Technical Appendices for Fifth Evaluation Report

Next Generation Accountable Care Organization (NGACO) Model Evaluation

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Technical Appendices for Report 5

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Appendix A: Quantitative Methods and Analysis

Study Design to Assess Impact of the NGACO Model

Difference-in-Differences (DID) Design

We used a DID design to assess the impact of the NGACO model in its first five performance years (PY1, PY2, PY3, PY4, and PY5). As shown in **Exhibit A.1**, the design compares differences in outcomes for the NGACO and propensity score-weighted comparison beneficiaries (residing in the same markets) in a performance year against differences in outcomes for the NGACO and comparison groups in three preceding baseline years (BY1, BY2, BY3) for each cohort.

- A separate comparison group in the baseline period is created for each performance year by identifying beneficiaries who would be eligible for alignment with an NGACO, had their care been mainly with NGACO providers.

- The comparison group and the NGACO group's baselines are used to establish what would have happened to the NGACO beneficiaries in a given performance year in the absence of the NGACO model.

- The NGACO model's treatment effect is estimated relative to this untreated counterfactual.

The DID design assumes that time-varying and time-invariant, unobservable factors affect the treatment and comparison group similarly. If observed characteristics between the NGACO and comparison groups are correlated with unobserved characteristics between the two groups, using propensity-score weights can mitigate biases that may result from observed and unobserved differences influencing outcomes between the two groups. A key assumption of our DID design is that of parallel trends, namely, that changes in outcomes from the baseline years to the performance year would have been similar in the NGACO and comparison group in the absence of the NGACO model. We tested this assumption across the baseline years by comparing the NGACO group's trend in BY1 to BY3 against the trend in the comparison group for all outcomes, noting where the assumptions passed and failed for each cohort and model-wide.

Exhibit A.1. Use of DID to Estimate the NGACO Model's Treatment Effect
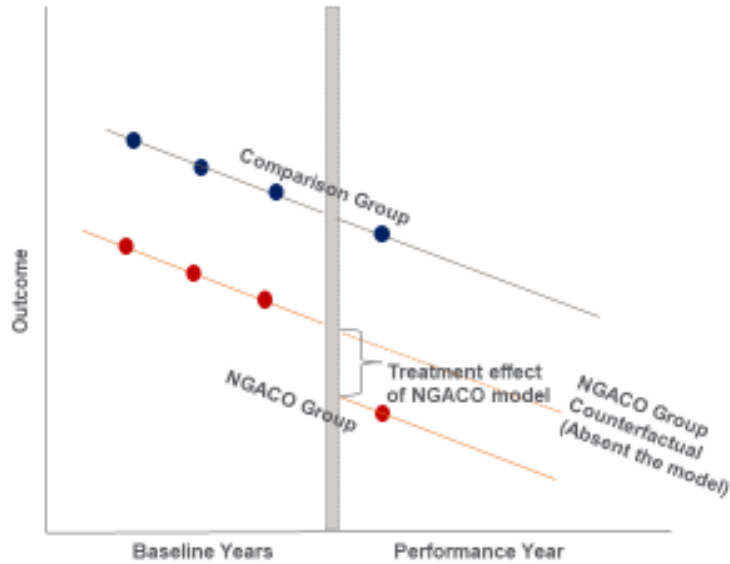
Performance and Baseline Years

Our analysis used a DID design to examine changes in outcomes for the NGACO and comparison group beneficiaries in PY1, PY2, PY3, PY4, and PY5 relative to three preceding baseline years (BY1, BY2, and BY3,) for each cohort; for each cohort, BY3 is the earliest year prior to the PY. **Exhibit A.2** shows calendar years (CY) as they correlate with PYs and BYs for each NGACO cohort.

Exhibit A.2. Calendar Years that Correspond to BYs and PYs for the 2016, 2017, and 2018 Cohorts

Performance Year	NGACO and Comparison Group	CY 2013	CY 2014	CY 2015	CY 2016	CY 2017	CY 2018	CY 2019	CY 2020
PY1 (CY 2016)	2016 Cohort	BY3	BY2	BY1	PY1	-	-	-	
PY2 (CY 2017)	2016 Cohort	BY3	BY2	BY1	-	PY2	-	-	
	2017 Cohort	-	BY3	BY2	BY1	PY2	-	-	
PY3 (CY 2018)	2016 Cohort	BY3	BY2	BY1	-	-	PY3	-	
	2017 Cohort	-	BY3	BY2	BY1	-	PY3	-	
	2018 Cohort	-	-	BY3	BY2	BY1	PY3	-	
PY4 (CY 2019)	2016 Cohort	BY3	BY2	BY1	-	-	-	PY4	
	2017 Cohort	-	BY3	BY2	BY1	-	-	PY4	
	2018 Cohort	-	-	BY3	BY2	BY1	-	PY4	
PY5 (CY 2020)	2016 Cohort	BY3	BY2	BY1	-	-	-	-	PY5
	2017 Cohort	-	BY3	BY2	BY1	-	-	-	PY5
	2018 Cohort	-	-	BY3	BY2	BY1	-	-	PY5

NOTES: CY = calendar year (January 1 through December 31); BY= baseline year; PY = performance year.

Defining NGACO and Comparison Groups

For our Fifth Evaluation Report, NGACO beneficiaries and comparison beneficiaries were *prospectively attributed* to the performance-year NGACO providers (treatment group) or providers unaffiliated with any Medicare ACO (comparison group) for each PY and its respective BY. See **Exhibit A.3** for summary definitions.

