	139	21	144
Timely follow-up[e]	796	403	803	398	805	396	798	402

SOURCE: NORC team analysis of 2018-2021 Medicare claims and enrollment data.

NOTES: **Estimates in this table are weighted using entropy balance weights but not regression-adjusted.** [a]Total spending and all spending categories are top coded at 99.9th percentile by DCE market and year. [b]Home health episodes are top coded at 14. [c]Continuous hospice days prior to death is presented as PBPY for DID estimates and 90% CI. Eligible population for continuous hospice days prior to death are decedents only. [d]Eligible population for all-condition readmissions are beneficiaries with index hospitalizations. [e]Eligible population for timely follow-up are beneficiaries with one or more acute events related to one of six chronic conditions (hypertension, asthma, heart failure, coronary artery disease, chronic obstructive pulmonary disease, diabetes). PBPY = per beneficiary per year; BPY = beneficiaries per year; SD = standard deviation; ED = emergency department; ACSC = ambulatory care sensitive condition; SNF = skilled nursing facility; IRF = inpatient rehabilitation facility; LTCH = long-term care hospital; OP = outpatient.

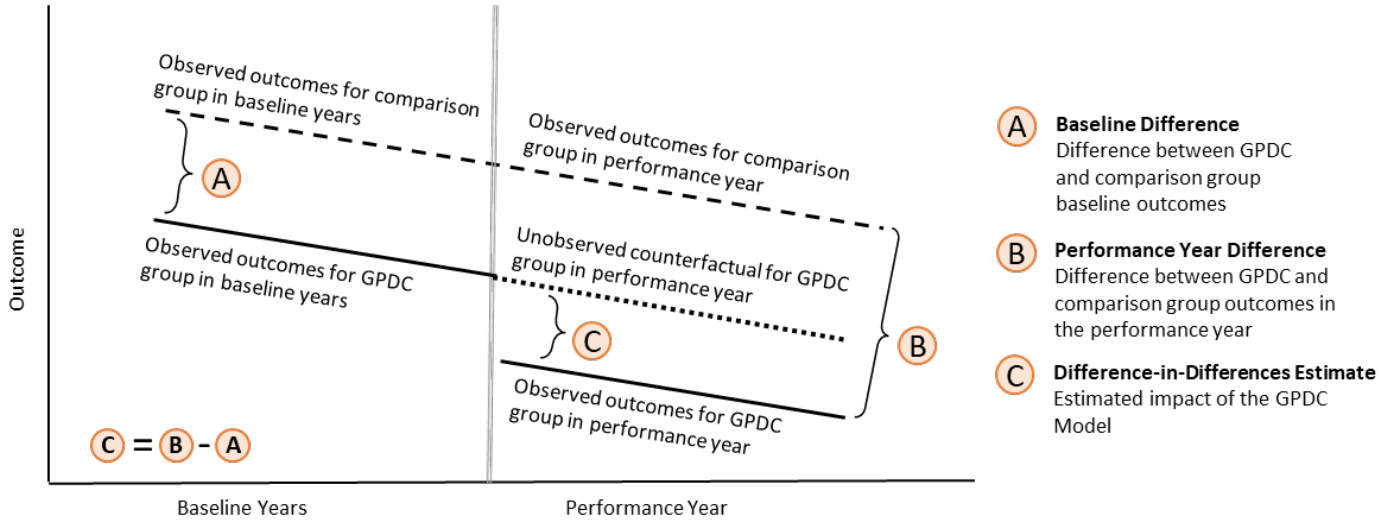
G.3 Analytic Approach to Estimate Impacts for Standard and New Entrant DCEs

For Standard and New Entrant DCEs in the GPDC Model's first performance year, we used a difference-in differences (DID) design to assess how the GPDC Model's providers in each DCE type impacted Medicare spending, utilization, and quality of care outcomes for their beneficiaries in PY 2021, relative to a comparison group and three preceding pre-intervention ("baseline") years (**Exhibit G.18**). By observing the outcomes among GPDC and comparison beneficiaries before and after model launch, we can estimate the expected outcomes for GPDC beneficiaries in the absence of the GPDC Model (also known as the untreated counterfactual) by continuing baseline trends for GPDC beneficiaries into PY 2021. The impact of the GPDC Model is the difference between the untreated counterfactual and the observed outcomes in PY 2021. DID regression models were run separately for each DCE, then pooled to estimate a single impact for each DCE type.

The DID design requires the following key assumptions:

- **Unobserved factors affect the treatment and comparison groups similarly**. If observed characteristics between the GPDC and comparison group are correlated with unobserved characteristics between the two groups, using entropy balancing weights mitigate biases that may result from unobserved differences influencing outcomes between the two groups. For instance, we do not observe beneficiary-level income; however, by using ZCTA-level median income in our entropy balancing weights, we aim to mitigate bias potentially arising from income differences between the GPDC and comparison groups.
- **The change in outcomes over the baseline years are parallel between the treatment and comparison groups**. We tested this assumption by comparing trends for GPDC beneficiaries with trends for comparison beneficiaries in the baseline years (2018-2020) below.

Exhibit G.18. DID Design to Estimate the GPDC Model's Treatment Effect



NOTES: GPDC = Global and Professional Direct Contracting. The unobserved counterfactual is the expected outcomes for the GPDC group in the performance year absent the GPDC model.

Performance and Baseline Years in DID Design

For PY 2021 analyses, the baseline years were the three preceding calendar years (2018-2020). The evaluation's three-year baseline of 2018-2020 diverges from the model's financial benchmarking methodology, which uses 2017-2019 as the baseline for all cohorts in PY 2021[49] to limit direct effects of the COVID-19 pandemic in 2020.[50] We included 2020 in the baseline because:

- **We could capture a baseline for providers newer to serving FFS Medicare beneficiaries, particularly among New Entrant DCEs.**[51] We included DCEs with adequate data in all baseline years in our analyses. By using the most recent three years, we lose fewer providers from the GPDC and comparison performance year panels and can better capture providers who began to serve FFS beneficiaries more recently.

[49] For more details on the model's financial benchmarking methodology, see: Global and Professional Direct Contracting Model Financial Operating Guide: Overview.

[50] Including 2017 as a baseline year is also challenging due to the update to the chronic conditions algorithms in the Chronic Conditions Data Warehouse (CCW) in 2017. Because of this change, the 2017 prospective chronic conditions flags (that is, flags using 2016 data) are not comparable to prospective chronic conditions flags in 2018 and beyond.

[51] "Not more than 50% of the DC Participant Providers in a New Entrant DCE may have prior experience in the Shared Savings Program, the Next Generation ACO Model, the Comprehensive ESRD Care Model, or the Pioneer ACO Model. Organizations found ineligible to participate as New Entrant DCEs on the basis of this criterion will have the opportunity to participate as a Standard DCE, provided all other model requirements are met. New Entrant DCEs may not have more than 3,000 beneficiaries that are 'alignable' through claims-based alignment in any of the baseline years (CY 2017, CY 2018, and CY 2019), as this suggests that the organization has significant experience serving Medicare FFS beneficiaries." Taken from: Direct Contracting Model: Global and Professional Options, Request for Applications; 11/25/19.

- **We observed no violation of parallel trends in the baseline years for total spending in the GDPC and comparison groups when including 2020.**[52] Because baseline trends are parallel (similar between the two groups), we would expect to observe very similar spending impacts if 2020 were excluded from the baseline years.
- **We believe that 2020 is an important data point** that may reflect changes in care seeking behaviors and practice patterns that are sustained into the model's performance years when COVID-19 is expected to be endemic and, thus, might be more comparable to the performance years than years before COVID-19.
- **We anticipated that community-level COVID-19 effects in 2020 should be similar between GPDC and comparison beneficiaries,** as our comparison beneficiaries are selected from the same geographic areas (that is, hospital referral regions [HRRs]) as GPDC beneficiaries. We also conducted sensitivity analyses to assess the extent to which the GPDC and comparison group beneficiaries were impacted by COVID-19 and compared trends in observable COVID-19 related metrics (for example, community-level cases, mortality, and case fatality rates). The sensitivity checks indicated that our total spending impact estimates for Standard and New Entrant DCEs were robust to controlling for community-level COVID-19 mortality.

Exhibit **G**.19 presents the results of a sensitivity analysis conducted to assess the effect of the COVID-19 PHE on the impact estimates. In this analysis, we included the total COVID-19 deaths per 1,000 population as a county-level covariate in the DID regression model. We found no meaningful differences between the model without COVID-19 adjustment ("Main") and the model adjusted for COVID-19 deaths ("Sensitivity"); all results are non-significant, and inclusion of the COVID-19 covariate does not change the direction of the impact. This is an expected result because our comparison group is drawn from the same geographic area as the treatment group; thus, we would not expect additional county-level adjustment for COVID-19 to meaningfully change our findings.

[52] To assess the assumption of parallel trends, we tested whether the differences in GPDC and comparison groups in 2020 (the baseline year prior to the performance year) versus the differences in first two baseline years (2018 and 2019) were jointly statistically indistinguishable from zero using a joint F-test; this test indicated that trends between the GPDC and comparison groups were parallel in the baseline years.

Exhibit G.19. Sensitivity Analysis for Total Gross Medicare Spending: COVID-19 Public Health Emergency Adjustment, PY 2021

Type	Number of GPDC Beneficiaries	Analysis	PBPY Impact Estimate (90% CI)	Aggregate Impact Estimate (90% CI)	% Impact
Standard	281,589	Main	-$17.55 (-$103.25, $68.15)	-$4,941,909 (-$29,074,979, $19,191,161)	-0.15
		Sensitivity	-$3.47 (-$89.35, $82.41)	-$976,447 (-$25,159,579, $23,206,686)	-0.03
New Entrant	42,196	Main	-$166.14 (-$429.28, -$97.00)	-$7,010,466 (-$18,113,776, $4,092,884)	-1.26
		Sensitivity	-$202.91 (-$467.74, $61.93)	-$8,561,871 (-$19,736,735, $2,612,992)	-1.52

- **SOURCE**: NORC team analysis of 2018-2021 Medicare claims and enrollment data.
- **NOTES:** Estimates in this table are weighted and regression-adjusted. COVID-19 public health emergency adjustment includes using total deaths per 1,000 population in county as a covariate. ***p<0.01, **p<0.05, *p<0.1. PBPY = per beneficiary per year; CI = confidence interval.

DID Model Specification and Key Covariates

We estimated DID models separately for each DCE relative to its comparison group. We then pooled the DCE-level estimates to obtain the model's impact on spending, utilization, and quality of care outcomes in PY 2021 separately for Standard DCEs and New Entrant DCEs, relative to their counterfactual. We established the counterfactual by determining baseline years[53] (2018-2020) for all DCEs and a balanced beneficiary comparison group,[54] assuming parallel trends in the groups' outcomes within the DID estimation framework. The GPDC treatment effect for each DCE type reflects the marginal effect of the model over incentives that existed in the baseline period for its associated providers, relative to the comparison group. We estimated the treatment effect in our DID model as an interaction term capturing the relative change in average spending between treatment and comparison groups from the baseline years to PY 2021. We included year fixed effects to account for observed trends in Medicare spending for beneficiaries in this evaluation.

[53] The baseline period for each DCE is defined as the three years prior to the DCE beginning in the model, on a rolling basis. For PY 2021 DCEs, baseline years are 2018-2020; for DCEs that start in PY 2022, baseline years will be 2019-2021, and for DCEs that start in PY 2021, baseline years will be 2020-2022.

[54] Comparison group beneficiaries represent beneficiaries in the same markets as treatment group beneficiaries who receive services from non-GPDC providers. Comparison group beneficiaries and DCE baseline beneficiaries were balanced to be like the DCE beneficiaries in the PY on observed characteristics, including beneficiary demographics and clinical characteristics and market characteristics. The EB process is described previously in Appendix G.1.2. In the PY, comparison group beneficiaries are prospectively claims-aligned to comparison providers, which are non-GPDC providers. PY comparison providers are then followed back to the BYs for prospective claims-alignment of comparison beneficiaries in the BYs. For additional detail on how beneficiaries were aligned to the BYs and PY 2021 treatment and comparison groups, please see Appendix G.1.1.

Our model within the DID framework for estimating impact in a given DCE and a given performance year, adjusting for beneficiary and community (ZIP code-level) characteristics, with year and market (HRR) fixed effects, as well as time-varying market effect, was specified as:

$$g\left[E\left(Y_{injkt}\right)\right] = \beta_0 + \beta_1 DCE_j + \theta_1 DCE_j * PY_t + \Upsilon Patient_{injkt} + \Lambda Community_{njkt} + \mathrm{T} Year_t + \Omega Market_k + \mathrm{K} Market_k * Year_t$$

Wherein:

- Y_{injkt} is the outcome for the beneficiary i in DCE or comparison group j, residing in community n, in market (HRR) k and year t. We modeled Y with appropriate distributional form and link function $g(.)$, for each spending, utilization, or quality of care outcome (**Exhibit G.20**).
- DCE_j is the binary indicator for being in the DCE group in either performance year or baseline years. It is set to the value of "1" if the beneficiary is aligned with a DCE Participant Provider (and "0" otherwise). The coefficient β_1 captures the mean of the difference between the DCE and comparison groups that is constant over time.
- Coefficient θ_1 is the DID estimate for $DCE_j * PY_t$, the indicator for being in the DCE group in a given performance year of the GPDC Model.
- $Patient$ and $Community$ are sets of beneficiary and community characteristics with coefficient sets Υ and Λ, respectively.
- $Year_t$, $Market_k$, $and\ Market_k * Year_t$ are yearly fixed effects, market fixed effect and time-varying market effects, with coefficient sets $\mathrm{T}, \Omega, \mathrm{and}\ \mathrm{K}$, respectively.

Impacts at the DCE-level were adjusted for the following characteristics:

- **Beneficiary-level covariates** included age (and the square of age), sex, race/ethnicity, disability, ESRD status, dual eligibility, Part D coverage, number of months of alignment in the year, disease burden at the end of the preceding year (using 25 clinical domain indicators representing for 66 chronic conditions), MA enrollment in the preceding year, and long-term care stay (>100 days) in the preceding year.
- **Community-level covariates** included beneficiary residence in metropolitan area, percentile of ZIP code-level Medicare primary care providers and alignment eligible specialists per 1,000 Medicare FFS population in 10 miles, percentile of ZIP code-level population age 25 years or older with a college or higher degree, percentile of ZIP code-level median household income, percentile of ZIP code-level poverty rate, HPSA category for primary care, and HPSA category for mental health care.
- **Market-level covariates** included indicators for each HRR and interactions for HRR and years to account for both time-invariant and time-varying market factors.

Statistical Model Specifications

Exhibit G.20 summarizes the distributional assumptions and link functions used for modeling the 22 claims-based outcome measures for the Standard and New Entrant DCEs in PY 2021. **Appendix H** gives a complete description of how we defined, operationalized, and calculated all outcome measures. Outcome measures for spending and utilization were modeled as continuous variables, using generalized linear models (GLMs). For outcomes where more than 20 percent of the sample had zero values, we used two-part models (TPMs) with a probit or logit model to assess the likelihood of a nonzero outcome and GLM to assess levels of the outcome for those with nonzero outcomes. For spending outcome variables modeled with GLMs or non-zero part in the TPM, we determined the appropriate distributional form using a modified Park test.[55] This test examined the empirical relationship between the mean and the variance to ascertain the appropriate distribution. For utilization variables modeled with GLMs or non-zero part in the TPM, we chose between Poisson and negative binomial distribution based on the dispersion test. The four quality of care measures were modeled as binary measures and therefore used logit models.

Exhibit G.20. PY 2021 Statistical Model Specifications for Outcome Measures

Outcome Measure	Specification
Spending	
Total Medicare spending (Parts A and B)	Generalized linear model (GLM): Poisson distribution and log link
Acute care setting	Two-part model (TPM): first part probit; second part GLM with gamma distribution and log link
Outpatient facility	TPM: first part probit; second part GLM with gamma distribution and log link
SNF	TPM: first part probit; second part GLM with gamma distribution and log link
Inpatient rehabilitation facility and long-term care hospital	TPM: first part probit; second part GLM with inverse Gaussian distribution and log link
Professional services	GLM: Poisson distribution and log link
Primary care visits	GLM: gamma distribution and log link
Specialty care visits	TPM: first part probit; second part GLM with gamma distribution and log link
Home health	TPM: first part probit; second part GLM with gamma distribution and log link
Hospice	TPM: first part probit; second part GLM with Poisson distribution and log link
Utilization	
Acute care hospitalizations	TPM: first part probit; second part GLM with negative binomial distribution and log link
Acute care length of stay (days)	TPM: first part probit; second part GLM with negative binomial distribution and log link
ED visits and observation stays	TPM: first part probit; second part GLM with negative binomial distribution and log link

[55] Manning W, Mullahy J. Estimating log models: To transform or not to transform? J Health Econ. 2001;20:461–494.