Exhibit A.3. NGACO and Comparison Groups Defined, in BYs and in PYs

	Baseline Years	Performance Years
NGACO Group		
All NGACO-aligned fee-for-service (FFS) beneficiaries	Beneficiaries residing in NGACO market areas in the BYs prospectively attributed to NGACO participating providers in a given PY using the model's alignment rules and aligned for at least 30 days in the year	Beneficiaries prospectively attributed to NGACO participating providers in a given PY using the model's alignment rules, situated in NGACO market areas and aligned for at least 30 days in the year
Comparison Group		
Alignment-eligible FFS beneficiaries in NGACO markets not aligned with NGACOs	Beneficiaries residing in NGACO market areas in the BYs prospectively attributed to non-NGACO providers during the BY using NGACO model alignment rules and aligned for at least 30 days in the year	Beneficiaries residing in NGACO market areas prospectively attributed to non-NGACO providers during the PY using NGACO model alignment rules and aligned for at least 30 days in the year

NOTES: Non-NGACO providers were defined as excluding NGACO participating providers, NGACO preferred providers, and providers in SSP ACOs and Pioneer ACOs in the respective years. Beneficiaries aligned to Comprehensive ESRD Care (CEC) model were excluded from NGACO and comparison groups. BY= baseline year; PY = performance year.

Alignment Approach

We used final action claims and followed the NGACO model's alignment algorithm to prospectively attribute beneficiaries to either NGACO or comparison groups in our analyses.[1] The term *prospective attribution* indicates that the NGACO model's alignment for a given PY and BYs is based on Medicare claims from a *preceding* 24-month alignment period. The alignment algorithm was used to attribute beneficiaries to an NGACO's participating providers or to non-NGACO providers in each BY or PY, based on providers that received the largest share of dollars

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[1] A full description of the alignment algorithm is available from: RTI International. Next Generation ACO Model Calculation of the Performance Year Benchmark: Performance Years 2019 and 2020. September 2018. Available at https://innovation.cms.gov/files/x/nextgenaco-benchmarkmethodology-py4.pdf

for beneficiaries' qualifying evaluation and management (QEM) visits in the alignment period;[2] see **Exhibit A.4.**

Exhibit A.4.   Alignment Periods for the Model Evaluation, PY5

	Cohort	Period Type	CY 2013	CY 2014	CY 2015	CY 2016	CY 2017		CY 2020
PY5 (CY 2020)	**2016 Cohort**		**BY3**	**BY2**	**BY1**	–	–	–	**PY5**
		Alignment Period	July 1, 2010 – June 30, 2012	July 1, 2011 – June 30, 2013	July 1, 2012 – June 30, 2014	–	–	–	July 1, 2017 – June 30, 2019
	2017 Cohort		–	**BY3**	**BY2**	**BY1**	–	–	**PY5**
		Alignment Period	–	July 1, 2011 – June 30, 2013	July 1, 2012 – June 30, 2014	July 1, 2013 – June 30, 2015	–	–	July 1, 2017 – June 30, 2019
	2018 Cohort		–	–	**BY3**	**BY2**	**BY1**	–	**PY5**
		Alignment Period	–	–	July 1, 2012 – June 30, 2014	July 1, 2013 – June 30, 2015	July 1, 2014 – June 30, 2016	–	July 1, 2017 – June 30, 2019

NOTES: The alignment periods were applied to the NGACO and comparison groups. CY = calendar year (January 1 through December 31); BY= baseline year; PY = performance year.

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[2] QEM codes comprised the following: 99201, 99202, 99203, 99204, 99205, 99211, 99212, 99213, 99214, 99215, 99324, 99325, 99326, 99327, 99328, 99334, 99335, 99336, 99337, 99339, 99340, 99341, 99342, 99343, 99344, 99345, 99347, 99348, 99349, 99350, 99495, 99496, 99490, G0402, G0438, G0439.

We used the following eight steps to implement the alignment for NGACO and comparison beneficiaries in each BY and PY:

1. **Identify Alignment-Eligible NGACO and Non-NGACO Providers.** We identified alignment-eligible NGACO participating providers in PY5 and alignment-eligible non-NGACO providers in each BY or PY. The former were identified from the participating provider file that the program analysis contractor uses for alignment. Alignment-eligible providers in PY5 were identified as practitioners within practices or—in the case of federally qualified health centers (FQHCs), rural health clinics (RHCs), and critical access hospitals (CAHs)—practitioners within facilities.[3] To define the baseline providers for all cohorts, we identified the alignment-eligible providers by National Provider Identifier (NPI) alone to capture practitioner performance over time; the NPI is a more comprehensive way to identify providers, as tax identification number (TIN)-NPI and claims certification number (CCN)-NPI combinations can change over time. Alignment-eligible practitioners have selected primary care or specialist designations.[4] Alignment for the comparison group in each cohort mirrored the approach used for the NGACO group.

2. **Identify Alignment-Eligible Beneficiaries.** We identified alignment-eligible beneficiaries at the beginning of each BY or PY using the Medicare enrollment database. Alignment-eligible beneficiaries had to: (1) be alive; (2) be covered by Medicare Parts A and B; (3) not be in a Medicare Advantage or other Medicare managed care plan; (4) not have Medicare as their secondary payer; (5) reside in the United States; and (6) have at least one paid claim for a QEM service during the two-year alignment period.

3. **Calculate Allowable Charges for All Alignment-Eligible Beneficiaries.** For all alignment-eligible beneficiaries in the BY and PY, we used Medicare claims to determine the total allowable charges for all QEM services received from the group of providers composing each NGACO or non-NGACO provider during the alignment period. Charges from the earliest alignment year were weighted by one-third and those in the recent alignment year were weighted by two-thirds to obtain the total weighted allowable charges for each alignment-eligible beneficiary.

4. **Align Beneficiaries with NGACO and Non-NGACO Providers Using Claims-Based NGACO Alignment Algorithm.** We aligned each eligible beneficiary to the group of participating providers composing an NGACO or group of non-NGACO providers according to the NGACO model's alignment rules, based on the percentage of the beneficiary's weighted allowable charges for QEM services over the alignment period. The alignment rules give precedence to primary care specialists over other selected specialists and use the most recent QEMs to break ties when weighted charges are equal across two or more groups of providers for a beneficiary.

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[3] FQHCs, RHCs, and CAHs were identified based on billing codes 77, 71, and 85, respectively, on outpatient claims. Practitioners billing through CAHs included those that receive payment from Medicare through the Optional Payment Method, where the CAH bills for facility and professional outpatient services to Medicare when physicians or practitioners reassign billing rights to the CAH.

[4] Primary care practitioners included those with specialty codes 01, 08, 11, 37, 38, 50, 89, and 97. Specialists included those with specialty codes 06, 12, 13, 16, 23, 25, 26, 27, 29, 39, 46, 70, 79, 82, 83, 84, 86, 90, and 98.

5. **Align Beneficiaries Via Voluntary Alignment.** We attributed voluntarily aligned beneficiaries to NGACOs in the PY.[5] Voluntarily aligned beneficiaries were also aligned with the NGACOs in the BYs if they were deemed to be alignment-eligible at the beginning of those years.[6] Voluntary alignment took precedence over claims alignment.

6. **Assess Results of Prospective Alignment Replication Using Final Action Claims Against NGACO Model's Prospective Beneficiary Alignment Lists.** We checked the match between our aligned beneficiaries and the NGACO program analysis contractor's list of prospectively aligned beneficiaries in each PY. We retained NGACO beneficiaries who matched with the program analysis contractor's prospectively aligned beneficiary list in a given PY. We had a match rate of 99 percent with the program analysis contractor's prospectively aligned population.

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[5] The proportion of NGACO voluntarily aligned beneficiaries was 0.37 percent for PY5 (0.03 percent for the 2016 cohort, 0.74 percent for the 2017 cohort, and 0.26 percent for the 2018 cohort).

[6] The following proportions of 2016 cohort NGACO PY5 beneficiaries were voluntarily aligned in baseline years: 0.01 percent for BY3, 0.01 percent for BY2, and 0.01 percent for BY1.

The following proportions of the 2017 cohort NGACO PY5 beneficiaries were voluntarily aligned in baseline years: 0.57 percent for BY3, 0.63 percent for BY2, and 0.67 percent for BY1.

The following proportions of the 2018 cohort NGACO PY5 beneficiaries were voluntarily aligned in baseline years: 0.16 percent for BY3, 0.17 percent for BY2, and 0.19 percent for BY1.

7. **Apply BY or PY Model Exclusions to Replicated Prospective Alignment Lists for NGACO and Comparison Groups.** We excluded NGACO and comparison beneficiaries based on the NGACO model's exclusion criteria to determine their duration of alignment with the NGACO or comparison group in each BY or PY. A beneficiary was aligned to the NGACO or comparison group for all months of a BY or PY until he or she met an exclusion criterion.[7] The date a beneficiary's alignment ended for the year (alignment end date) was either his or her date of exclusion from alignment or the last day of the BY or PY. Per the NGACO model's alignment rules, an aligned NGACO beneficiary could be excluded from the model over the course of the PY for several reasons: (1) died; (2) had Medicare as a secondary payer during any month; (3) lost Medicare Part A or B during any month; (4) transitioned to Medicare Advantage or a managed care plan during any month; (5) resided in a non-U.S. location during any month; or (6) was aligned to another Medicare shared-savings initiative. The evaluation handled these exclusions the same way, except for the fifth and sixth criteria. For the fifth criterion, the program analysis contractor excludes NGACO-aligned beneficiaries who moved outside of an NGACO's extended service area during a performance year or received a majority of QEM services from a provider located outside of an NGACO's extended service area during a performance year. For the evaluation, we applied geographic exclusions to the NGACO or comparison group in a BY or PY by restricting NGACO and comparison beneficiaries to those in hospital referral regions (HRRs) containing 1 percent or more of a PY's NGACO-aligned beneficiaries. For the sixth criterion, the evaluation accounted for exclusions owing to alignment to another Medicare shared-savings initiatives in BYs and PYs for both the NGACO and comparison groups. Beneficiaries aligned to the Comprehensive ESRD Care (CEC) model were excluded from NGACO and comparison groups. Remaining beneficiaries were aligned to groups of NGACO and non-NGACO providers. NGACO providers included all participating providers in an ACO. Non-NGACO providers were defined as those who were not in NGACOs in the PY as participating or preferred providers, and not in SSP or Pioneer ACOs in a respective year (BY or PY). In the next section we describe how we identified these provider groups. If after applying the NGACO alignment algorithm, a beneficiary was aligned with providers in an NGACO, SSP ACO, or Pioneer ACO, then the beneficiary was excluded from alignment to the comparison group at the beginning of a BY or PY. Since the attribution algorithms for the Shared Savings Program are not the same as the NGACO Model's, it was possible after applying the NGACO alignment algorithm that some beneficiaries in the comparison group were also in SSP ACOs. Pioneer ACO beneficiaries were excluded from the comparison group, because both the NGACO and Pioneer attribution algorithms are prospective. Finally, because many NGACO providers were in SSP or Pioneer ACOs in BYs, after applying the NGACO alignment algorithm, many NGACO group beneficiaries in BYs were also in SSP or Pioneer ACOs.

8. **Apply additional beneficiary exclusions:** We applied the following inclusion and exclusion criteria to beneficiaries in the NGACO and comparison groups in each year: beneficiaries were required to be 18 years or older and must have been aligned with the group for at least one month in the year. Comparison beneficiaries who ended alignment prior to the end of PY or BYs due to non-death reasons were excluded from the evaluation.

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[7] The program analysis contractor excludes such beneficiaries from financial calculations for performance years.

9. **Compare Evaluation Alignment Replication Against NGACO Performance Year Alignment.** We had a match rate of 98 percent of the final population used by the program analysis contractor for financial reconciliation in PY5. [8] **Exhibit A.5** shows the match rate between model-aligned beneficiaries and the evaluation-aligned beneficiaries for all PYs.

Exhibit A.5.   Alignment Periods for Model Evaluation, PY5

	Before Evaluation Exclusion Criteria				After Evaluation Exclusion Criteria	
	Model prospectively aligned beneficiaries	Evaluation prospectively aligned beneficiaries	Matching beneficiaries	% Evaluation-aligned beneficiaries matching model's alignment	# Evaluation-aligned beneficiaries matching model's alignment	% Evaluation-aligned beneficiaries matching model's alignment
PY5	1,318,886	1,437,908	1,309,596	99.3%	1,004,104	98.1%
PY4	1,613,267	1,978,604	1,594,669	98.8%	1,179,390	98.0%
PY3	1,738,749	1,742,705	1,700,105	97.8%	1,387,227	96.9%
PY2	1,476,681	1,679,915	1,458,556	98.8%	1,155,039	93.7%
PY1	612,935	807,799	604,383	98.6%	445,444	93.3%

NOTES: The evaluation inclusion criteria are inclusive of the model alignment rules and in addition, beneficiaries who are aligned during the performance year for at least 30 days.