Outcome Measure	Specification
Inpatient rehabilitation facility and long-term care hospital days	TPM: first part probit; second part GLM with negative binomial distribution and log link
SNF days	TPM: first part probit; second part GLM with negative binomial distribution and log link
Home health episodes	TPM: first part probit; second part GLM with negative binomial distribution and log link
Continuous hospice days prior to death	TPM: first part probit; second part GLM with negative binomial distribution and log link
Quality of Care	
All-condition readmissions	Logit
Mortality	Logit
ACSC hospitalizations	Logit
Timely follow-up after acute exacerbation of chronic conditions	Logit

NOTES: E&M = evaluation and management; ED = emergency department; GLM = generalized linear model; SNF = skilled nursing facility; ACSC = ambulatory care sensitive condition; TPM = two-part model.

Pooled Estimation

In our approach to estimating the GPDC Model's impacts, we calculated the model-level impact employing a weighted average of impacts generated from DCE-specific regression models for each DCE type. To aggregate individual DCE impacts to obtain a model-level estimate, we weighted each DCE's impact by the proportion of total model-aligned beneficiaries who are aligned to the DCE:

$$Impact_{DCE1+\cdots+DCEn} = \frac{(Impact_{DCE1}) * \ldots\ldots + (Impact_{DCEn}) * (N_{DCEn})}{N_{D\ldots1+\ldots+DCEn}}$$

For example, if five percent of all aligned beneficiaries were aligned to a DCE with an impact estimate of $45 per beneficiary per year (PBPY) and the remaining beneficiaries were aligned to a DCE with an impact of $20 PBPY, the combined impact of the two DCEs would be ($45 * 0.05) + ($20 * 0.95) = $21.25 PBPY.

Standard errors for the model-level estimates were calculated as a weighted average of the standard errors associated with DCE-level impacts in the performance year included across each DCE type. Standard errors for individual DCE-level estimates were first converted to variances and weighted by the squared proportion of DCE beneficiaries in a given performance year, then converted back to standard error from the combined variance. This approach offered us the advantage of directly computing the model-level impacts from impacts of individual-DCEs for their heterogenous beneficiary populations. We obtained similar model-level impacts from regression models that pooled all DCEs with DCE-level interactions to account for heterogeneity, and clustered standard errors at the DCE-market level.

Assessment of Parallel Baseline Trends

The DID design assumes that time-varying and time-invariant, unobservable factors affect the treatment and comparison groups similarly. A key assumption of the DID design is that the baseline trends (that is, the change in outcomes within the baseline years) are parallel between treatment and comparison groups, which was verified prior to performing the DID analysis. For each level of analysis, we tested whether trends in outcomes between DCE and comparison groups were parallel across the baseline years.

A DID approach attributes statistical evidence of divergence (or convergence) in outcomes between the treatment (GPDC DCE) and comparison groups (non-GPDC beneficiaries in GPDC DCE market areas) after the performance year began as model impacts. The DID estimation method has two main assumptions, detailed below.

The first assumption is often referred to as the *parallel trends* assumption, which states that the time trends in outcome variables would have been the same in the performance year in the absence of the model. Presence of parallel trends in the outcome variable(s) across the two groups in the baseline years serves as a justification for the assumption of parallel trends in the performance year.

The second assumption is one of *no anticipation* effect, which states that the model should not have had any effect on the DCEs in the baseline years. A violation of this assumption would be if the model is found to have a non-zero effect on the DCEs in the baseline years. Any presence of a divergence in the outcomes' trajectory across DCE and comparison groups could constitute a violation of both the *parallel trends* as well as the *no anticipation* assumption. Ignoring such a divergence in the baseline years could result in misattribution of the estimated effect to the model and result in biased estimates of the model's impact.

We assessed the assumption of parallel trends by verifying that there was no prior evidence of divergence/convergence in outcomes in the baseline years. Verifying that there is no empirical evidence of non-parallel trends in the baseline is an important step to support the validity of impacts calculated by DID. As both DID and parallel trend tests are intended to determine evidence of divergence/convergence, our approach to testing the parallel trends assumption mirrors the DID framework to calculate impacts. We verified the assumption of parallel trends for each DCE (**Exhibits G.21** and **G.22**) and model-wide (**Exhibits G.23** and **G.24**) by examining the significance of an interaction term between treatment (GPDC) and baseline year variables, for each outcome measure:

- **Estimating the GPDC Model's effect on outcomes for the baseline years**: We modified the model specification, shown in reduced form without covariates below, dropping performance year data and including treatment effects for the baseline years.

$$g\left[E\left(Y_{imnjkt}\right)\right] = \beta_0 + \beta_1 DCE_j + \delta_1 BY2_t + \delta_2 BY1_t + \theta_{-2} DCE_j * BY2_t + \theta_{-1} DCE_j * BY1_t$$

After estimating this regression for each GPDC DCE type, we tested whether θ_{-2}, and θ_{-1} were jointly statistically different from zero. If yes, we rejected the null hypothesis of no divergence/convergence between the DCE and comparison groups during baseline years for that given outcome. When we found that θ_{-2}, and θ_{-1} are not jointly statistically distinguishable from zero, this combined F test gave us more confidence that any impacts we observe after the model start can be attributed to the GPDC Model.

Exhibits G.21 and G.22 compare pooled model-wide impact estimates from all DCEs and DCEs with parallel baseline trends, for Standard and New Entrant DCEs, respectively. For all outcomes, we show the number of DCEs and percent of beneficiaries in DCEs that failed parallel trends test in the individual DCE-level models. When a DCE failed the parallel trends test for a given outcome, the underlying assumption for the DID model is compromised, bringing into question the credibility of our impact estimate. Therefore, we verified whether model-wide impact estimates were consistent in direction, magnitude, and significance between all DCEs and those DCEs with parallel baseline trends. We observed consistent model-wide impacts for most spending, utilization, and quality of care outcomes among Standard and New Entrant DCEs, with a few exceptions (in **bold**), after excluding DCEs without parallel baseline trends when calculating model-wide impact estimates. This sensitivity is not surprising in the first PY because we have fewer DCEs, and as we have more DCEs/ACOs across later PYs we can expect pooled findings to become robust to excluding few DCEs with non-parallel baseline trends. For Standard DCEs, the impact estimate for outpatient facility spending for DCEs with parallel baseline trends was similar in direction, smaller in magnitude and not statistically significant. For New Entrant DCEs, the impact estimate for primary care visit spending diverged in direction and was significant at p<0.01, while the impact estimate for home health episodes was similar in direction, smaller in magnitude and not statistically significant. We conclude that New Entrant DCEs' impact estimate for primary care visit spending is unclear, as it diverged in its sensitivity check, while other impact estimates for Standard and New Entrant DCEs seem credible.

Exhibit G.21. Impact of GPDC on PBPY Spending, Utilization, and Quality of Care Outcomes, All DCEs vs DCEs with Parallel Baseline Trends, Standard DCEs, PY 2021

Outcome	# DCEs that failed parallel trends	% of Beneficiaries in DCEs that failed parallel trends	All 29 DCEs		Only DCEs with Parallel Trends	
			Impact Estimate	% Impact	Impact Estimate	% Impact
Spending ($ PBPY)[a]						
Total Medicare spending (Parts A and B)	3	8.08	-17.55	-0.15	-15.95	-0.13
Acute care setting	3	6.76	-57.64**	-1.70	-60.98**	-1.78
Outpatient facility	2	9.62	**-25.17***	**-1.35**	**-19.56**	**-1.07**
SNF	1	2.10	-20.41*	-2.33	-22.05*	-2.53
IRF and LTCH	3	15.18	-13.80	-3.29	-12.44	-2.91
Professional services	1	3.28	15.66	0.49	18.63	0.57
Primary care visits	13	45.57	15.46***	2.49	11.24***	1.70
Specialty care visits	7	40.76	2.76***	1.27	2.22**	1.23
Home health	0	0	-14.57***	-2.45	-14.57***	-2.45
Hospice	0	0	9.33	2.16	9.33	2.16

Outcome	# DCEs that failed parallel trends	% of Beneficiaries in DCEs that failed parallel trends	All 29 DCEs		Only DCEs with Parallel Trends	
			Impact Estimate	% Impact	Impact Estimate	% Impact
Utilization (per 1,000 BPY)						
Acute care hospitalizations	2	8.42	-2.48*	-1.18	-3.02**	-1.41
Acute care length of stay (days)	3	10.37	-4.07	-0.29	-10.19	-0.71
ED visits and observation stays	4	16.94	-4.64**	-1.23	-5.75**	-1.54
IRF and LTCH days	1	2.35	-5.89	-2.56	-5.08	-2.27
SNF days	2	4.46	-26.98	-1.72	-26.80	-1.70
Home health episodes[b]	1	9.55	-8.83***	-2.68	-9.72***	-2.88
Continuous hospice days prior to death[c]	2	5.01	0.76	3.21	0.88	3.77
Quality of care (per 1,000 BPY)						
All-condition readmissions[d]	1	2.88	-1.82	-1.14	-1.93	-1.21
Mortality	3	10.74	-0.08	-0.35	-0.09	-0.41
ACSC hospitalizations	3	17.98	-0.61**	-3.46	-0.62*	-3.35
Timely follow-up[e]	3	7.72	4.02	0.50	7.28	0.89

SOURCE: NORC team analysis of 2018-2021 Medicare claims and enrollment data.

NOTES*:* Estimates in this table are weighted and regression-adjusted. [a] Total spending and all spending categories are top coded at 99.9th percentile by DCE market and year. [b]Home health episodes are top coded at 14. [c]Continuous hospice days prior to death is presented as PBPY for DID estimates and 90% CI. Eligible population for continuous hospice days prior to death are decedents only. [d]Eligible population for all-condition readmissions are beneficiaries with index hospitalizations. [e]Eligible population for timely follow-up are beneficiaries with one or more acute events related to one of six chronic conditions (hypertension, asthma, heart failure, coronary artery disease, chronic obstructive pulmonary disorder, diabetes). ***p<0.01, **p<0.05, *p<0.1. PBPY= per beneficiary per year; BPY = beneficiaries per year; ED = emergency department; ACSC = ambulatory care sensitive condition; CI = confidence interval; SNF = skilled nursing facility; IRF = inpatient rehabilitation facility; LTCH = long-term care hospital.

Exhibit G.22. Impact of GPDC on PBPY Spending, Utilization, and Quality of Care Outcomes, All DCEs vs DCEs with Parallel Baseline Trends, New Entrant DCEs, PY 2021

Outcome	# DCEs that failed parallel trends	% Beneficiaries that failed parallel trends	All 15 DCEs		Only DCEs with Parallel Trends	
			Impact Estimate	% Impact	Impact Estimate	% Impact
Spending ($ PBPY)[a]						
Total Medicare spending (Parts A and B)	0	0	-166.14	-1.26	-166.14	-1.26
Acute care setting	0	0	-60.06	-1.82	-60.06	-1.82
Outpatient facility	0	0	-32.49	-1.90	-32.49	-1.90
SNF	2	10.08	-39.02	-4.61	-40.33	-4.80
IRF and LTCH	1	2.37	41.90	11.97	11.68	3.40
Professional services	1	4.41	-7.54	-0.21	-2.76	-0.08
Primary care visits	5	37.86	**-11.10****	**-1.65**	**27.11*****	**3.86**
Specialty care visits	0	0	-0.51	-0.23	-0.51	-0.23

Outcome	# DCEs that failed parallel trends	% Beneficiaries that failed parallel trends	All 15 DCEs		Only DCEs with Parallel Trends	
			Impact Estimate	% Impact	Impact Estimate	% Impact
Home health	0	0	23.40*	3.75	23.40*	3.75
Hospice	1	15.84	-17.14	-3.10	-48.15	-8.06
Utilization (per 1,000 BPY)						
Acute care hospitalizations	1	4.65	-1.84	-0.91	-1.06	-0.52
Acute care length of stay (days)	0	0	5.56	0.42	5.56	0.42
ED visits and observation stays	1	4.65	-10.62*	-2.76	-12.35*	-3.20
IRF and LTCH days	1	2.37	13.05	7.15	5.42	2.97
SNF days	3	12.12	-47.67	-3.26	-42.01	-2.98
Home health episodes[b]	1	2.58	**14.33****	**4.47**	**10.23**	**3.33**
Continuous hospice days prior to death[c]	2	9.29	-4.87	-13.46	-0.58	-1.82
Quality of care (per 1,000 BPY)						
All-condition readmissions[d]	0	0	1.10	0.65	1.10	0.65
Mortality	0	0	-2.15***	-7.07	-2.15***	-7.07
ACSC hospitalizations	4	30.56	0.83	4.39	1.23	6.58
Timely follow-up[e]	1	7.12	7.81	1.01	12.54	1.59

SOURCE: NORC team analysis of 2018-2021 Medicare claims and enrollment data.

NOTES*:* Estimates in this table are weighted and regression-adjusted. [a] Total spending and all spending categories are top coded at 99.9th percentile by DCE market and year. [b]Home health episodes are top coded at 14. [c]Continuous hospice days prior to death is presented as PBPY for DID estimates and 90% CI. Eligible population for continuous hospice days prior to death are decedents only. [d]Eligible population for all-condition readmissions are beneficiaries with index hospitalizations. [e]Eligible population for timely follow-up are beneficiaries with one or more acute events related to one of six chronic conditions (hypertension, asthma, heart failure, coronary artery disease, chronic obstructive pulmonary disorder, diabetes). ***p<0.01, **p<0.05, *p<0.1. PBPY= per beneficiary per year; BPY = beneficiaries per year; ED = emergency department; ACSC = ambulatory care sensitive condition; CI = confidence interval; SNF = skilled nursing facility; IRF = inpatient rehabilitation facility; LTCH = long-term care hospital.

Exhibits G.23 and G.24 present parallel trends test results for selected outcomes from the pooled models for Standard and New Entrant DCEs, respectively. These results also point to the credibility of our pooled mode-level impact estimates. Most key outcomes, particularly total spending, have parallel trends where the p-value of the joint F-test was 0.1 or greater. For ED visits and observation stays which failed parallel trends test in the pooled model, we verified that impacts were consistent for all DCEs and DCEs with parallel baseline trends (**Exhibits** G.21 and G.22).

Exhibit G.23. Parallel Trends Test Results, Standard DCEs, PY 2021

Outcome	Parallel trends test p-value from pooled model
Spending ($ PBPY)[a]	
Total Medicare spending (Part A and B)	0.30
Utilization (per 1,000 BPY)	
Acute care hospitalizations	0.86
ED visits and observation stays	0.0005
SNF days	0.16
Quality of care (per 1,000 BPY)	
All-condition readmissions[b]	0.41
Mortality	0.75
ACSC hospitalizations	0.11
Timely follow-up[c]	0.10

SOURCE: NORC team analysis of 2018-2021 Medicare claims and enrollment data.

NOTE: [a]PBPY denotes per beneficiary per year. Total spending and all spending categories are top coded at 99.9th percentile by ACO market and year. [b]Eligible population for all-condition readmissions are beneficiaries with index hospitalizations. [c]Eligible population for timely follow-up are beneficiaries with one or more acute events related to one of six chronic conditions (hypertension, asthma, HF, CAD, COPD, diabetes). ***p<0.01, **p<0.05, *p<0.1. BPY = beneficiaries per year; ED = emergency department; ACSC = ambulatory care sensitive condition; SNF = skilled nursing facility.

Exhibit G.24. Parallel Trends Test Results, New Entrant DCEs, PY

Outcome	Parallel trends test p-value from pooled model
Spending ($ PBPY)[a]	
Total Medicare spending (Part A and B)	0.18
Utilization (per 1,000 BPY)	
Acute care hospitalizations	0.73
ED visits and observation stays	0.13
SNF days	0.81
Quality of care (per 1,000 BPY)	
All-condition readmissions[b]	0.99
Mortality	0.53
ACSC hospitalizations	0.93
Timely follow-up[c]	0.96

SOURCE: NORC team analysis of 2018-2021 Medicare claims and enrollment data.