NGACO and Comparison Group Providers Used to Determine Beneficiary Alignment

2016, 2017, and 2018 NGACO Cohort Providers Used for Alignment in PYs. We identified participating providers used for PY alignment in the 2016, 2017, and 2018 NGACO cohorts using the participating provider alignment file from the program analysis contractor.[9] Participating providers are practitioners (i.e., identified by NPIs) with primary care or specialist designations per the model's alignment rules in a PY, within either NGACO practices (as determined by TINs), FQHCs, RHCs, or CAHs delivering outpatient services (i.e., identified by CCNs). The complete set of NGACO participating providers for alignment in a given PY uses the TIN-NPI and CCN-NPI combinations for the NGACOs with financial liability for shared savings in the PY.

- For the 11 NGACOs in the 2016 cohort, the 12 NGACOs in the 2017 cohort, and the 14 NGACOs in the 2018 cohort, we defined participating providers in PY5 as providers retained by the NGACOs from PY4, plus new providers who joined the NGACOs before the start of PY5.

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[8] This discrepancy is likely due to differences in timing of enrollment information and claims used for exclusions by the program analysis contractor and for the evaluation

[9] The participating provider alignment file differs from the complete list of NGACO participating providers active during the PY. The latter list includes participating providers added by the NGACO during the PY.

2016, 2017, and 2018 NGACO Cohort Providers Used for Alignment in BYs.[10] The providers used to align NGACO beneficiaries during the base period of a given PY included all alignment-eligible NGACO participating providers listed for the PY in question. However, because TINs may change over time, and these changes are more likely the further a BY is from its PY, we used NPIs and not TIN-NPI or CCN-NPI combinations to align beneficiaries during all BYs. Since the baseline period varied by cohort, the set of providers used to align beneficiaries during the baseline period varied as follows:

■ For all cohorts, we used alignment-eligible participating providers identified by NPIs in a PY to align beneficiaries to the cohort's baseline years (2013-2015 for the 2016 cohort, 2014-2016 for the 2017 cohort, and 2015-2017 for the 2018 cohort). This approach may place greater emphasis on the performance of individual practitioners in the baseline, while emphasizing practice associations during a PY.

2016, 2017, and 2018 Cohort Comparison Group Providers Used for Alignment in a PY. For the 2016, 2017, and 2018 cohorts, the comparison group of providers used for alignment in a PY included all alignment-eligible non-NGACO providers in a given year.[11] Providers who joined and left the NGACO model in a preceding PY were eligible for inclusion in the comparison group in subsequent PYs. As with the NGACO group alignment in the first PY, comparison group beneficiary alignment was implemented using groups of TIN-NPIs and CCN-NPIs.

2016, 2017, and 2018 Cohort Comparison Group Providers Used for Alignment in BYs. Comparison group providers used to align beneficiaries to the comparison group in the BYs included alignment-eligible providers who were not NGACO providers in the corresponding PY and who were not in a Medicare ACO in the respective BYs. Base year comparison group beneficiary alignment was implemented using NPIs rather than TIN-NPIs or CCN-NPIs for the reasons noted above. As with the PYs, the comparison group in the BYs may include providers who formerly or subsequently participated in a Medicare ACO.[12] We assume that once providers left a Medicare ACO and returned to usual FFS Medicare, they were valid representatives of the comparison group.

NGACO Market Areas for Evaluation of the Model

For the purpose of this evaluation, we defined an NGACO's market area as the collection of HRRs where 1 percent or more of an NGACO's aligned population of beneficiaries resided in the PY.[13] By defining the NGACOs' market areas using HRRs, we can examine the impact of the NGACO model in market areas where NGACOs have a meaningful footprint, using a sizable comparison group of non-NGACO beneficiaries in the same markets. HRRs have been used to define markets in prior

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[10] For the first PY of each cohort, the baseline was set to TIN-NPI and CCN-NPI. For subsequent PYs, the baseline was set to NPIs.

[11] The group of non-NGACO providers is defined as providers other than NGACO participating providers, NGACO preferred providers, and providers in SSP ACOs and Pioneer ACOs in the respective years

[12] Providers who subsequently became NGACO providers in the PY were excluded from the comparison group providers.

[13] HRRs are Medicare FFS markets representing catchment areas around tertiary medical centers.

ACO evaluations.[14] **Exhibit A.6** lists and enumerates the HRRs that comprise the markets for the 37 NGACOs in PY5. We limited our evaluation to NGACO and comparison group beneficiaries located in these market areas. To ensure that comparison beneficiaries drawn from the same markets were similar to NGACO beneficiaries, we used propensity score weights on observed demographics, disease burden, and ZIP code-level community characteristics, as discussed below.

Exhibit A.6. NGACO's Market Areas for Model Evaluation, PY5

NGACO	# of HRRs in the Market Area	State and City of HRRs that Comprise the Market Area
2016 Cohort		
ACCST	2	TX: Beaumont, Houston
Bellin	4[a]	MI: Marquette; WI: Appleton, Green Bay, Milwaukee
CHESS	4	NC: Charlotte, Greensboro, Hickory, Winston-Salem
Deaconess	2[a]	IN: Evansville; KY: Louisville
Henry Ford	6	MI: Ann Arbor, Dearborn, Detroit, Flint, Pontiac, Royal Oak
Park Nicollet	2	MN: Minneapolis, St. Paul
Pioneer Valley	4	CT: Hartford; MA: Boston, Springfield, Worcester
ThedaCare	5	WI: Appleton, Green Bay, Marshfield, Milwaukee, Neenah
Triad	7[a]	NC: Charlotte, Durham, Greensboro, Raleigh, Wilmington, Winston-Salem; VA: Roanoke
Trinity	12	IL: Blue Island, Chicago, Hinsdale, Joliet, Melrose Park; MI: Grand Rapids, Muskegon; NJ: Hackensack, Morristown, New Brunswick, Newark; OH: Columbus
UnityPoint	17[a]	IA: Cedar Rapids, Davenport, Des Moines, Dubuque, Iowa City, Mason City, Sioux City, Waterloo; IL: Peoria, Rockford, Springfield; MN: Rochester; MO: Columbia; NE: Omaha; SD: Sioux Falls; WI: La Crosse, Madison
2017 Cohort		
Accountable Care Options	2	FL: Fort Lauderdale, Miami
APA	7	CA: Los Angeles, Orange County, San Bernardino, San Francisco, San Mateo County; WA: Seattle, Tacoma
Arizona	3	AZ: Mesa, Phoenix, Sun City
Atrius	4	MA: Boston, Worcester; NH: Manchester; RI: Providence

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[14] McWilliams, J. Michael, Michael E. Chernew, Bruce E. Landon, and Aaron L. Schwartz. "Performance differences in year 1 of pioneer accountable care organizations." New England Journal of Medicine 372, no. 20 (2015): 1927-1936. McWilliams, J. Michael, Laura A. Hatfield, Michael E. Chernew, Bruce E. Landon, and Aaron L. Schwartz. "Early performance of accountable care organizations in Medicare." New England Journal of Medicine 374, no. 24 (2016): 2357-2366.

NGACO	# of HRRs in the Market Area	State and City of HRRs that Comprise the Market Area
Carilion	5	NC: Durham, Winston-Salem; VA: Charlottesville, Lynchburg, Roanoke
Indiana U	7[a]	IL: Urbana; IN: Fort Wayne, Indianapolis, Lafayette, Muncie, Terre Haute; KY: Louisville
Northwest	4	WA: Olympia, Seattle, Spokane, Tacoma
ProHealth	2	WI: Madison, Milwaukee
ProspectNE	3	CT: Hartford, New Haven; RI: Providence
St. Luke's	2	ID: Boise; UT: Salt Lake City
UNC	4	NC: Durham, Greensboro, Hickory, Raleigh
UTSW	7[a]	OK: Oklahoma City; TX: Abilene, Dallas, Fort Worth, Tyler, Waco, Wichita Falls
2018 Cohort		
ACC of TN	2	TN: Johnson City, Knoxville
Best Care Collab	1	FL: Fort Myers
CareMount	4	CT: Hartford, New Haven; NY: Albany, White Plains
Central Utah	4	NV: Las Vegas; UT: Ogden, Provo, Salt Lake City
CoxHealth	1[a]	MO: Springfield
Franciscan	6[a]	LA: Baton Rouge, Lafayette, Metairie, Monroe, Shreveport, Slidell
Mary Washington	3	VA: Arlington, Charlottesville, Richmond
NECQA	3[a]	MA: Boston, Worcester; RI: Providence
Primaria	2	IN: Indianapolis, Muncie
Primary Care Alliance	2	FL: Ocala, Orlando
Reliance	6	MI: Ann Arbor, Dearborn, Detroit, Pontiac, Royal Oak; OH: Toledo
Reliant	4[a]	CT: Hartford; MA: Boston, Worcester; RI: Providence
Torrance	2	CA: Los Angeles, Orange County
UW Health	2	WI: Madison, Milwaukee

NOTES: [a] Denotes a change in HRR assignment from PY4: Bellin added Milwaukee WI; Deaconess no longer includes Indianapolis, IN; Triad added Charlotte, Raleigh, Wilmington, NC and Roanoke, VA; UnityPoint added Mason City, IA, Rockford IL, Rochester, MN, Omaha, NE, Sioux Falls, SD, La Crosse, and Madison, WI; Indiana U added Fort Wayne, IN; UTSW added Oklahoma City, OK, Abilene, Waco, Wichita Falls, TX; CoxHealth no longer included Springdale, AR; Franciscan added Metairie, LA; NEQCA no longer included Manchester, NH; Reliant no longer included Springfield, MA.

Accounting for COVID in PY5 and Other Considerations

In constructing the analytic data set, we included several binary indicator variables that flag certain characteristics of beneficiaries related to participation in Medicare initiatives in BYs and PYs. To account for the effect of COVID-19 in PY5, we also included county-level variables

measuring COVID risks that were used to balance NGACO and comparison groups. The variables include the following:

- **Accounting for COVID in PY5:** Although comparison groups was drawn from the same market areas, they may come from different communities and face different risks for COVID-19 exposure or for delaying needed care due to health care resources. The validity of the NGACO model's impact estimate—based on our DID design—hinged on COVID-19's "common shocks" to both groups; for this reason, we balanced the two groups on their county-level COVID-19 variables in 2020: number of cases per 100,000 population; number of deaths due to COVID per 100,000 population; and percent of cases that were fatal. These variables were not included in our evaluation's regression models.
- **Participation in other CMMI initiatives:** For both the NGACO and comparison groups, we identified whether beneficiaries participated in other concurrent CMMI shared-savings initiatives [Comprehensive Primary Care Plus (CPC+), Comprehensive Primary Care (CPC), Financial Alignment Initiative (FAI), Independence at Home (IAH), and Multi-Payer Advanced Primary Care Practice (MAPCP)] and episodic initiatives (Bundled Payments for Care Improvement, Oncology Care Model, Comprehensive Joint Replacement). In this report, we present descriptive statistics on participation for all three cohorts in PY5. We include covariates in our regression models to adjust for participation in other concurrent CMMI shared-savings initiatives but do not adjust our regressions for episodic initiatives because their initiation could jointly influence outcomes for NGACO beneficiaries or beneficiaries in the comparison group.
- **Access to care from providers:** To ensure that comparison beneficiaries had similar access to care as the beneficiaries in the NGACO group, we defined a measure of access to providers as the number of alignment-eligible providers per 1,000 population located within 10 miles of a beneficiary's ZIP code. The variable was included in our propensity score model as well as the regression models used in the evaluation, as discussed below.