NOTE: D0013 (Vively Health), D0027 (On Belay Health Solutions, LLC), and D0098 (Perfect Health) were excluded from analyses due to insufficient baseline data. [a]PBPY denotes per beneficiary per year. Total spending and all spending categories are top coded at 99.9th percentile by ACO market and year. [b]Eligible population for all-condition readmissions are beneficiaries with index hospitalizations. [c]Eligible population for timely follow-up are beneficiaries with one or more acute events related to one of six chronic conditions (hypertension, asthma, HF, CAD, COPD, diabetes). ***p<0.01, **p<0.05, *p<0.1. BPY = beneficiaries per year; ED = emergency department; ACSC = ambulatory care sensitive condition; SNF = skilled nursing facility.

Exhibits G.25 and G.26 present detailed impact results for spending, utilization, and quality of care outcomes for PY 2021 Standard and New Entrant DCEs, including mean outcomes in the baseline (2018-2020) and performance (2021) years, and the change from baseline to performance years in the GPDC and comparison groups. The impact estimate, 90% confidence interval, and percent impact are estimated from the DID model.

Exhibit G.25. PY 2021 Impact Results for Spending, Utilization, and Quality of Care Outcomes, Standard DCEs

Outcome	Number of aligned beneficiaries	Comparison			GPDC			Difference-in-Differences			
		Baseline (2018-2020)	PY 2021	Change	Baseline (2018-2020)	PY 2021	Change	Impact Estimate	90% CI		% Impact
Spending ($ PBPY)[a]											
Total Medicare spending (Parts A and B)	281,589	11,803.52	12,231.02	427.50	11,331.73	11,727.11	395.38	-17.55	-103.25	68.15	-0.15
Acute care setting	281,589	3,588.54	3,546.73	-41.81	3,431.18	3,332.93	-98.25	-57.64**	-102.50	-12.78	-1.70
OP facility	281,589	1,828.41	2,032.69	204.29	1,668.50	1,840.47	171.97	-25.17*	-47.06	-3.27	-1.35
SNF	281,589	979.51	946.82	-32.69	907.95	855.69	-52.25	-20.41*	-39.78	-1.03	-2.33
IRF and LTCH	281,589	426.38	443.72	17.34	403.81	406.13	2.32	-13.80	-29.80	2.19	-3.29
Professional services	281,589	3,010.80	3,202.18	191.38	3,018.79	3,226.83	208.04	15.66	-8.93	40.26	0.49
Primary care visits	281,589	533.37	615.97	82.60	537.61	636.23	98.62	15.46***	12.26	18.66	2.49
Specialty care visits	281,589	202.87	232.27	29.40	190.27	220.78	30.51	2.76***	1.41	4.12	1.27
Home health	281,589	667.46	635.05	-32.41	625.60	581.38	-44.22	-14.57***	-22.31	-6.84	-2.45
Hospice	281,589	456.07	455.50	-0.56	433.34	442.08	8.75	9.33	-4.66	23.32	2.16
Utilization (per 1,000 BPY)											
Acute care hospitalizations	281,589	239.55	221.94	-17.61	226.93	207.56	-19.37	-2.48*	-4.74	-0.23	-1.18
Acute care length of stay (days)	281,589	1,537.26	1,499.41	-37.85	1,443.40	1,402.85	-40.55	-4.07	-23.72	15.57	-0.29
ED visits and observation stays	281,589	439.59	408.01	-31.58	408.26	373.76	-34.50	-4.64**	-8.09	-1.18	-1.23
IRF and LTCH days	281,589	249.61	243.51	-6.10	236.13	224.04	-12.09	-5.89	-14.92	3.14	-2.56
SNF days	281,589	1,855.82	1,678.39	-177.42	1,739.57	1,543.52	-196.05	-26.98	-62.37	8.40	-1.72
Home health episodes[b]	281,589	369.53	357.78	-11.75	340.47	321.11	-19.36	-8.83***	-13.19	-4.47	-2.68
Continuous hospice days prior to death[c]	8,080	26.82	25.50	-1.32	24.76	24.35	-0.41	0.76	-0.37	1.89	3.21

Outcome	Number of aligned beneficiaries	Comparison			GPDC			Difference-in-Differences			
		Baseline (2018-2020)	PY 2021	Change	Baseline (2018-2020)	PY 2021	Change	Impact Estimate	90% CI		% Impact
Quality of Care (per 1,000 BPY)											
All-condition readmissions[d]	30,939	164.14	167.73	3.59	156.71	158.38	1.67	-1.82	-5.96	2.31	-1.14
Mortality	281,589	25.48	23.22	-2.26	25.42	23.10	-2.33	-0.08	-0.47	0.30	-0.35
ACSC hospitalizations	281,589	25.01	18.45	-6.56	23.99	17.04	-6.95	-0.61**	-1.08	-0.14	-3.46
Timely follow-up[e]	10,265	803.20	793.41	-9.79	819.18	814.26	-4.92	4.02	-3.55	11.58	0.50

SOURCE: NORC team analysis of 2018-2021 Medicare claims and enrollment data.
NOTES: Estimates in this table are weighted and regression-adjusted. [a]Total spending and all spending categories are top coded at 99.9th percentile by DCE market and year. [b]Home health episodes are top coded at 14. [c]Continuous hospice days prior to death is presented as PBPY for DID estimates and 90% CI. Eligible population for continuous hospice days prior to death are decedents only. [d]Eligible population for all-condition readmissions are beneficiaries with index hospitalizations. [e]Eligible population for timely follow-up are beneficiaries with one or more acute events related to one of six chronic conditions (hypertension, asthma, heart failure, coronary artery disease, chronic obstructive pulmonary disorder, diabetes). ***p<0.01, **p<0.05, *p<0.1. PBPY = per beneficiary per year; ED = emergency department; ACSC = ambulatory care sensitive condition; CI = confidence interval. SNF = skilled nursing facility; IRF = inpatient rehabilitation facility; LTCH = long-term care hospital; OP = outpatient.

Exhibit G.26. PY 2021 Impact Results for Spending, Utilization, and Quality of Care Outcomes, New Entrant DCEs

Outcome	Number of aligned beneficiaries	Comparison			GPDC			Difference-in-Differences			
		Baseline (2018-2020)	PY 2021	Change	Baseline (2018-2020)	PY 2021	Change	Impact Estimate	90% CI		% Impact
Spending ($ PBPY)[a]											
Total Medicare spending (Parts A and B)	42,196	12,950.40	13,523.45	573.05	12,644.25	13,049.92	405.67	-166.14	-429.28	97.00	-1.26
Acute care setting	42,196	3,665.54	3,577.46	-88.09	3,385.32	3,242.89	-142.42	-60.06	-178.12	58.01	-1.82
OP facility	42,196	1,731.99	1,933.10	201.10	1,529.93	1,676.46	146.53	-32.49	-87.88	22.90	-1.90
SNF facility	42,196	908.04	908.46	0.41	850.37	807.39	-42.98	-39.02	-92.93	14.88	-4.61
IRF and LTCH	42,196	565.44	466.80	-98.64	410.06	391.80	-18.26	41.90	-19.04	102.83	11.97
Professional services	42,196	3,285.20	3,566.28	281.08	3,316.44	3,599.30	282.86	-7.54	-82.57	67.49	-0.21
Primary care visits	42,196	606.96	679.21	72.25	601.57	662.25	60.68	-11.10**	-19.90	-2.31	-1.65
Specialty care visits	42,196	209.46	235.37	25.91	198.11	221.34	23.23	-0.51	-4.18	3.17	-0.23
Home health	42,196	662.83	642.52	-20.31	644.80	647.99	3.19	23.40*	0.33	46.47	3.75
Hospice	42,196	486.65	499.02	12.37	529.64	535.53	5.89	-17.14	-63.39	29.11	-3.10
Utilization (per 1,000 BPY)											
Acute care hospitalizations	42,196	234.43	215.99	-18.44	221.33	201.89	-19.44	-1.84	-8.07	4.39	-0.91
Acute care length of stay (days)	42,196	1,493.85	1,448.54	-45.31	1,380.29	1,341.79	-38.50	5.56	-43.26	54.38	0.42
ED visits and observation stays	42,196	437.95	404.72	-33.23	417.59	374.90	-42.69	-10.62*	-20.84	-0.41	-2.76
IRF and LTCH days	42,196	249.77	212.78	-36.99	213.60	195.47	-18.12	13.05	-8.01	34.10	7.15
SNF days	42,196	1,666.95	1,578.83	-88.12	1,553.60	1,416.18	-137.42	-47.67	-141.76	46.41	-3.26
Home health episodes[b]	42,196	348.63	335.07	-13.55	333.96	335.33	1.37	14.33**	2.56	26.11	4.47
Continuous hospice days prior to death[c]	1,464	32.11	34.67	2.55	33.79	31.30	-2.49	-4.87	-10.05	0.31	-13.46

Outcome	Number of aligned beneficiaries	Comparison			GPDC			Difference-in-Differences			
		Baseline (2018-2020)	PY 2021	Change	Baseline (2018-2020)	PY 2021	Change	Impact Estimate	90% CI		% Impact
Quality of Care (per 1,000 BPY)											
All-condition readmissions[d]	4,750	169.64	174.56	4.93	163.99	169.56	5.57	1.10	-10.59	12.78	0.65
Mortality	42,196	32.56	30.13	-2.43	32.50	28.21	-4.29	-2.15***	-3.47	-0.82	-7.07
ACSC hospitalizations	42,196	28.98	20.68	-8.30	26.75	19.76	-6.99	0.83	-0.64	2.30	4.39
Timely follow-up[e]	1,559	785.82	781.11	-4.71	780.03	783.25	3.22	7.81	-12.79	28.41	1.01

SOURCE: NORC team analysis of 2018-2021 Medicare claims and enrollment data.
NOTES: Estimates in this table are weighted and regression-adjusted. [a] Total spending and all spending categories are top coded at 99.9th percentile by DCE market and year. [b]Home health episodes are top coded at 14. [c]Continuous hospice days prior to death is presented as PBPY for DID estimates and 90% CI. Eligible population for continuous hospice days prior to death are decedents only. [d]Eligible population for all-condition readmissions are beneficiaries with index hospitalizations. [e]Eligible population for timely follow-up are beneficiaries with one or more acute events related to one of six chronic conditions (hypertension, asthma, heart failure, coronary artery disease, chronic obstructive pulmonary disorder, diabetes). ***p<0.01, **p<0.05, *p<0.1. PBPY = per beneficiary per year; ED = emergency department; ACSC = ambulatory care sensitive condition; CI = confidence interval. SNF = skilled nursing facility; IRF = inpatient rehabilitation facility; LTCH = long-term care hospital; OP = outpatient.

Exhibits G.27 and G.28 present detailed impact results for spending, utilization, and quality of care outcomes for PY 2021 Standard and New Entrant DCEs, excluding DCEs that failed parallel trends tests. Like **Exhibits** G.25 and G.26, tables include mean outcomes in the baseline (2018-2020) and performance (2021) years, and the change from baseline to performance year in the GPDC and comparison groups. The impact estimate, 90% confidence interval, and percent impact are estimated from the DID model.

Exhibit G.27. PY 2021 Impact Results for Spending, Utilization, and Quality of Care Outcomes Excluding DCEs that Failed Parallel Trends Tests, Standard DCEs

Outcome	Number of aligned beneficiaries	Comparison			GPDC			Difference-in-Differences			
		Baseline (2018-2020)	PY 2021	Change	Baseline (2018-2020)	PY 2021	Change	Impact Estimate	90% CI		% Impact
Spending ($ PBPY)[a]											
Total Medicare spending (Parts A and B)	258,837	11,853.63	12,303.34	449.71	11,391.98	11,810.70	418.72	-15.95	-105.76	73.87	-0.13
Acute care setting	262,566	3,600.28	3,566.21	-34.08	3,450.47	3,356.26	-94.21	-60.98**	-107.92	-14.05	-1.78
OP facility	254,501	1,811.84	2,016.89	205.05	1,626.26	1,803.96	177.71	-19.56	-42.39	3.27	-1.07
SNF	275,670	977.62	944.02	-33.60	904.59	849.79	-54.80	-22.05*	-41.47	-2.64	-2.53
IRF and LTCH	238,835	431.36	444.15	12.80	414.76	414.88	0.12	-12.44	-29.47	4.59	-2.91
Professional services	272,366	3,051.31	3,247.16	195.86	3,070.94	3,286.83	215.89	18.63	-6.70	43.96	0.57
Primary care visits	153,256	564.08	655.38	91.30	570.00	673.55	103.56	11.24***	7.06	15.42	1.70
Specialty care visits	166,813	173.09	194.24	21.14	160.25	182.04	21.79	2.22**	0.66	3.77	1.23
Home health	281,589	667.46	635.05	-32.41	625.60	581.38	-44.22	-14.57***	-22.31	-6.84	-2.45
Hospice	281,589	456.07	455.50	-0.56	433.34	442.08	8.75	9.33	-4.66	23.32	2.16
Utilization (per 1,000 BPY)											
Acute care hospitalizations	257,885	244.04	226.64	-17.40	230.47	210.85	-19.62	-3.02**	-5.41	-0.64	-1.41
Acute care length of stay (days)	252,391	1,566.28	1,529.71	-36.56	1,470.01	1,424.52	-45.49	-10.19	-31.15	10.78	-0.71
ED visits and observation stays	233,887	425.90	395.28	-30.62	402.31	367.33	-34.99	-5.75**	-9.49	-2.01	-1.54
IRF and LTCH days	274,962	243.17	236.19	-6.98	230.43	218.34	-12.09	-5.08	-14.09	3.94	-2.27
SNF days	269,043	1,865.07	1,685.57	-179.50	1,748.58	1,550.58	-198.00	-26.80	-62.95	9.35	-1.70
Home health episodes[b]	254,685	371.10	362.23	-8.86	346.25	328.27	-17.99	-9.72***	-14.30	-5.15	-2.88
Continuous hospice days prior to death[c]	7,675	26.53	25.17	-1.36	24.47	24.16	-0.32	0.88	-0.28	2.03	3.77

Outcome	Number of aligned beneficiaries	Comparison			GPDC			Difference-in-Differences			
		Baseline (2018-2020)	PY 2021	Change	Baseline (2018-2020)	PY 2021	Change	Impact Estimate	90% CI		% Impact
Quality of care (per 1,000 BPY)											
All-condition readmissions[d]	30,048	163.87	167.45	3.58	156.28	157.82	1.54	-1.93	-6.13	2.26	-1.21
Mortality	251,339	25.41	23.06	-2.36	25.23	22.81	-2.42	-0.09	-0.50	0.31	-0.41
ACSC hospitalizations	230,981	25.93	19.08	-6.85	25.28	17.95	-7.33	-0.62*	-1.16	-0.09	-3.35
Timely follow-up[e]	9,473	806.01	795.76	-10.25	823.72	821.66	-2.06	7.28	-0.45	15.02	0.89

SOURCE: NORC team analysis of 2018-2021 Medicare claims and enrollment data.

NOTES: [a]Total spending and all spending categories are top coded at 99.9th percentile by DCE market and year. [b]Home health episodes are top coded at 14. [c]Continuous hospice days prior to death is presented as PBPY for DID estimates and 90% CI. Eligible population for continuous hospice days prior to death are decedents only. [d]Eligible population for all-condition readmissions are beneficiaries with index hospitalizations. [e]Eligible population for timely follow-up are beneficiaries with one or more acute events related to one of six chronic conditions (hypertension, asthma, heart failure, coronary artery disease, chronic obstructive pulmonary disorder, diabetes). ***p<0.01, **p<0.05, *p<0.1. PBPY = per beneficiary per year; BPY = beneficiaries per year; ED = emergency department; ACSC = ambulatory care sensitive condition; CI = confidence interval; SNF = skilled nursing facility; IRF = inpatient rehabilitation facility; LTCH = long-term care hospital.

Exhibit G.28. PY 2021 Impact Results for Spending, Utilization, and Quality of Care Outcomes Excluding DCEs that Failed Parallel Trends Tests, New Entrant DCEs

Outcome	Number of aligned beneficiaries	Comparison			GPDC			Difference-in-Differences			
		Baseline (2018-2020)	PY 2021	Changes	Baseline (2018-2020)	PY 2021	Changes	DID estimate	90% CI		% Impact
Spending ($ PBPY)[a]											
Total Medicare spending (Parts A and B)	42,196	12,950.40	13,523.45	573.05	12,644.25	13,049.92	405.67	-166.14	-429.28	97.00	-1.26
Acute care setting	42,196	3,665.54	3,577.46	-88.09	3,385.32	3,242.89	-142.42	-60.06	-178.12	58.01	-1.82
OP facility	42,196	1,731.99	1,933.10	201.10	1,529.93	1,676.46	146.53	-32.49	-87.88	22.90	-1.90
SNF facility	37,942	908.16	911.84	3.67	841.62	800.08	-41.54	-40.33	-97.94	17.27	-4.80
IRF and LTCH	41,198	524.84	446.58	-78.26	393.41	354.85	-38.56	11.68	-39.78	63.14	3.40
Professional services	40,334	3,240.11	3,518.20	278.10	3,261.70	3,545.89	284.20	-2.76	-78.64	73.12	-0.08
Primary care visits	26,222	623.26	696.04	72.78	629.76	730.04	100.28	27.11***	15.84	38.38	3.86
Specialty care visits	42,196	209.46	235.37	25.91	198.11	221.34	23.23	-0.51	-4.18	3.17	-0.23
Home health	42,196	662.83	642.52	-20.31	644.80	647.99	3.19	23.40*	0.33	46.47	3.75
Hospice	35,513	502.66	522.33	19.67	565.78	549.23	-16.55	-48.15	-99.71	3.41	-8.06
Utilization (per 1,000 BPY)											
Acute care hospitalizations	40,233	233.73	215.17	-18.57	219.59	200.87	-18.73	-1.06	-7.44	5.32	-0.52
Acute care length of stay (days)	42,196	1,493.85	1,448.54	-45.31	1,380.29	1,341.79	-38.50	5.56	-43.26	54.38	0.42
ED visits and observation stays	40,233	437.18	404.91	-32.27	417.08	373.52	-43.56	-12.35*	-22.87	-1.83	-3.20
IRF and LTCH days	41,198	246.33	211.23	-35.10	212.54	187.90	-24.63	5.42	-15.17	26.01	2.97
SNF days	37,081	1,625.00	1,542.51	-82.50	1,496.43	1,369.69	-126.74	-42.01	-141.62	57.60	-2.98
Home health episodes[b]	41,109	337.68	324.91	-12.78	319.87	318.02	-1.84	10.23	-0.84	21.31	3.33
Continuous hospice days prior to death[c]	1,328	31.61	31.24	-0.38	33.11	31.46	-1.65	-0.58	-4.55	3.38	-1.82
Quality of Care (per 1,000 BPY)											
All-condition readmissions[d]	4,750	169.64	174.56	4.93	163.99	169.56	5.57	1.10	-10.59	12.78	0.65
Mortality	42,196	32.56	30.13	-2.43	32.50	28.21	-4.29	-2.15***	-3.47	-0.82	-7.07
ACSC hospitalizations	29,303	29.74	20.34	-9.40	27.52	19.88	-7.65	1.23	-0.43	2.88	6.58
Timely follow-up[e]	1,429	796.10	790.82	-5.27	791.48	798.92	7.44	12.54	-9.07	34.15	1.59

SOURCE: NORC team analysis of 2018-2021 Medicare claims and enrollment data.

NOTES: Three New Entrant DCEs were excluded from analyses due to insufficient baseline data. [a]Total spending and all spending categories are top coded at 99.9th percentile by DCE market and year. [b]Home health episodes are top coded at 14. [c]Continuous hospice days prior to death is presented as PBPY for DID estimates and 90% CI. Eligible population for continuous hospice days prior to death are decedents only. [d]Eligible population for all-condition readmissions are beneficiaries with index hospitalizations. [e]Eligible population for timely follow-up are beneficiaries with one or more acute events related to one of six chronic conditions (hypertension, asthma, heart failure, coronary artery disease, chronic obstructive pulmonary disease, diabetes). ***p<0.01, **p<0.05, *p<0.1. PBPY = per beneficiary per year; BPY = beneficiaries per year; ED = emergency department; ACSC = ambulatory care sensitive condition; CI = confidence interval; SNF = skilled nursing facility; IRF = inpatient rehabilitation facility; LTCH = long-term care hospital.

Exhibits G.29 and G.30 present detailed **DCE-level** impact results for spending, utilization, and quality of care outcomes for PY 2021 Standard and New Entrant DCEs, respectively. We present mean outcomes in the baseline (2018-2020) and performance (2021) years, and the change from **baseline** to **performance years** in the GPDC and comparison groups. The impact estimate, 90% confidence interval, and percent impact are estimated from the DID model.

Our DID estimate is based on satisfying the parallel trends assumption, which allows us to establish the counterfactual when – absent the model – time trends in the outcome variable between the GPDC and comparison groups would be the same in the performance year. The presence of parallel trends in the outcome variable across the two groups in the BYs justifies the assumption of parallel trends in the performance year. Failing the parallel trends test (that is, the p-value of the joint F test is less than 0.05) indicates that the DID estimate for the DCE needs to be interpreted/used with caution (affected entities are **bolded** to highlight these results).

Exhibit G.29. PY 2021 DCE-Level Gross Spending Impact Results, Standard DCEs

Standard DCE Name[a]	Number of aligned beneficiaries	Comparison ($ PBPY)		GPDC ($ PBPY)		Difference-in-Differences				Parallel trends test p-value	Shared savings/ losses ($ PBPY)
		Baseline (2018-2020)	PY 2021	Baseline (2018-2020)	PY 2021	Impact Estimate ($ PBPY)	90% CI		% Impact		
PremierMD	7,174	14,890.65	16,051.23	14,166.58	14,899.51	-371.22	-992.11	249.67	-2.43	0.99	-434.57
MetroHealth	**9,223**	**10,700.37**	**10,861.50**	**10,431.41**	**10,347.54**	**-240.96**	**-709.99**	**228.07**	**-2.28**	**0.002**	**-332.54**
VillageMD Houston	11,301	12,861.02	13,590.21	11,989.20	11,904.59	-764.37***	-1,215.95	-312.80	-6.03	0.82	-805.89
PFP	6,627	10,863.74	11,174.79	10,410.71	10,587.98	-120.82	-621.90	380.25	-1.13	0.81	-325.35
Complete Health	**6,354**	**11,989.03**	**12,113.79**	**11,156.72**	**11,089.51**	**-183.31**	**-687.97**	**321.35**	**-1.63**	**0.02**	**-141.42**
Pathways	7,325	16,253.18	16,422.80	16,315.93	16,383.70	-102.51	-690.98	485.96	-0.62	0.25	-309.98
Pioneer	5,839	10,461.77	10,614.95	9,395.75	10,319.81	786.48**	272.57	1,300.40	8.25	0.29	143.41
Praxis	6,704	9,005.87	9,040.74	8,448.12	8,778.50	297.66	-155.39	750.70	3.51	0.86	60.40
NMI Health	6,546	9,168.95	9,584.25	9,058.19	8,879.23	-589.23*	-1,094.01	-84.46	-6.22	0.54	-327.01
PHC	11,508	9,580.76	9,614.47	9,260.24	9,795.60	502.78**	137.05	868.51	5.41	0.63	-262.63
Regal	5,919	12,831.33	13,544.79	12,449.72	13,032.61	-109.36	-794.81	576.10	-0.83	0.57	-93.83
ACH	7,302	14,358.41	14,916.07	13,872.06	15,526.80	1,115.97***	548.76	1,683.18	7.74	0.53	1,038.48
VillageMD GA	9,064	10,824.72	11,080.63	10,551.33	10,773.26	-27.52	-456.48	401.44	-0.25	0.49	-40.39
VillageMD Chicago	12,183	11,468.59	11,996.11	11,583.23	11,800.11	-315.93	-716.59	84.74	-2.61	0.88	79.29
Saint Francis	5,481	10,301.00	10,527.93	9,796.28	10,379.85	367.76	-165.75	901.26	3.67	0.65	138.63
Primaria	**5,494**	**11,474.52**	**11,649.77**	**10,840.05**	**10,956.88**	**-48.74**	**-606.59**	**509.11**	**-0.44**	**0.06**	**-436.42**
VillageMD NH	6,012	11,942.13	12,204.61	11,543.90	11,731.52	-66.11	-667.30	535.08	-0.56	0.43	-273.46
PPCP	5,304	9,380.82	9,653.04	8,851.31	9,522.90	414.73	-101.75	931.21	4.55	0.72	-16.99
COPC	26,904	10,690.37	11,035.31	9,340.92	9,470.51	-171.81	-452.15	108.52	-1.78	0.4	-372.97

Standard DCE Name[a]	Number of aligned beneficiaries	Comparison ($ PBPY)		GPDC ($ PBPY)		Difference-in-Differences				Parallel trends test p-value	Shared savings/ losses ($ PBPY)
		Baseline (2018-2020)	PY 2021	Baseline (2018-2020)	PY 2021	Impact Estimate ($ PBPY)	90% CI		% Impact		
PGSEO	**7,175**	**11,249.55**	**11,486.39**	**10,470.44**	**11,049.51**	**358.63**	**-143.17**	**860.43**	**3.35**	**0.03**	**-204.69**
Advent	5,044	10,930.86	10,970.38	10,519.13	10,203.79	-353.37	-898.21	191.46	-3.35	0.54	-279.16
Principium (Clover)	58,779	13,095.95	13,936.23	12,862.46	13,752.98	65.23	-141.10	271.56	0.48	0.45	483.19
360 Health	2,998	13,578.19	14,637.23	14,824.88	15,734.75	-246.41	-1,358.17	865.35	-1.54	0.31	334.82
PeaceHealth	17,865	10,350.78	10,502.01	10,601.84	10,833.48	76.74	-243.96	397.43	0.71	0.31	-105.88
Healthcare Partners NV	6,927	12,745.82	13,071.70	11,186.13	11,638.31	166.18	-432.45	764.80	1.45	0.44	-233.86
Space Coast	3,774	11,952.91	11,838.16	11,549.29	11,904.03	465.62	-244.71	1,175.95	4.07	0.56	-246.48
Health Point	5,600	13,067.07	13,185.32	12,312.10	12,042.53	-380.98	-949.24	187.27	-3.07	0.35	-617.39
Alignment	3,436	8,598.41	8,841.79	8,070.89	7,769.68	-529.66	-1,115.40	56.09	-6.38	0.77	-495.20
Humana	7,727	12,845.87	13,099.06	11,949.37	11,698.11	-486.78*	-953.53	-20.03	-3.99	0.11	-667.22

SOURCE: NORC team analysis of 2018-2021 Medicare claims and enrollment data.

NOTES: Estimates in this table are weighted and regression-adjusted. Total spending is top coded at 99.9th percentile by DCE market and year. Shared savings/losses for each DCE from financial settlement results were scaled to the number of beneficiary-months included in our analysis. aAbbreviations for DCE names include: PFP = Premier Family Physicians; NMI = Northern Michigan; PHC = Physicians Healthcare Collaborative; ACH = American Choice Healthcare; GA = Georgia; NH = New Hampshire; PPCP = Preferred Primary Care Physicians; COPC = Central Ohio Primary Care; PGSEO = Physicians Group of South Eastern Ohio; NV = Nevada. ***p<0.01, **p<0.05, *p<0.1. PBPY = per beneficiary per year; CI = confidence interval.

Exhibit G.30. PY 2021 DCE-Level Gross Spending Impact Results, New Entrant DCEs

New Entrant DCE Name[a]	Number of aligned beneficiaries	Comparison ($ PBPY)		GPDC ($ PBPY)		Difference-in-Differences				Parallel trends test p-value	Shared savings/ losses ($ PBPY)
		Baseline (2018-2020)	PY 2021	Baseline (2018-2020)	PY 2021	Impact Estimate ($ PBPY)	90% CI		% Impact		
Iora Health	6,683	10,013.93	10,680.59	10,053.86	10,537.60	-185.58	-834.08	462.93	-1.73	0.98	-450.74
ilumed	2,832	12,327.45	12,117.61	12,112.94	12,027.06	120.32	-646.17	886.81	1.01	0.99	390.14
AR Health Advantage	1,862	16,037.69	17,331.39	17,243.31	18,146.88	-487.38	-1,789.12	814.36	-2.62	0.12	562.34
Advanced Value Care	1,476	16,166.59	17,259.25	14,452.36	16,844.96	1,415.81	-124.01	2,955.62	9.18	0.82	508.55
CareMore (Aspire)	1,087	26,277.62	27,458.27	28,160.21	29,223.86	-201.59	-3,598.59	3,195.41	-0.69	0.91	4,728.26
Best Value	2,568	13,047.14	12,673.28	11,932.70	12,211.65	620.88	-208.72	1,450.49	5.36	0.78	-407.16
Oak Street	4,854	16,202.02	15,917.88	15,093.83	14,752.75	-76.37	-917.99	765.24	-0.52	0.84	-2,138.91
CVMG	3,696	12,826.84	13,950.78	12,297.42	11,837.63	-1,537.33***	-2,428.72	-645.94	-11.49	0.29	-201.30
VillageMD AZ	7,474	11,073.64	11,959.26	10,959.75	12,073.08	236.82	-292.43	766.08	2.00	0.64	43.66
Akos IPA	1,825	10,722.78	11,004.36	10,091.04	10,441.43	85.40	-849.38	1,020.18	0.82	0.74	-320.18
Humana	2,291	11,918.66	12,399.24	11,477.14	11,411.69	-528.24	-1,435.00	378.51	-4.42	0.24	-526.20
United PA	998	13,066.63	14,409.87	13,443.74	12,300.12	-2,525.63	-5,144.90	93.64	-17.04	0.12	-5,006.95
Nivano PI	1,726	16,889.21	17,869.63	16,152.86	18,002.36	911.82	-783.27	2,606.91	5.34	0.52	783.59
Alignment NC	1,963	9,910.71	10,418.56	9,812.34	9,528.29	-786.86	-1,639.20	65.48	-7.63	0.09	-368.05
Enhanz	861	13,344.97	14,431.81	13,301.52	13,409.07	-975.75	-2,604.43	652.93	-6.78	0.34	-382.35

SOURCE: NORC team analysis of 2018-2021 Medicare claims and enrollment data.

NOTES: Estimates in this table are weighted and regression-adjusted. Three New Entrant DCEs were excluded from analyses due to insufficient baseline data. Total spending is top coded at 99.9th percentile by DCE market and year. Shared savings/losses for each DCE from financial settlement results were scaled to the number of beneficiary-months included in our analysis. aAbbreviations for DCE names include: AR = Arizona; CVMG = Central Valley Medical Group; AZ = Arizona; IPA = Independent Physician Association; PA = Physician Association; PI = Physicians Incorporated; NC = North Carolina. ***p<0.01, **p<0.05, *p<0.1. PBPY = per beneficiary per year; CI = confidence interval.

Appendix H: Measure Specifications

This appendix:

- Specifies the variables used in the descriptive tables, entropy balancing, and regression adjustment for impact analyses, and
- Describes the claims-based outcome measures used to evaluate the GPDC Model's impact.

H.1 Variables for Descriptive Analysis, Entropy Balancing, and Regression Adjustment

Here we describe and specify the variables used for the descriptive analysis, entropy balancing, and regression adjustment. **Exhibit H.1** lists each variable used, data source, level of measurement, a description of the variable, and for which purposes it is used in analyses.