Data Sources

Exhibit A.7 shows the data used for the construction of the NGACO and comparison groups.

Exhibit A.7. Analytic File Construction: Data Sources and Rationale

Data (Years)	Purposes	Source(s)
NGACO participating provider alignment file (2020)	Align Medicare beneficiaries to an NGACO or comparison group based on allocation of the total allowable QEM charges during the alignment period.	CMS
NGACO participating and preferred provider lists (2020)	Used to identify participating and preferred providers. The final participating provider list included providers in alignment file who were active in PY but also included providers added in PY. Preferred providers in lists were excluded from the non-ACO providers to which comparison beneficiaries were attributed.	CMS

Data (Years)	Purposes	Source(s)
Providers in SSP (2013-2017, 2020), Pioneer (2013-2016) and NGACOs (2016-2017)	Used to exclude comparison beneficiaries who were prospectively aligned to other Medicare ACO providers during BYs or PYs.	CMS
NGACO attributed and excluded beneficiary lists (2020)	Identify the beneficiaries who were either aligned with an NGACO provider or excluded because of model exclusion criteria.	CMS
Beneficiaries in other Medicare shared savings initiatives (2013–2017, 2020)	Used to identify beneficiaries in other Medicare shared savings initiatives in the NGACO or comparison group. Beneficiaries in Pioneer ACOs or Comprehensive ESRD Care initiatives were excluded from the comparison group.	CMS
Beneficiaries in SSP, Pioneer, and NGACOs (2013-2017, 2020)	Used to calculate Medicare ACO penetration rate in HRR.	CMS
Medicare beneficiary summary and claims files (2010–2020)	Identify the NGACO and comparison group beneficiaries through alignment, their characteristics, and outcomes including spending, utilization, and quality. Also used to calculate Medicare Advantage and ACO penetration rate in HRRs.	CMS
Medicare FFS Public Provider Enrollment Data; National Plan and Provider Enumeration System; and Medicare Data on Provider Practice and Specialty (2012–2019)	Identify individual providers (by NPIs) associated with practices (by TINs) and their specialties. Also used to compute measures of provider density by ZIP code and market competition (physician practice HHI and alignment-eligible providers per 1,000 population in HRR).	CMS
AHA survey data (2012-2019)	Calculate hospital competition in market (HHI) and acute care hospital beds per 1,000 population in HRR. Hospitals from the same system within the same HRR are considered as one market-sharing entity when calculating the HHI.	AHA
American Community Survey (2012–2019)	Identify the sociodemographic characteristics of communities (ZIP code tabulation area) where NGACO and comparison beneficiaries reside.	Census Bureau
COVID-19 Pandemic Vulnerability Index	Use source data to calculate county-level variables to measure the local risk of COVID-19 that may affect beneficiary care seeking.	NIH
Dartmouth Atlas ZIP code-HRR crosswalks (2012–2019)	Identify markets (HRRs) in relation to ZIP codes where NGACO and comparison beneficiaries reside.	Dartmouth Institute
ZIP code-ZIP code tabulation area crosswalks (2015–2020)	Link beneficiary ZIP code with community characteristics at ZIP code tabulation area level (earlier versions of the crosswalks are not available).	HRSA

NOTES: AHA = American Hospital Association; HRR = hospital referral region; HRSA = Health Resources and Services Administration; HHI = Herfindahl-Hirschman Index; NPI = national provider identifier; TIN = tax identification number; AHA = American Hospital Association; NIH = National Institutes of Health.

Propensity Score Weighting

Beneficiaries in our evaluation were not randomized to the NGACO and comparison groups; for this reason, we used propensity score methods to ensure that the beneficiaries in the two groups were similar in their observed characteristics.[15] Propensity score-balancing approaches mitigate biases arising from differences in observed characteristics of NGACO and comparison beneficiaries. The propensity score is the predicted probability of a beneficiary being in the NGACO group in a year, conditional on a set of characteristics observed at the beginning of that year. We describe our approach to estimating propensity scores for beneficiaries in the NGACO and comparison groups in each BY and PY. The observed characteristics we considered for the propensity score included beneficiaries' demographic characteristics and disease burden as well as their community characteristics (ZIP code) and market (HRR) variables. For each NGACO and each BY or PY, we estimated propensity scores for beneficiaries in the NGACO and corresponding comparison group. We used logit models to predict the probability of a beneficiary being in the NGACO group (propensity score) based on the following characteristics:

- **Beneficiary characteristics** in the reference year (BY or PY) included age, gender, race/ethnicity (White, Black, Hispanic, Asian, other), disability, end-stage renal disease status, Medicaid dual-eligibility, Part D coverage, number of months aligned with the NGACO or comparison group in the year, death in the year, and disease burden at the end of the prior year. We defined a beneficiary's disease burden using 62 chronic condition indicators available on the Master Beneficiary Summary File in the Chronic Conditions Data Warehouse Virtual Data Research Center. The conditions included 27 common chronic conditions and 35 other chronic or potentially disabling conditions the beneficiary had in the preceding year.[16] We did not use the hierarchical condition category (HCC) risk score to measure a beneficiary's disease burden because the HCC score is more susceptible to changes in provider coding practices than the chronic condition indicators.[17] We did not include utilization and cost in the reference or prior year, as these outcomes were assessed in our analysis of impacts of NGACO incentives; their inclusion would be expected to attenuate effects or dampen impacts.

- **Community characteristics** variables captured attributes measured at the ZIP code level. The variables included rurality; density of providers within 10 miles per 1,000 population; and neighborhood socioeconomic characteristics (percentage of people living below the poverty

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[15] Austin PC. An introduction to propensity score methods for reducing the effects of confounding in observational studies. *Multivariate Behav Res.* 2011;46(3):399–424.

[16] CMS Chronic Condition Data Warehouse. *Chronic Condition Algorithms*. Available at: https://www.ccwdata.org/documents/10280/19139421/ccw-chronic-condition-algorithms.pdf; CMS Chronic Condition Data Warehouse. *Other Chronic or Potentially Disability Condition Algorithms*. Available at: https://www.ccwdata.org/documents/10280/19139421/other-condition-algorithms.pdf .

[17] RTI International. *Evaluation of the CMS-HCC Risk Adjustment Model Final Report*. 2011 Available at: https://www.cms.gov/Medicare/HealthPlans/MedicareAdvtgSpecRateStats/downloads/evaluation_risk_adj_model_2011.pdf .

line, percentage with high school and college education, and median income[18]) of the beneficiary's ZIP code.

- **County-level COVID variables** in PY5 were included to balance the NGACO and comparison group beneficiaries drawn from the same HRR on their area-level COVID risks that may have influenced their care seeking in 2020. The variables included 7-day moving average of new COVID cases per 100,000 population; 7-day moving average of COVID deaths per 100,000 population; and percent of COVID cases that were fatal (case fatality). Each variable was measured first on a daily basis, then the average over the entire year was used in the propensity score model.

- **Market characteristics** included indicator variables for HRRs within which the beneficiaries reside.

Weighting the comparison beneficiaries by the odds of the propensity score offered the best covariate balance for each NGACO across a PY and its BYs, while allowing us to assess the average treatment effect on the treated.[19, 20] NGACO beneficiaries were assigned a weight of one and the comparison beneficiaries were assigned weights of $PS_i/(1\text{-}PS_i)$, where PS_i is the beneficiary i's propensity score.

Finally, we implemented additional checks of our results to assess the impact of weighting the comparison group by odds of the propensity score. First, because comparison beneficiaries with large weights could inordinately influence our results, we confirmed that a very small proportion of comparison group beneficiaries had large weights.[21] Second, covariates (except the county-level COVID variables) in the propensity score model were included in the DID models to obtain accurate impact estimates if the covariates were potentially mis-specified.[22]

Exhibit A.8 shows graphs of the common support in the estimated propensity scores for the respective cohort's treatment (NGACO=blue line) and comparison group (red line) in PY5. Common support graphically summarizes the overlap in propensity scores and is used to illustrate the density of each group across the distribution of scores. Specifically, the x-axis in each graph is the propensity score (range from zero to one), and y-axis is the percent of beneficiaries who received the corresponding propensity score.

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[18] For neighborhood socioeconomic characteristics and county-level COVID variables, we included quintile indicators instead of the continuous format of those variables in the model estimating propensity score. The variables were still included in continuous format as for the covariate balance check.

[19] We assessed covariate balance by looking at standardized differences for the covariates before and after weighting. The method that yielded the lowest standardized difference of means across all covariates, with standardized differences <0.25 for all covariates, was considered to offer the best covariate balance.

[20] Stuart EA. Matching methods for causal inference: A review and a look forward. *Stat Sci.* 2010;25(1):1; Hirano K, Imbens GW, Ridder G. Efficient estimation of average treatment effects using the estimated propensity score. *Econometrica.* 2003;71(4):1161–1189.

[21] For the comparison beneficiaries, 0.37 percent had a weight of greater than three.

[22] Bang H, Robins JM. Doubly robust estimation in missing data and causal inference models. *Biometrics.* 2005;61(4):962–973.

Exhibit A.8. Common Support of the Propensity Score by Cohort, BYs and PY5
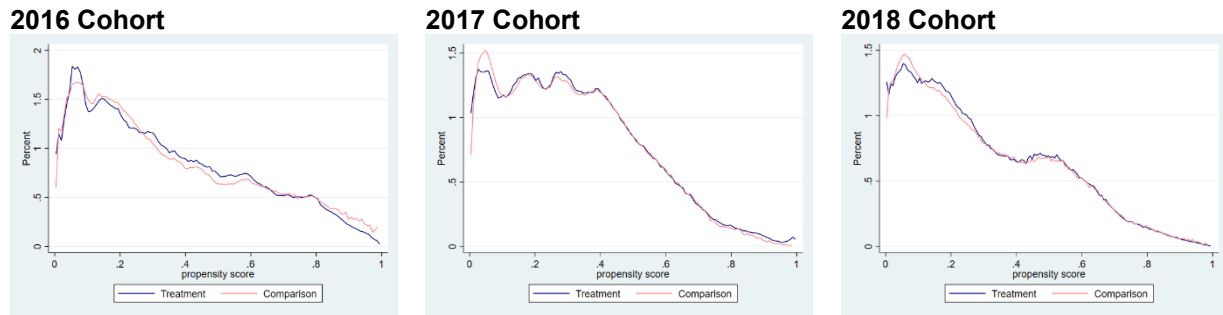
Measures of Spending and Utilization

For this evaluation, we used 14 claims-based outcome measures to assess the NGACO model's impact; see **Exhibit A.9** for definitions of the measures. Measures include total Medicare spending, eight categories of Medicare spending by care setting and service, and five utilization measures. We also included two telehealth utilization measures, used for descriptive analysis only.

Exhibit A.9. Definitions for Claims-Based Outcome Measures

Measure	Definition
Medicare Spending [a]	
Total Medicare Parts A and B spending per beneficiary per year (PBPY)	Total Medicare Parts A and B spending PBPY aligned to either the NGACO or comparison group. Spending includes Medicare paid amounts on Parts A and B claims from the start of the PY until the end of the PY or until the end date for the beneficiary's alignment (i.e., until she or he was excluded because of alignment exclusion criteria) for the treatment or comparison group.
Medicare spending on acute care inpatient hospitals PBPY	Total Medicare spending on acute care inpatient hospitals PBPY aligned to either the NGACO or comparison group. Spending includes Medicare paid amount on facility claims from the start of the year until the end of the year or until the last day the beneficiary remained aligned with the treatment or comparison group. Spending on Part B professional services in this setting is excluded.
Medicare spending on skilled nursing facility (SNF) PBPY	Total Medicare spending on SNFs, including swing beds PBPY aligned to either the NGACO or comparison group. Spending includes Medicare paid amount on SNF claims from the start of the year until the end of the year or until the last day the beneficiary remained aligned with the treatment or comparison group. Spending on Part B professional services in this setting is excluded.
Medicare spending on other post-acute care facilities PBPY	Total Medicare spending on other inpatient, post-acute care facilities (long-term care hospitals and inpatient rehabilitation hospitals) PBPY aligned to either the NGACO or comparison group. Spending includes Medicare paid amount on facility claims from the start of the year until the end of the year or until the last day the beneficiary remained aligned with the treatment or comparison group. Spending on Part B professional services in these settings is excluded.