Exhibit H.1. Variables for Descriptives, Weighting, and Risk Adjustment

Variable	Source	Level	Variable Description	Descriptive Tables	Entropy Balancing	Regression Adjustment
Domain: Demographics						
Age	MBSF	Beneficiary	Beneficiary age at end of the reference year. Continuous age is used for regression adjustment and reported in the descriptive tables, while age categories (under 65, 65-69, 70-74, 75-79, 80-84, 85 and over) are used for entropy balancing	X	X	X
Sex	MBSF	Beneficiary	Indicator for male	X	X	X
Dual eligibility	MBSF	Beneficiary	Indicator for dual eligibility in any month during the calendar year (that is., calendar year for the performance or baseline years)	X	X	X
Race	MBSF	Beneficiary	Beneficiary race as per the RTI race code algorithm[56]; combining American Indian/Alaska Native, other, and unknown categories due to small sample size for some DCEs	X	X	X
Months of alignment	MBSF	Beneficiary	Number of beneficiary months of alignment in during the calendar year	X	X	X
Year	MBSF	Beneficiary	Calendar year, for the performance (2021) or baseline years (2018-2020)	X	X	X
GPDC status	Alignment file	Beneficiary	Indicator for whether a beneficiary is aligned to GPDC or comparison group in a year	X	X	X
State	MBSF	Beneficiary	State of residence; State is used to create Census Region (Northeast, Midwest, South, West) for descriptive tables	X		
Domain: Clinical[a]						
End-stage renal disease (ESRD)	MBSF	Beneficiary	Indicator for Medicare coverage based on ESRD diagnosis during the year		X	X
Disability	MSBF	Beneficiary	Indicator for Medicare coverage based on disability status during the year	X	X	X
Cancer	MBSF	Beneficiary	Indicator for cancer including colorectal cancer, endometrial cancer, breast cancer, lung cancer, prostate cancer, urologic cancers (kidney, renal pelvis, and ureter), and leukemias & lymphomas, based on meeting CCW criteria in the prior year		X	X

[56] Beneficiary race code modified using RTI algorithm. https://resdac.org/cms-data/variables/research-triangle-institute-rti-race-code

Variable	Source	Level	Variable Description	Descriptive Tables	Entropy Balancing	Regression Adjustment
Cardiac conditions	MBSF	Beneficiary	Indicator for cardiac conditions including acute myocardial infarction, heart failure, atrial fibrillation, and ischemic heart disease, based on meeting CCW criteria in the prior year	X	X	X
Vascular conditions	MBSF	Beneficiary	Indicator for vascular disease including hypertension and peripheral vascular disease, based on meeting CCW criteria in the prior year	X	X	X
Cognitive disorders	MBSF	Beneficiary	Indicator for cognitive disorders including Alzheimer's Disease and non-Alzheimer's dementia, based on meeting CCW criteria in the prior year		X	X
Stroke	MBSF	Beneficiary	Indicator for stroke including stroke/transient ischemic attack, based on meeting CCW criteria in the prior year		X	X
Endocrine	MBSF	Beneficiary	Indicator for endocrine conditions including diabetes, hyperlipidemia, anemia, hypothyroidism, and benign prostatic hyperplasia, based on meeting CCW criteria in the prior year	X	X	X
Eye	MBSF	Beneficiary	Indicator for eye disorders including glaucoma and cataract, based on meeting CCW criteria in the prior year	X	X	X
Rheumatoid conditions	MBSF	Beneficiary	Indicator for rheumatoid conditions including osteoporosis with or without pathological fracture and rheumatoid arthritis/osteoarthritis, based on meeting CCW criteria in the prior year	X	X	X
Respiratory conditions	MBSF	Beneficiary	Indicator for respiratory conditions including asthma, chronic obstructive pulmonary disease, and all-cause pneumonia, based on meeting CCW criteria in the prior year	X	X	X
Chronic kidney disease	MBSF	Beneficiary	Indicator for chronic kidney disease , based on meeting CCW criteria in the prior year	X	X	X
Hip fracture	MBSF	Beneficiary	Indicator for hip fracture including hip and pelvic fracture, based on meeting CCW criteria in the prior year		X	X
Infections	MBSF	Beneficiary	Indicator for infections including human immunodeficiency virus and/or acquired immunodeficiency syndrome and viral hepatitis (general), based on meeting CCW criteria in the prior year		X	X
Metabolic developmental disorders	MBSF	Beneficiary	Indicator for metabolic developmental disorders including cystic fibrosis and other metabolic developmental disorders, based on meeting CCW criteria in the prior year		X	X

Variable	Source	Level	Variable Description	Descriptive Tables	Entropy Balancing	Regression Adjustment
Mental health conditions	MBSF	Beneficiary	Indicator for behavioral health conditions including schizophrenia; schizophrenia and other psychotic disorders; personality disorders; anxiety disorders; post-traumatic stress disorder; bipolar disorder; depression, bipolar, or other depressive mood disorders; or depressive disorders, based on meeting CCW criteria in the prior year	X	X	X
Developmental disorders	MBSF	Beneficiary	Indicator for developmental disorders including attention deficit hyperactivity disorder (ADHD), conduct disorders, and hyperkinetic syndrome, autism spectrum disorders, intellectual disabilities and related conditions, other developmental delays, and learning disabilities, based on meeting CCW criteria in the prior year		X	X
Skin conditions	MBSF	Beneficiary	Indicator for skin conditions including pressure and chronic ulcers, based on meeting CCW criteria in the prior year		X	X
Substance use disorders	MBSF	Beneficiary	Indicator for substance use disorders including alcohol use disorders, drug use disorders, opioid use disorder, and tobacco use, based on meeting CCW criteria in the prior year		X	X
Chronic pain disorders	MBSF	Beneficiary	Indicator for chronic pain disorders including fibromyalgia, chronic pain and fatigue, based on meeting CCW criteria in the prior year	X	X	X
Spinal cord disorders/ injuries	MBSF	Beneficiary	Indicator for spinal cord disorders/injuries including spinal cord injury and spina bifida and other congenital anomalies of the nervous system, based on meeting CCW criteria in the prior year		X	X
Obesity	MBSF	Beneficiary	Indicator for obesity, based on meeting CCW criteria in the prior year	X	X	X
Traumatic brain injury	MBSF	Beneficiary	Indicator for traumatic brain injury including traumatic brain injury and nonpsychotic mental disorders due to brain damage, based on meeting CCW criteria in the prior year		X	X
Sensory impairments	MBSF	Beneficiary	Indicator for sensory impairments including blindness and visual impairment and sensory – deafness and hearing impairment, based on meeting CCW criteria in the prior year		X	X
Mobility impairments	MBSF	Beneficiary	Indicator for mobility impairments, based on meeting CCW criteria in the prior year		X	X
Liver conditions	MBSF	Beneficiary	Indicator for liver conditions including liver disease, cirrhosis and other liver conditions, based on meeting CCW criteria in the prior year		X	X

Variable	Source	Level	Variable Description	Descriptive Tables	Entropy Balancing	Regression Adjustment
Neurological disorders and conditions	MBSF	Beneficiary	Indicator for neurological disorders and conditions including Parkinson's Disease and Secondary Parkinsonism, cerebral palsy, epilepsy, muscular dystrophy, migraine and chronic headache, multiple sclerosis and transverse myelitis, based on meeting CCW criteria in the prior year		X	X
Total number of chronic conditions	MBSF	Beneficiary	Count of major chronic conditions in the prior year. Capped at 10 when used in entropy balancing	X	X	
Long-term care flag	Medicare claims	Beneficiary	Indicator for long-term care nursing home stay in the prior year	X	X	X
Prior MA enrollment	MBSF	Beneficiary	Indicator for whether a beneficiary was enrolled in an MA plan in the prior year	X	X	X
High Needs flag	Central Repository of High Needs Files	Beneficiary	Indicator for beneficiaries considered High Needs using the model's High Needs eligibility criteria. For more details the High Needs eligibility criteria, see the Global and Professional Direct Contracting Model Financial Operating Guide: Overview.	X		
Part D coverage	MBSF	Beneficiary	Indicator for Part D coverage in any month during the year	X		X
Part D low-income drug subsidy	MBSF	Beneficiary	Indicator for received Part D Low-Income Drug Subsidy during the year	X		
Prospective CMS-HCC Risk Score	RTI High Needs File	Beneficiary	HCC score in the prior year	X		
Claims-Based Frailty Index	Medicare claims	Beneficiary	Frailty Index categories (0-≤0.15, >0.15-≤0.25, >0.25-≤0.35, >0.35-≤0.45, >0.45) are used for descriptive tables	X		
Domain: Market or Neighborhood						
Rural-Urban Commuting Area (RUCA) Code	USDA ERS	ZIP	Rural-Urban Commuting Areas (RUCA) codes based on a beneficiary's ZIP code. For descriptive tables, we define rural area as having RUCA code 7-10. For entropy balancing and regression, we use 'metro' where we define metropolitan area as having RUCA code 1-3.	X	X	X
Health professional shortage area (HPSA) primary care	AHRF	County	HPSA category for primary care			X
HPSA mental health	AHRF	County	HPSA category for mental health care			X
GPDC benchmark rate	GPDC Rate Book	County	County-level benchmark rate for GPDC-aged/disabled beneficiaries in 2021		X	

Variable	Source	Level	Variable Description	Descriptive Tables	Entropy Balancing	Regression Adjustment
Providers per 1,000 FFS population	Medicare claims; MBSF	ZIP	Percentile of ZIP code-level number of Medicare FFS alignment-eligible providers per 1,000 Medicare FFS population. Based on provider location in outpatient/carrier claims and beneficiary residence in the MBSF		X	X
Percent below poverty line	5-year American Community Survey (ACS) Estimates	ZIP Code Tabulation Areas (ZCTA)	Percent below federal poverty line in ZCTA. The continuous version is used for descriptive tables; the percentile version is used for regression adjustment	X		X
Bachelor's degree or higher	5-year American Community Survey (ACS) Estimates	ZCTA	Percent population aged 25 and older holding a bachelor's degree in ZCTA. The continuous version is used for descriptive tables; the percentile version is used for entropy balancing and regression adjustment	X	X	X
Median income	5-year American Community Survey (ACS) Estimates	ZCTA	Median household income in ZCTA. The percentile version is used for entropy balancing and regression adjustment		X	X
Area Deprivation Index	CMS and GBIH	Census Block Group	National percentile rank for Area Deprivation Index based on beneficiary's Census block group; ADI categories (1-25, 26-50, 51-75, 76-100) are used for descriptive tables	X		
Hospital referral region (HRR)	Dartmouth Atlas ZIP code to HRR crosswalk	HRR	Indicator for HRR based on beneficiary's ZIP code			X
Domain: COVID-19						
ICU admission for COVID-19 diagnosis	Medicare claims	Beneficiary	Indicator for severity of COVID-19 based on principal diagnoses on acute care hospital claims with ICU use during the year	X		
Acute care hospital admission for COVID-19 diagnosis	Medicare claims	Beneficiary	Indicator for severity of COVID-19 based on principal diagnoses on acute care hospital claims (without ICU use) during the year	X		

Variable	Source	Level	Variable Description	Descriptive Tables	Entropy Balancing	Regression Adjustment
Outpatient COVID-19 diagnosis	Medicare claims	Beneficiary	Indicator for severity of COVID-19 based on principal diagnoses on professional services, SNF, or outpatient claims only (without hospitalization) during the year	X		
COVID-19 case rate	PVI	County	County-level rates of COVID-19 infection in the year (7-day average across the year)	X		
COVID-19 mortality rate	PVI	County	County-level COVID-19 mortality rates in the year (7-day average across the year)	X		
COVID-19 case-fatality rate	PVI	County	County-level COVID-19 case-fatality rates in the year (7-day average across the year)	X		
COVID vaccination rate	PVI	County	County-level percent of population that are vaccinated in the year (average across the year)	X		
5-year American Community Survey (ACS) Estimates	Surgo Ventures	County	County-level COVID-19 Community Vulnerability Index – CCVI incorporates evidence on COVID-19 risk factors measures how much a community is vulnerable to the impacts of COVID-19 through a simple composite score (index)	X		
Domain: Other Alternative Payment Models						
CPC+ or PCF Model	MDM	Beneficiary	Indicator for whether a beneficiary was aligned to CPC+ or PCF anytime in the year	X		
FAI	MDM	Beneficiary	Indicator for whether a beneficiary was aligned to FAI anytime in the year	X		
(IAH Demonstration	MDM	Beneficiary	Indicator for whether a beneficiary was aligned to the IAH Demonstration anytime in the year	X		
NGACO Model	MDM	Beneficiary	Indicator for whether a beneficiary was aligned to the NGACO Model anytime in the year	X		
CEC Model	MDM	Beneficiary	Indicator for whether a beneficiary was aligned to the CEC Model anytime in the year	X		
SSP	MDM	Beneficiary	Indicator for whether a beneficiary was aligned to the Shared Savings Program anytime in the year	X		
CJR Model	CMS CJR Contractor	Beneficiary	Indicator for whether a beneficiary was in CJR Model anytime in the year	X		
BPCI or BPCI Advanced Initiatives	CMS BPCI-A Contractor	Beneficiary	Indicator for whether a beneficiary was in the BPCI or BPCI Advanced models any time in the year	X		

Variable	Source	Level	Variable Description	Descriptive Tables	Entropy Balancing	Regression Adjustment
OCM	CMS OCM Contractor	Beneficiary	Indicator for whether a beneficiary was in OCM anytime in the year	X		

NOTE: MBSF = Medicare Beneficiary Summary File; USDA ERS= US Department of Agriculture Economic Research Service; AHRF = Area Health Resource File; GBIH = Geographic Based Indices of Health; ACS = American Community Survey; PVI = Pandemic Vulnerability Index dataset; MDM = Master Data Management Files; ADHD = attention deficit hyperactivity disorder; FFS = fee-for-service; MA = Medicare Advantage; CPC+ = Comprehensive Primary Care Plus; PCF = Primary Care First; FAI = Financial Alignment Initiative; IAH = Independence at Home; CEC = Comprehensive ESRD Care; SSP = Shared Savings Program; CJR = Comprehensive Care for Joint Replacement; BPCI = Bundled Payments for Care Improvement; OCM = Oncology Care Model; Next Generation ACO = NGACO; HCC = Hierarchical Condition Categories. Refer to **Appendix F** for more details on each data source. [a]Clinical indicators are coded as "1" if beneficiary has one or more of the conditions in the indicator and "0" if otherwise/unknown. CCW indicators are based on the end-of-year flags in the prior year.

H.2 Measures of Spending, Utilization, and Quality

The following sections describe the claims-based spending, utilization, and quality measures used to evaluate the GPDC Model's impact. There are 22 claims-based outcome measures for which we assessed the GPDC Model's impacts in the first evaluation report. Measures include gross and net total Medicare spending, nine categories of Medicare spending by care setting and service type, seven utilization measures, and four quality of care measures that were created for the treatment group and comparison group in PY 2021 and its baseline years. To account for claims in co-occurring models (NGACO, CPC+, and PCF) as well as difference in claim payment structure for the treatment and comparison groups, spending measures are specified differently in baseline years compared to performance years and for the treatment group compared to the comparison group. In contrast, the utilization and quality measure specifications do not change from the baseline to performance year or from the treatment group to the comparison group.

H.2.1. Medicare Spending Outcomes

We created three kinds of outcome measures to capture DCE-level Medicare spending in the baseline years and PY 2021: 1) total Medicare gross spending, 2) total Medicare net spending, and 3) Medicare spending in care settings.[57]

Total Medicare Gross Spending

Total Medicare gross spending included Medicare Parts A & B spending, capturing GPDC's Total Care Capitation (TCC)/Primary Care Capitation (PCC) and Advanced Payment Option (APO) payments.[58] This measure distinguished between amounts paid on population-based

GPDC Model Payment Adjustments

Total Care Capitation (TCC) – capitated payment that applies to applies to all services covered by Medicare Parts A and B that are provided to aligned beneficiaries by Participant and Preferred Providers participating in this option.

Primary Care Capitation (PCC) – capitated payment that applies to certain primary care services provided to aligned beneficiaries by Participant and Preferred Providers who are primary care clinicians participating in this option.

Advance Payment Option (APO) – reduced FFS payments for services not covered under PCC. Only DCEs that elect PCC can also choose this option.

[57] It is important to note that there are substantive differences in how the total spending and spending category measures are calculated. The total spending measure represents what Medicare actually paid by including patient-level capitated payments under the GPDC Model, whereas the spending category measures represent what Medicare would have paid DCEs absent capitation, across a variety of care settings. Direct comparisons between total spending and spending categories are not feasible given differences in how these measures were constructed and analyzed.

[58] For more information on how TCC, PCC, and APO payments are defined by the model, refer to the PY 2021 Financial Operating Policies: Capitation and Advanced Payment Mechanisms document, available at: https://innovation.cms.gov/media/document/dc-cap-advpymntmech.

payment (PBP) claims,[59] non-PBP claims[60] and other model-specific payments reconciled through the claims system for APMs

Exhibits H.2 and **H.3** detail the process for determining treatment and comparison group beneficiary gross Medicare spending during the baseline and performance years, respectively. The processes to calculate gross Medicare spending are described separately for baseline and performance years below.

Baseline years. We identified claims with claim admission date (for facility claims) or claim from date (for physician/supplier claims) during the baseline years (**Exhibit H.2**). We processed claims differently depending on whether they were facility claims[61] or physician/supplier claims.[62]

We then used the program identifier on the claim to distinguish between NGACO claims (to account for PBPs in this overlapping model) and non-NGACO claims, and between claims for treatment group and comparison group beneficiaries.

- For facility claims that were NGACO instances, gross Medicare spending was calculated as the claim value amount from claims with PBP adjustments for NGACO minus the uncompensated care payment amount.
- For facility claims that were not NGACO instances, gross Medicare spending was calculated as the claim payment amount minus the uncompensated care payment amount.
- For physician/supplier claims that were NGACO instances, gross Medicare spending was calculated as the claim payment amount plus the claim PBP reduction amount.
- For physician/supplier claims that were not NGACO instances, we further distinguished between CPC+ and PCF claims and claims that were not associated with either of these primary care models. We used the program identifier on the claim to distinguish between CPC+/PCF claims and non-CPC+/PCF claims. For physician/supplier claims that were CPC+/PCF instances for beneficiaries in the treatment group or comparison group, gross Medicare spending was calculated as the claim payment amount adjusted for the corresponding line other applied amount, representing CPC+ Payment Adjustment Amounts, PCF

[59] PBP claims are reduced based on the respective model's financial strategy that typically pays model participants outside of the claims system. To capture spending accurately, we removed those adjustments, available through the CCW, to allow for the claims to represent what Medicare would have paid, absent the GPDC Model.

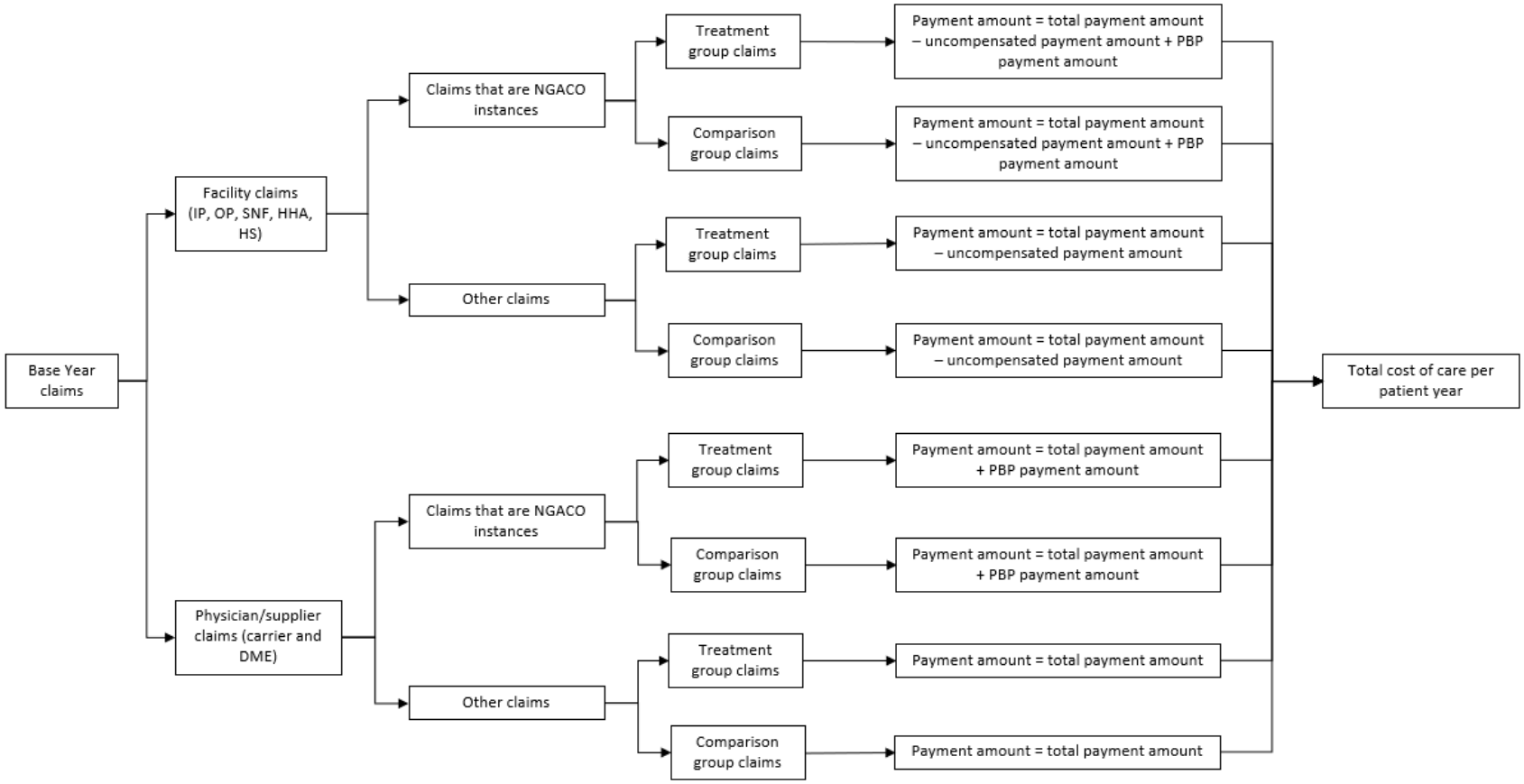
[60] Although PBPs are a feature of several models, for PY 2021 and its baseline years, we only adjust for PBP claims that are a feature of the NGACO Model. Although PBP claims are not a feature of the GPDC Model, beneficiaries aligned to the NGACO Model may be included in the treatment group in baseline years and for the comparison group in baseline and performance years. Thus, we account for PBP costs on claims for NGACO beneficiaries to accurately capture gross Medicare spending for this evaluation.

[61] Facility claims include claim types 10 (Home Health Agency), 20 (non-swing bed skilled nursing facility), 30 (swing bed skilled nursing facility), 40 (hospital outpatient), 50 (hospice), and 60 (inpatient).

[62] Physician/supplier claims include claim types 71 (local carrier non-durable medical equipment, prosthetics, orthotics, and supplies), 72 (local carrier durable medical equipment, prosthetics, orthotics, and supplies), 81 (durable medical equipment regional carrier; non-durable medical equipment, prosthetics, orthotics, and supplies), and 82 (durable medical equipment regional carrier; durable medical equipment, prosthetics, orthotics, and supplies).

Flat Visit Reduction Amounts, or PCF Flat Visit Fee Increased Amounts. For physician/supplier claims that were not CPC+/PCF instances for beneficiaries in the treatment group or comparison group, gross Medicare spending was calculated as the claim payment amount.

Exhibit H.2. Total Gross Medicare Spending in BYs (2018-2020)



NOTES: IP = Inpatient; OP = Outpatient; SNF = Skilled Nursing Facility; HHA = Home Health Agency; HS = Hospice; DME = Durable Medical Equipment; NGACO = Next Generation Accountable Care Organization; PBP = Population-Based Payment. The total payment amount for facility claims that are NGACO instances is the claim value amount from claims with value code Q0; the total payment amount for facility claims that are not NGACO instances (that is, "Other" claims) is the claim payment amount. The uncompensated care payment amount is subtracted from all payment amounts for facility claims. The total payment amount for physician/supplier claims that are NGACO instances is the claim payment amount plus the PBP reduction amount; the total payment amount for physician/supplier claims that are not NGACO instances and are either treatment group or comparison group claims could be from Comprehensive Primary Care Plus (CPC+); Primary Care First (PCF) instances or non-CPC+/PCF instances. The total payment amount for CPC+/PCF instances is the claim payment amount adjusted for the line other applied amount for claims with the line other applied indicator code T, A2, or A3. The total payment amount for non-CPC+/PCF instances is the claim payment amount.

PY 2021. We identified PY 2021 claims in the same manner as we did for the BYs (**Exhibit H.3**). We then used the program identifier on the claim to distinguish NGACO claims (to account for PBPs); as compared to the BYs, we distinguish NGACO claims for the comparison group only because beneficiary overlap with NGACO and GPDC is prohibited in PY 2021. We additionally distinguish GPDC claims (to account for capitation and APO payments; treatment group only) and non-NGACO/GPDC claims (treatment group and comparison group).

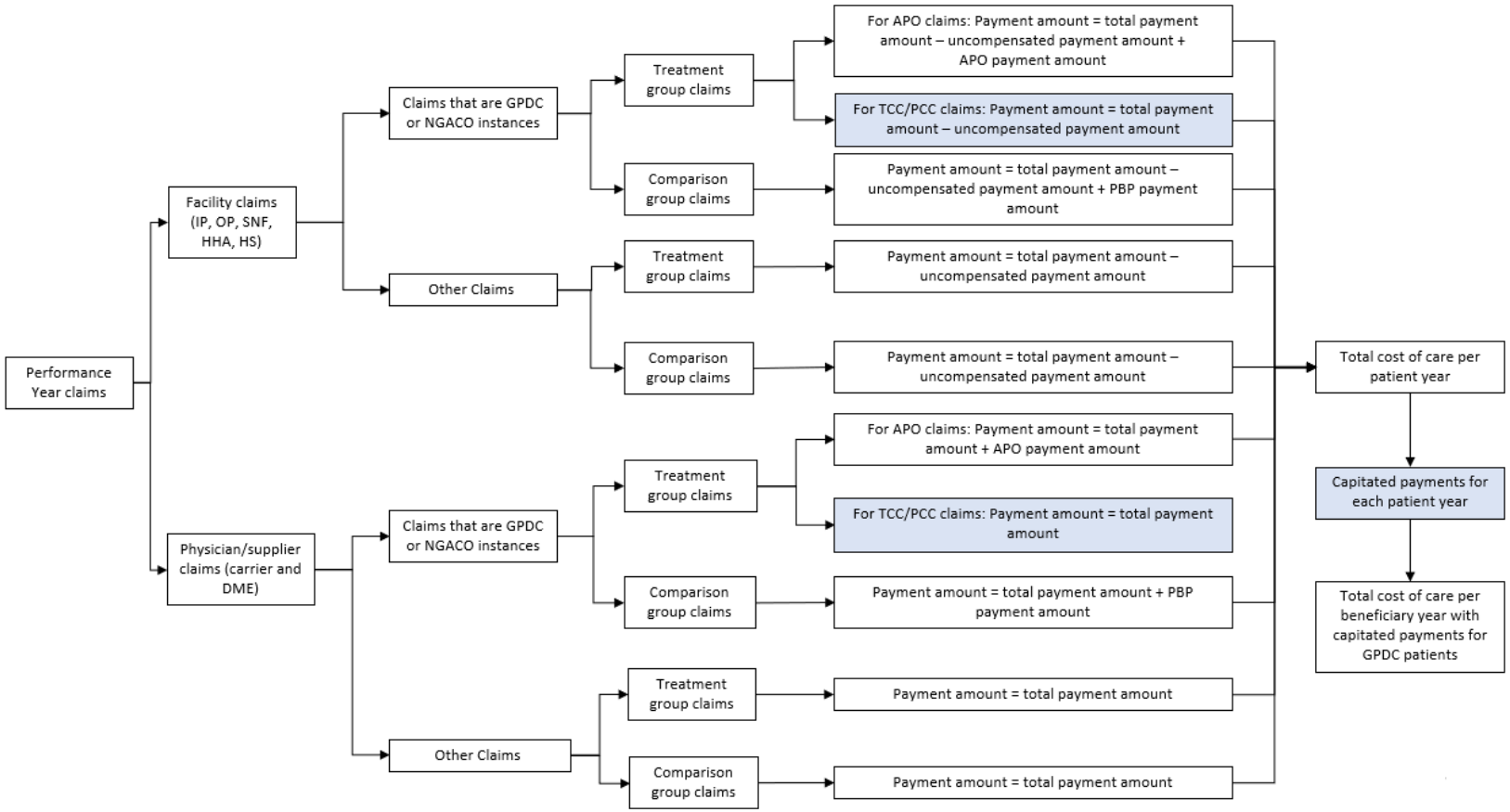
- Facility claims that were NGACO instances were processed the same way as in the baseline years.
- For facility claims that were GPDC instances, gross Medicare spending for PCC+APO claims was calculated as the claim payment amount minus the uncompensated care amount plus the claim APO reduction amount; gross Medicare spending for TCC/PCC only claims was calculated as the claim payment amount minus the uncompensated care payment amount. We linked Medicare claims to the GPDC provider election files, provided by the Innovation Center's GPDC payment analysis and operational support contractor,[63] to distinguish between APO and TCC/PCC claims.[64] We obtained PBP/APO reduction amounts from the CCW, and aggregated monthly, beneficiary-level TCC/PCC amounts, provided by the Innovation Center's GPDC model payment analysis and operational support contractor, to the year-level for the purpose of calculating the gross Medicare spending measure. When spending was aggregated to the beneficiary-year level, capitated payments for each beneficiary-year were added to the gross Medicare spending amount.
- Facility claims that were not NGACO/GPDC instances were processed the same way as claims that were not NGACO instances in the baseline years.
- Physician/supplier claims that were NGACO instances were processed the same way as in the baseline years.
- For physician/supplier claims that were GPDC instances, gross Medicare spending for PCC+APO claims was calculated as the claim payment amount plus the claim APO reduction amount; gross Medicare spending for TCC/PCC only claims was calculated as the claim payment amount. As above, we aggregated spending to the beneficiary-year level and added the appropriate capitated payment for each beneficiary-year to the gross Medicare spending amount.
- For physician/supplier claims that were not NGACO/GPDC instances for beneficiaries in the treatment group, gross Medicare spending was calculated as the claim payment amount.

Physician/supplier claims that were not NGACO/GPDC instances for beneficiaries in the comparison group were processed the same way as claims that were not NGACO instances in the baseline years.

[63] These data are available in the CM/CMMI Central Repository Payment File.

[64] To distinguish between TCC, PCC, and PCC+APO claims, we followed guidance provided by the Innovation Center's GPDC payment analysis and operational support contractor in "Constructing MER [Monthly Expenditure Report]/QBR [Quarterly Benchmark Report] Data from the Claim & Claim Line Feed Data Files" (January 16, 2022; Revision: 2022.01.02).

Exhibit H.3. Total Gross Medicare Spending in PY 2021



NOTES: IP = Inpatient; OP = Outpatient; SNF = Skilled Nursing Facility; HHA = Home Health Agency; HS = Hospice; DME = Durable Medical Equipment; GPDC = Global and Professional Direct Contracting; NGACO = Next Generation Accountable Care Organization; APO = Advance Payment Option; PCC = Primary Care Capitation; TCC = Total Care Capitation; PBP = Population-Based Payment. The total payment amount for facility claims that are NGACO instances is the claim value amount from claims with value code Q0. The total payment amount for facility claims that are APO GPDC instances is the claim payment amount plus the PBP reduction amount. The total payment amount for facility claims that are TCC/PCC GPDC instances is the claim payment amount plus the beneficiary-year capitation amounts for TCC/PCC claims. The total payment amount for facility claims that are non-NGACO/GPDC instances (that is, "Other" claims) is the claim payment amount. The uncompensated care payment amount is subtracted from all payment amounts for facility claims. The total payment amount for physician/supplier claims that are NGACO instances is the claim payment amount plus the PBP reduction amount. The total payment amount for physician/supplier claims that

are APO GPDC instances is the claim payment amount plus the PBP reduction amount. The total payment amount for physician/supplier claims that are TCC/PCC GPDC instances is the claim payment amount plus the beneficiary-year capitation amount for TCC/PCC claims. The total payment amount for physician/supplier claims that are non-NGACO/GPDC instances and are treatment group claims is the claim payment amount. The total payment amount for physician/supplier claims that are non-NGACO/GPDC instances and are comparison group claims could be Comprehensive Primary Care Plus (CPC+)/Primary Care First (PCF) instances or non-CPC+/PCF instances. The total payment amount for CPC+/PCF instances is the claim payment amount adjusted for the line other applied amount for claims with the line other applied indicator code T, A2, or A3. The total payment amount for non-CPC+/PCF instances is the claim payment amount.

In computing total Medicare gross spending, we include the APO claims reduction amounts that are advanced to DCEs electing PCC plus to APO (PCC+APO) option. Under the APO, DCEs receive advance monthly payments that are reduced on FFS claims for their providers participating in the APO. APO payments are reconciled against the amount of reduction made in FFS payments using the following formula:

$$\sum \text{APO Claims Reduction Amount} = \text{APO} \left(\sum \text{Monthly Advance Payment Amount} - \text{Reconciliation Amount} \right)$$

Total Medicare Net Spending

Total Medicare net spending is defined as total Medicare gross spending *less* the shared savings payments CMS made to GPDC DCEs in PY 2021 under the Professional or Global option. We obtained the shared savings amount from the public financial results from the Provisional Settlement[65] in early August 2022[66] and adjusted for the difference in beneficiary-months between the evaluation's analytic population and the population used for financial calculations.[67] Shared savings applied to calculate the net spending totaled $17,941,211 for Standard DCEs and $15,522,587 for New Entrant DCEs (not including the shared savings amounts from the three New Entrant DCEs excluded from our analysis, as noted below) in PY 2021.

Medicare Spending in Care Settings

We constructed nine setting-specific outcomes for Medicare spending to reflect intensity of resource use (**Exhibit H.4**). These measures capture what Medicare would have paid absent GPDC's TCC/PCC payments[68] and include amounts on non-APO claims plus the amount Medicare would have paid absent APO reduction for APO claims for treatment group beneficiaries. They are adjusted for PBPs and other model-specific payments reconciled through the claims system for other APMs (NGACO, CPC+, and PCF) that overlapped with GPDC baseline years or treatment years (comparison group only) in PY 2021. Each measure reflects the paid amount on specific claims per beneficiary per year (PBPY), calculated as the paid amount in a year (through alignment end date) for beneficiaries aligned to either the DCE or comparison group.[69] Spending can accrue from beneficiaries with an admission date or visit encounter start date from the beginning of the PY (January 1)

[65] Per the GPDC FAQs, under the Provisional Settlement, "CMS will distribute interim-shared savings and collect interim-shared losses shortly after the end of the PY reflecting cost experience through the first six months of the PY, with a final settlement taking place once complete data are available for the full PY (approximately seven months after the PY ends)."

[66] PY 2021 GPDC Financial Results. Available at: https://www.cms.gov/priorities/innovation/media/document/gpdc-py2021-financial-results

[67] Our analytic population excluded prospectively plus aligned beneficiaries, and included the January-March 2021 when calculating total Medicare Part A & B spending. To accommodate for this difference in net spending calculation, we adjusted the shared saving amount based on total number of aligned beneficiary months – to be specific, we used beneficiary months from financial calculation divide shared saving amount then times beneficiary months from evaluation's analytic population as the modified shared saving amount.

[69] Direct comparisons between total spending and spending categories are not feasible given differences in how these measures were constructed and analyzed.

through the end of the PY (December 31) or until the last day the beneficiary remained aligned with the treatment or comparison group.

Exhibit H.4. Claims-Based Setting-Specific Medicare Spending Measures, PY 2021

Setting	Specification
Acute care	Paid amounts on FFS IP claims for short-term (general and specialty) hospitals or CAHs, excluding federal and non-federal emergency hospitals
OP facility	Paid amounts on FFS OP claims for hospital outpatient care
SNF	Paid amounts on FFS non-swing bed SNF and swing bed SNF claims
IRF and LTCH	Paid amount on FFS inpatient claims for IRF and LTCH providers
Professional services	Paid amounts on FFS non-DME Carrier claims, excluding claim lines with one of the 76 E&M HCPCS codes used to determine GPDC Model alignment
Primary care visits	Paid amounts on FFS outpatient and non-DME carrier claims for primary care clinicians using the union of the E&M HCPCS codes used for GPDC Model alignment and the RBCS E&M services HCPCS codes
Specialty care visits	Paid amounts on FFS outpatient and non-DME carrier claims for specialty care clinicians, using the same HCPCS code list described for the primary care visits measure
Home health	Paid amounts on FFS home health claims
Hospice	Paid amounts on FFS hospice claims

NOTES: FFS = fee-for-service; IP = inpatient; CAH = critical access hospital; OP = outpatient; SNF = skilled nursing facility; IRF = inpatient rehabilitation facility; LTCH = long-term care hospital; DME = Durable Medical Equipment; HCPCS = Healthcare Common Procedure Coding System; RBCS = Restructured BETOS Classification System; E&M = evaluation and management.

We constructed three measures used to capture spending in professional settings (professional services spending, primary care visits spending, and specialty care visits spending). The professional services spending measure captures the paid amounts on FFS non-DME Carrier claims and excludes HCPCS codes for E&M services used for GPDC Model alignment that are captured in the primary care visit and specialty care visit spending measures. The primary care visit spending measure includes paid amounts on FFS Outpatient and non-DME Carrier claims with the union of HCPCS codes (total: 522 codes) for E&M services from the Restructured BETOS Classification System (RBCS; 514 codes) and E&M services used to determine GPDC Model alignment (76 codes) for outpatient services provided by primary care clinicians (i.e., providers with a specialty code that indicates general practice, family medicine, internal medicine, pediatric medicine, geriatric medicine, nurse practitioner, clinical nurse specialist, or physician assistant). The specialty care visit spending measure includes paid amounts on the same claim types with the same HCPCS code list as used in the primary care visit spending measure, but limits claims to specialty care clinicians (i.e., providers with a specialty code that indicates indicating cardiology, gastroenterology, osteopathic manipulative medicine, neurology, obstetrics/gynecology, hospice and palliative care, sports medicine, physical medicine and rehabilitation, psychiatry, geriatric psychiatry, pulmonology, nephrology, infectious disease, endocrinology, rheumatology, multispecialty clinic or group practice, addiction medicine, hematology, hematology/oncology, preventative medicine, medical oncology, gynecological/oncology, or neuropsychiatry). **Exhibit H.5** provides a high-level summary of the differences between the three measures.

Exhibit H.5. Summary of Setting-Specific Measures for Professional Services, PY 2021

	Claim Type(s) Include…		HCPCS/CPT Include…		Provider Type(s) Include…	
	Outpatient Claims	Non-DME Carrier Claims	GPDC Model Alignment E&M	RBCS E&M	Primary Care Clinician	Specialty Care Clinicians
Professional services spending		✓		✓	✓	✓
Primary care visits spending	✓	✓	✓	✓	✓	
Specialty care visits spending	✓	✓	✓	✓		✓

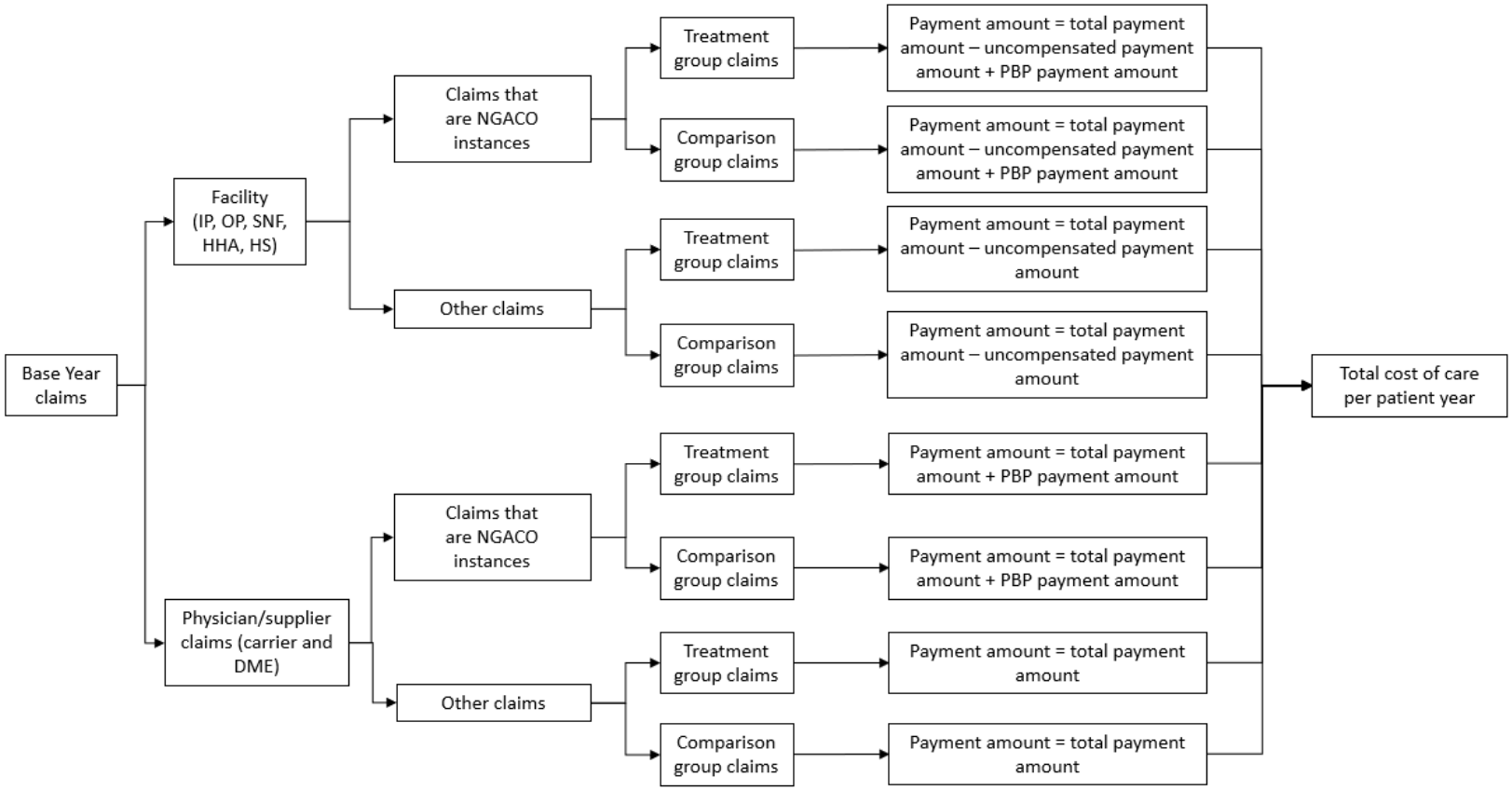
NOTES: DME = Durable Medical Equipment; HCPCS = Healthcare Common Procedure Coding System; RBCS = Restructured BETOS Classification System; E&M = evaluation and management.

Creating Setting-Specific Medicare Spending Measures. We adopted a different approach than is described above for gross Medicare spending to create measures in the BYs and PY 2021 that captured Medicare spending for different settings and service types. Instead of calculating what Medicare actually paid (as was done for gross Medicare spending), we calculated what Medicare would have paid. This was done because we are unable to cleanly parse out capitated payments across different care settings, as capitated amounts are calculated at the beneficiary-year level. However, this approach enables understanding of how DCEs influenced intensity of resource use in care settings. Therefore, the gross Medicare spending measure and the measures of Medicare spending in separate care settings cannot be directly compared.

Exhibits G.4 and G.5 detail the process for determining treatment and comparison group beneficiary gross Medicare spending in care setting and service type categories during the baseline and performance years, respectively. The processes to calculate the separate Medicare spending category measures is described separately for baseline and performance years below.

Baseline years. Claims identification and processing for the baseline year spending category measures is the same as the process for the baseline year total Medicare spending measure (**Exhibit H.6**).

Exhibit H.6. Medicare Spending in Care Setting and Service Type Categories in BYs (2018-2020)

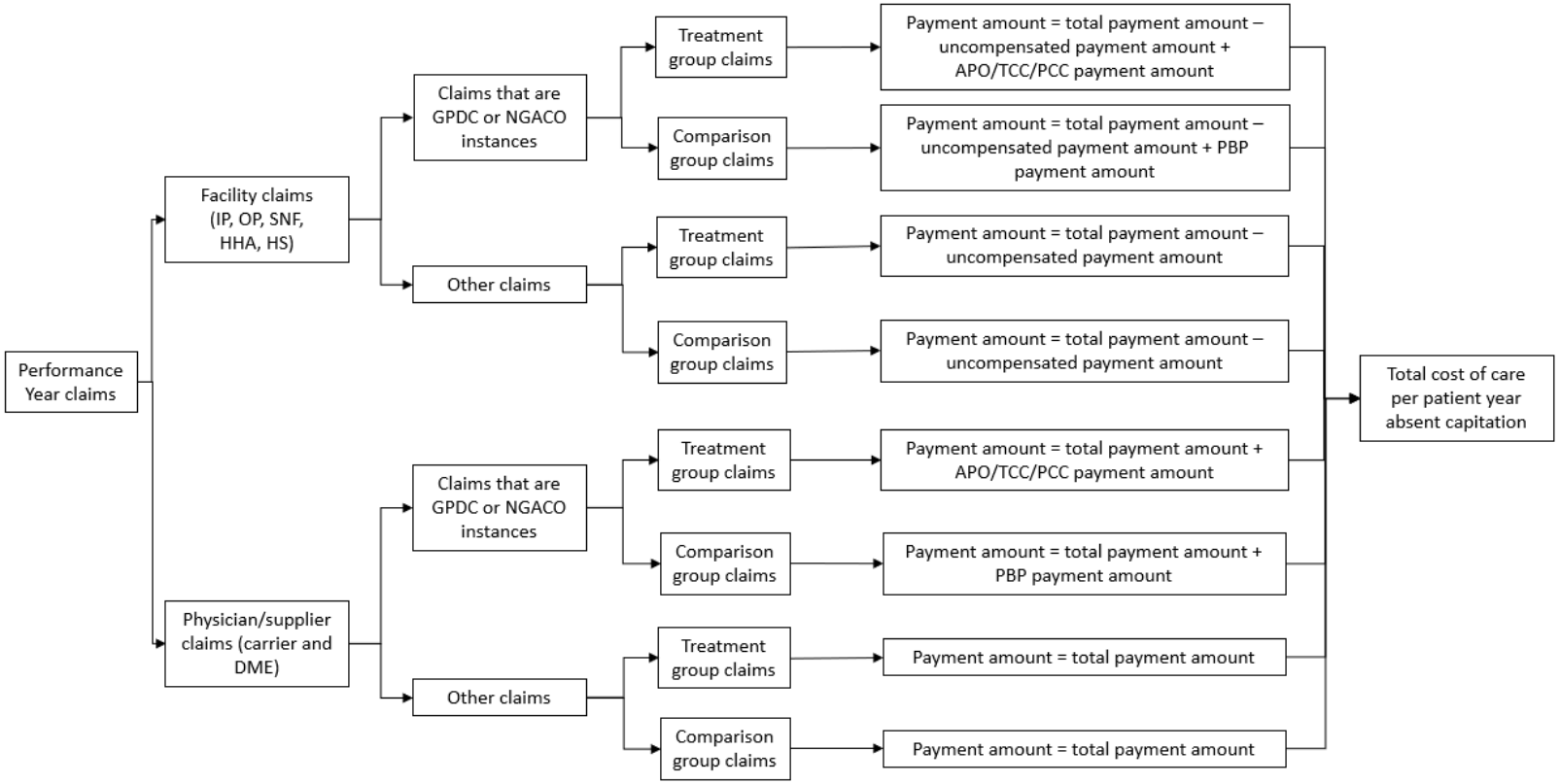


NOTES: IP = Inpatient; OP = Outpatient; SNF = Skilled Nursing Facility; HHA = Home Health Agency; HS = Hospice; DME = Durable Medical Equipment; NGACO = Next Generation Accountable Care Organization; PBP = Population-Based Payment. The total payment amount for facility claims that are NGACO instances is the claim value amount from claims with value code Q0; the total payment amount for facility claims that are not NGACO instances (that is, "Other" claims) is the claim payment amount. The uncompensated care payment amount is subtracted from all payment amounts for facility claims. The total payment amount for physician/supplier claims that are NGACO instances is the claim payment amount plus the PBP reduction amount; the total payment amount for physician/supplier claims that are not NGACO instances and are either treatment group or comparison group claims could be from Comprehensive Primary Care Plus (CPC+)/Primary Care First (PCF) instances or non-CPC+/PCF instances. The total payment amount for CPC+/PCF instances is the claim payment amount adjusted for the line other applied amount for claims with the line other applied indicator code T, A2, or A3. The total payment amount for non-CPC+/PCF instances is the claim payment amount.

PY 2021. We identified claims in the same manner for PY 2021 (**Exhibit H.7**) as we did for the baseline years. Similar to the PY 2021 total Medicare spending measure, we then used the program identifier on the claim to distinguish between NGACO, GPDC, and non-NGACO/GPDC claims. However, unlike the total spending measure, we only distinguish GPDC to account for APO payments (treatment group only).

- For facility claims that were NGACO instances, gross Medicare spending was calculated as the claim value amount from claims with PBP adjustments for NGACO minus the uncompensated care payment amount plus the claim PBP reduction amount.
- Facility claims that were GPDC instances were processed the same way as in the PY 2021 total Medicare spending measure, except that beneficiary-year level capitated payments were not added to the spending amounts.
- Facility claims that were not NGACO/GPDC instances were processed the same way as in the PY 2021 total Medicare spending measure. beneficiaries
- Physician/supplier claims that were NGACO instances were processed the same way as in the PY 2021 total Medicare spending measure.
- Physician/supplier claims that were GPDC instances were processed the same way as in the PY 2021 total Medicare spending measure, except that beneficiary-year level capitated payments were not added to the spending amounts.
- Physician/supplier claims that were not NGACO/GPDC instances for beneficiaries in the treatment group were processed the same way as in the PY 2021 total Medicare spending measure.

Exhibit H.7. Medicare Spending in Care Setting and Service Type Categories in PY 2021



NOTES: IP = Inpatient; OP = Outpatient; SNF = Skilled Nursing Facility; HHA = Home Health Agency; HS = Hospice; DME = Durable Medical Equipment; GPDC = Global and Professional Direct Contracting; NGACO = Next Generation Accountable Care Organization; APO = Advance Payment Option; PCC = Primary Care Capitation; TCC = Total Care Capitation; PBP = Population-Based Payment. The total payment amount for facility claims that are NGACO or GPDC instances is the claim payment amount plus the PBP reduction amount; the total payment amount for facility claims that are non-NGACO/GPDC instances (that is, "Other" claims) is the claim payment amount. The uncompensated care payment amount is subtracted from all payment amounts for facility claims. The total payment amount for physician/supplier claims that are NGACO or GPDC instances is the claim payment amount plus the PBP reduction amount; the total payment amount for physician/supplier claims that are non-NGACO/GPDC instances and are treatment group claims is the claim payment amount. The total payment amount for physician/supplier claims that are non-NGACO/GPDC instances and are comparison group claims could be from Comprehensive Primary Care Plus (CPC+)/Primary Care First (PCF) instances or non-CPC+/PCF instances. The total payment amount for CPC+/PCF instances is the claim payment amount adjusted for the line other applied amount for claims with the line other applied indicator code T, A2, or A3. The total payment amount for non-CPC+/PCF instances is the claim payment amount.

Accounting for APO Claims in Gross Total and Setting-Specific Medicare Spending

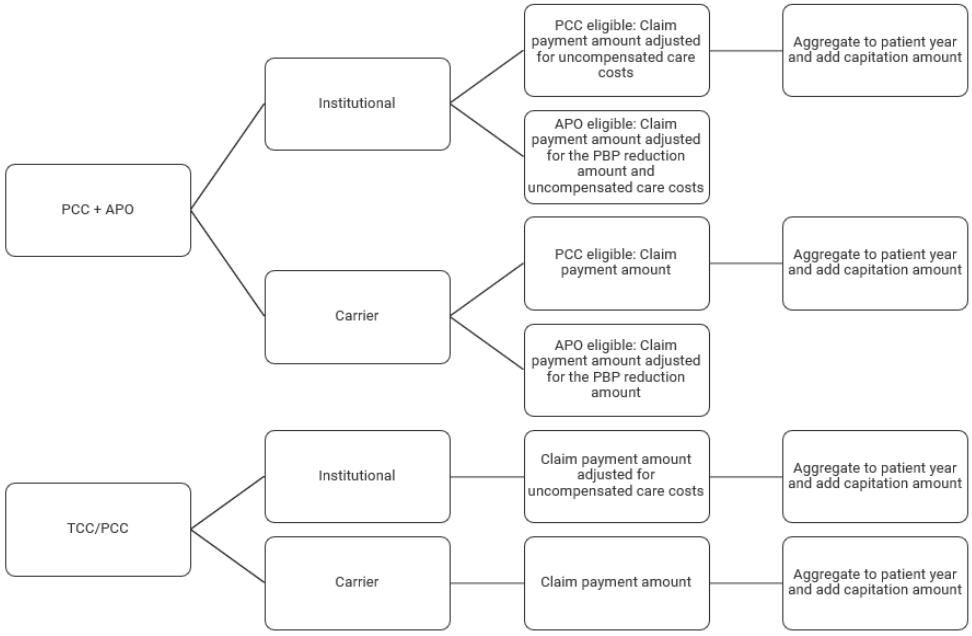
Exhibit H.8 shows the high-level process for accounting for APO claims in gross total Medicare spending and setting-specific Medicare spending measures in performance years. We determined whether claims were TCC, PCC only, or PCC+APO using guidance provided by the Innovation Center's GPDC payment analysis and operational support contractor. Irrespective of claim type, PCC+APO claims may have a component that is PCC eligible and a component that is APO eligible.

PCC+APO. For facility claims, the payment amount from the PCC-eligible component is the claim payment amount minus the uncompensated care payment amount. When we aggregate Medicare spending to the beneficiary-year, for gross Medicare spending, we add in the appropriate beneficiary-year capitation amount. For facility claims, the payment amount from the APO-eligible component is the claim payment amount plus the APO reduction amount minus the uncompensated care payment amount.

For physician/supplier claims, the payment amount from the PCC-eligible component is the claim payment amount. As above, when we aggregate gross Medicare spending to the beneficiary-year, we add in the appropriate beneficiary-year capitation amount. For physician/supplier claims, the payment amount from the APO-eligible component is the claim payment amount plus the APO reduction amount.

TCC/PCC only. For facility claims, the payment amount is the claim payment amount minus the uncompensated care payment amount. For physician/supplier claims, the payment amount is the claim payment amount. As described above, when we aggregate Medicare spending to the beneficiary-year, for gross Medicare spending, we add in the appropriate beneficiary-year capitation amount.

Exhibit H.8. Process to Account for APO Claims in Medicare Spending Measures for the GPDC Group in PY 2021



NOTES: PCC = Primary Care Capitation; APO = Advance Payment Option; TCC = Total Care Capitation; PBP = Population-Based Payment.

H.2.2. Medicare Utilization Outcomes

Seven utilization measures (**Exhibit H.9**) were created for the treatment group and comparison group in PY 2021 and its baseline years. These measures were selected to assess the GPDC Model's impact on utilization across different types of health care providers and settings. Unlike the total Medicare gross spending and spending category measures, the utilization measures are calculated the same way for the treatment and comparison group and in all baseline and performance years.

Exhibit H.9. Claims-Based Utilization Measures, PY 2021

Main Outcome	Specification
Acute care hospitalizations	Number of all-cause acute care inpatient hospital stays per 1,000 beneficiaries per year (BPY) during the reference year (through alignment end date) for beneficiaries aligned to either the DCE or comparison group. Stays that included transfers between facilities are counted as one stay. All stays with admission date occurring between the start and the end of the reference year, or the end date of the beneficiary's alignment to the treatment or comparison group during the reference year, are included in the measure.

Main Outcome	Specification
Acute care length of stay (days)	Number of days between acute care inpatient hospital admission and discharge per 1,000 BPY during the reference year (through alignment end date) for beneficiaries aligned to either the DCE or comparison group. Stays that included transfers between facilities are counted as one stay. Acute care inpatient hospital days from the start to the end of the reference year, or the end date of the beneficiary's alignment to the treatment or comparison group during the reference year, are included in the measure.
ED visits and observation stays	Number of ED visits, including observation stays, per 1,000 BPY during the reference year (through alignment end date) for beneficiaries aligned to either the DCE or comparison group. Visits that included transfers between facilities are counted as one visit. ED visits resulting in inpatient hospital stays are excluded. All ED visits, including observation stays, occurring between the start and the end of the reference year, or the end date of a beneficiary's alignment to the treatment or comparison group during the reference year, are included in the measure.
IRF and LTCH days	Number of institutional PAC (IRF and LTCH) days per 1,000 BPY during the reference year (through alignment end date) for beneficiaries aligned to either the DCE or comparison group. All institutional PAC days from the start to the end of the reference year, or the end date of the beneficiary's alignment to the treatment or comparison group during the reference year, are counted towards the measure.
SNF days	Number of SNF days (in either a swing bed or non-swing bed SNF) per 1,000 BPY[70] during the reference year (through alignment end date) for beneficiaries aligned to either the DCE or comparison group. All SNF days from the start to the end of the reference year, or the end date of the beneficiary's alignment to the treatment or comparison group during the reference year, are counted towards the measure.
Home health episodes	Number of 30-day home health episodes per 1,000 BPY during the reference year (through alignment end date) for beneficiaries aligned to either the DCE or comparison group. Prior to 1/1/2020, episodes include sum of 60-day home health episodes, as well as home health episodes with low-utilization payment adjustments and partial episode payment adjustments. After 1/1/2020, episodes include sum of 30-day home health episodes, as well as home health episodes with low-utilization payment adjustments and partial episode payment adjustments. Episodes were standardized to 30 days to allow for comparison over time. All episodes that began between the start and the end of the reference year, or the end date of a beneficiary's alignment to the treatment or comparison group during the year, are included in the measure.
Continuous hospice days prior to death	Number of continuous hospice service days between hospice election and death per 1,000 BPY during the reference year (through alignment end date) for beneficiaries aligned to either the DCE or comparison group who die while electing the Medicare hospice benefit, calculated using the claim from and claim through dates on hospice claims. Beneficiaries who disenroll from hospice alive and return would have their (measure) day count "restarted" at live discharge. Hospice stay days from the start to the end of the reference year, or the end date of a beneficiary's alignment to the treatment or comparison group during the year, are included in the measure.

NOTES: PBPY = per beneficiary per year, ED = emergency department, PAC = post-acute care; SNF = skilled nursing facility; IRF = inpatient rehabilitation facility; LTCH = long-term care hospital; DCE = Direct Contracting Entity; E&M = evaluation and management.

For measures that count days of utilization (e.g., acute care length of stay in days): 1) stays beginning on or before the alignment end date and ending on or after the alignment end date or the end of the reference year will contribute all days in the length of stay to the measure (for example, for reference year 2021 and alignment end date December 31, 2021, a stay beginning on December 15, 2021, and ending January 4, 2022, contributes 20 days to the measure for 2021); and 2) stays beginning after the alignment end date do not contribute any

[70] Although SNF days can only accumulate among SNF users, the measure rate per 1,000 BPY includes both SNF users and non-users.

days to the measure for that reference year (for example, for reference year 2021 and alignment end date December 31, 2021, a stay beginning on January 1, 2022, and ending on January 20, 2022, does not contribute any days to the measure for 2021; for reference year 2022, if this stay meets other measure criteria, it would contribute 20 days to the measure for 2022).

For measures that count stays/visits (e.g., number of acute care hospitalizations): 1) stays/visits beginning before January 1 of the reference year are not included in the measure (for example, for reference year 2021, a stay beginning on December 31, 2020, and ending on February 1, 2021, is not included in the measure); 2) stays/visits beginning on or before the alignment end date and ending on or after the alignment end date or the end of the reference year are included in the measure (for example, for reference year 2021 and alignment end date December 31, 2021, a stay beginning on December 31, 2021, and ending on January 1, 2022 is included in the measure for 2021); and 3) stays/visits beginning after the alignment end date are not included in the measure (for example, for reference year 2021 and alignment end date December 31, 2021, a stay beginning on January 1, 2022, and ending on January 20, 2022, is not included in the measure for 2021).[71] Examples of qualifying stays for measures for reference year 2021 are provided in **Exhibit H.10**.

Exhibit H.10. Measure Eligible Stay Start and End Dates, Reference Year 2021

Reference Year Start Date	Alignment End Date	Stay Start Date	Stay End Date	Stay Included in Measure for Reference Year 2021	Days Included in Measure for Reference Year 2021
January 1, 2021	December 31, 2021	December 15, 2021	January 4, 2022	Yes	20
January 1, 2021	December 31, 2021	January 1, 2022	January 4, 2022	No	0
January 1, 2021	December 1, 2021	December 2, 2021	December 4, 2021	No	0
January 1, 2021	December 31, 2021	December 31, 2020	February 1, 2021	No	0
January 1, 2021	December 31, 2021	December 31, 2021	January 1, 2022	Yes	2

H.2.3 Medicare Quality of Care Outcomes

Four quality of care outcomes (**Exhibit H.11**) were created for the treatment group and comparison group in PY 2021 and its baseline years. These measures were selected to assess the GPDC Model's impact on quality of care across different types of health care providers and settings, and for beneficiaries with varying levels of risk (e.g., beneficiaries with multiple chronic conditions). Similar to the utilization measures, the quality measures are calculated the same way in the treatment and comparison group and in baseline and performance years.

[71] Although the Model was implemented March 1, 2021, we used January 1, 2021, as the start date of the PY 2021 reference year.

Exhibit H.11. Claims-Based Quality of Care Measures, PY 2021

Main Outcome	Specification
All-condition readmission [72]	Rate of beneficiaries who were readmitted to a hospital within 30 days following discharge from the index hospitalization per 1,000 BPY during the reference year (through alignment end date) for beneficiaries aligned to either the DCE or comparison group who had an eligible index hospitalization. The denominator excludes beneficiaries who did not experience a hospitalization in a given year. This measure reflects the share of beneficiaries who had one or more unplanned readmissions in the reference year, among those who had an eligible hospitalization. We use CMS' risk standardized all-condition readmission measure for GPDCs to identify eligible hospitalizations and unplanned readmissions. Beneficiaries eligible for the measure denominator are DCE- or comparison group-aligned beneficiaries with one or more eligible index hospitalizations between the start and the end of the reference year, or the end date of a beneficiary's alignment to the treatment or comparison group during the reference year, who do not meet denominator exclusion criteria; beneficiaries eligible for the measure numerator are those with one or more unplanned readmissions within 30 days of discharge from their index hospitalization who do not meet numerator exclusion criteria.
Mortality	Rate of beneficiaries who died during the reference year per 1,000 BPY during the reference year (through alignment end date) for beneficiaries aligned to either the DCE or comparison group. Beneficiaries eligible for the measure denominator are DCE- or comparison group-aligned beneficiaries during the reference year; beneficiaries eligible for the measure numerator are those with date of death between the start and the end of the reference year, or the end date of the beneficiary's alignment to the treatment or comparison group during the reference year.
ACSC hospitalizations[73]	Rate of beneficiaries with one or more ACSC acute care hospitalizations in the performance year per 1,000 BPY during the reference year (through alignment end date) for beneficiaries aligned to either the DCE or comparison group. This measure reflects the risk of beneficiaries being hospitalized for ACSCs during the year. ACSCs include chronic conditions (diabetes with short-term complications, diabetes with long-term complications, chronic obstructive pulmonary disease or asthma in older adults, heart failure, uncontrolled diabetes, asthma in younger adults, and lower-extremity amputation among beneficiaries with diabetes) and acute conditions (community-acquired pneumonia and urinary tract infection). Beneficiaries eligible for the measure denominator are DCE- or comparison group-aligned beneficiaries who do not meet denominator exclusion criteria; beneficiaries eligible for the measure numerator are those with at least one inpatient hospital discharge with a primary diagnosis code indicating select chronic (diabetes with short-term complications, diabetes with long-term complications, uncontrolled diabetes, lower extremity amputation among beneficiaries with diabetes, COPD/asthma, or heart failure) and acute (community-acquired pneumonia or urinary tract infection) conditions between the start and the end of the reference year, or the end date of a beneficiary's alignment to the treatment or comparison group during the reference year, who do not meet numerator exclusion criteria.
Timely follow-up after acute exacerbations of chronic conditions[74]	Rate of beneficiaries who received follow-up care within the timeframe recommended by clinical practice guidelines in a non-emergency outpatient setting per 1,000 BPY during the reference year for beneficiaries aligned to either the DCE or comparison group with one or more acute events related to one of six chronic conditions (that is, hypertension, asthma, heart failure, coronary artery disease, chronic obstructive pulmonary disease, and Type I/II diabetes). Acute events are

[72] Global and Professional Direct Contracting Model: Quality Measurement Methodology (for PY 2021 only—4/1/2021-12/31/2021) (CMS)

[73] 2016 Measure Information About the Hospital Admissions for Acute and Chronic Ambulatory Care-Sensitive Condition (ACSC) Composite Measures (CMS)

[74] Global and Professional Direct Contracting Model: Quality Measurement Methodology (for PY 2021 only—4/1/2021-12/31/2021) (CMS)

Main Outcome	Specification
	those that required either an ED visit, observation stay, or hospitalization. Beneficiaries eligible for the measure denominator are those with one of six chronic conditions who have an acute event during the reference year where the end of the follow-up period occurs between the start and the end of the reference year, or the end date of the beneficiary's alignment to the treatment or comparison group during the reference year, who do not meet denominator exclusion criteria; beneficiaries eligible for the measure numerator are those who receive timely follow-up following their acute event. Acute events where the beneficiary enters a SNF, non-acute care, or hospice care within the follow-up interval are not included in the measure. The model launched this measure in 2022 for Standard and New Entrant DCEs. The measure was a pay-for-reporting measure in 2022 and transitioned to a pay-for-performance measure in 2023.

NOTES: BPY = beneficiaries per year; DCE = Direct Contracting Entity; ACSC = ambulatory care sensitive condition; ED = emergency department; SNF = skilled nursing facility.