Measure	Definition
Medicare spending on outpatient facilities PBPY	Total Medicare spending for outpatient facilities (including hospital outpatient department, emergency department (ED), FQHCs, and RHCs) PBPY for beneficiaries aligned to either the NGACO or comparison group. Spending includes Medicare paid amount on facility claims from the start of the year until the end of the year or until the date the beneficiary remained aligned with the treatment or comparison group. Spending on Part B professional services in these settings is excluded.
Medicare spending on physician and professional services PBPY	Total Medicare Part B professional spending PBPY for beneficiaries aligned to either the NGACO or comparison group. Includes spending for physician and non-physician professional services and ancillary services, including ambulance, anesthesia, labs, imaging, and drugs administered in physician offices. Spending includes Medicare paid amount on Part B claims from the start of the year until the end of the year or until the last day the beneficiary remained aligned with the treatment or comparison group.
Medicare spending on home health services PBPY	Total Medicare spending on home health services PBPY for beneficiaries aligned to either the NGACO or comparison group. Spending includes Medicare paid amount on home health services claims from the start of the year until the end of the year or until the last day the beneficiary remained aligned with the treatment or comparison group. Spending on Part B professional services in the home setting is excluded.
Medicare spending on hospice PBPY	Total Medicare spending on hospice services PBPY for beneficiaries aligned to either the NGACO or comparison group. Spending includes Medicare paid amount on hospice claims from the start of the year until the end of the year or until the last day the beneficiary remained aligned to the treatment or comparison group. Spending on Part B professional services is excluded.
Medicare spending on durable medical equipment PBPY	Total Medicare spending on durable medical equipment PBPY for beneficiaries aligned to either the NGACO or comparison group. Spending includes Medicare paid amount on durable medical equipment claims from the start of the year until the end of the year or until the last day the beneficiary remained aligned with the treatment or comparison group.
Utilization	
Acute care hospital stays per 1,000 beneficiaries per year (BPY)	Number of acute care hospital stays per 1,000 BPY for beneficiaries aligned to either the NGACO or comparison group. Stays that included transfers between facilities were counted as one stay. All stays occurring between the start of the year and the end of the year, or the end date of the beneficiary's alignment to the treatment or comparison group during the PY, are included in the measure.
SNF stays per 1,000 BPY	Number of SNF stays per 1,000 BPY for beneficiaries aligned to either the NGACO or comparison group. All SNF stays that began between the start of the year and the end of the year, or the end date of the beneficiary's alignment to the treatment or comparison group during the PY, are counted towards the measure.
SNF days per 1,000 BPY	Number of SNF days per 1,000 BPY for beneficiaries aligned to either the NGACO or comparison group. All SNF days that began between the start of the year and the end of the year, or the end date of the beneficiary's alignment to the treatment or comparison group, are counted towards the measure.

Measure	Definition
Evaluation and management (E&M) visits (excluding visits in acute care hospital and ED) per 1,000 BPY	Number of nonhospital E&M visits from primary care or specialist providers per 1,000 BPY for beneficiaries aligned to either the NGACO or comparison group (defined by Berenson-Eggers Type of Service or BETOS codes for E&M visits, which include M1A, M1B, M4A, M4B, M5A, M5B, M5C, M5D, M6; E&M visits in acute care hospitals and EDs are excluded). All E&M visits occurring between the start of the year and the end of the year, or the end date of a beneficiary's alignment to the treatment or comparison group, are included in the measure.
Home health episodes per 1,000 BPY	Number of episodes of home health per 1,000 BPY for a beneficiary during the period aligned to either the NGACO or comparison group. 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. All episodes that began between the start of the year and the end of the year, or the end date of a beneficiary's alignment to the treatment or comparison group during the year, are included in the measure.
Telehealth Utilization	
Telehealth visits per 1,000 BPY	Number of telehealth visits per 1,000 BPY for beneficiaries aligned to either the NGACO or comparison group (defined as services with HCPCS modifier code 95, GT, GQ, G0, or with CPT code 99441, 99442, 99443, 99421, 99422, 99423, G2012, G2010 G0071, G2025, G2061, G2062, G2063, 98966, 98967, 98968) on physician and outpatient claims. The G0 modifier code gets at telestroke services, while the last 6 CPT codes get at non-physician telehealth services. The latter may not co-occur with telehealth modifier codes. All telehealth visits occurring between the start of the year and the end of the year, or the end date of a beneficiary's alignment to the treatment or comparison group, are included in the measure.
E&M telehealth visits per 1,000 BPY	Number of E&M telehealth visits per 1,000 BPY for beneficiaries aligned to either the NGACO or comparison group (defined as services with CPT code 99441, 99442, 99443, 99421, 99422, 99423, G2012, G2010, G0071, G2025 on physician and outpatient claims. All E&M telehealth visits occurring between the start of the year and the end of the year, or the end date of a beneficiary's alignment to the treatment or comparison group, are included in the measure.

NOTES: All Medicare spending is expressed in 2021 dollars and is based on Medicare paid amounts on claims; we did not exclude any outlier payments, nor did we use standardized payments. Our models adjust for health, demographic, and market characteristics. For providers in NGACOs that opted for population-based payments or all-inclusive-population-based-payments, we used the actual amount Medicare would have paid for services absent the population-based payments. Findings were consistent with sensitivity analyses that excluded payments for beneficiaries above the 99th percentile. BETOS = Berenson-Eggers Type of Service; BPY = beneficiaries per year; E&M = evaluation and management; ED = emergency department; PBPY = per beneficiary per year; SNF = skilled nursing facility.

[b] Agency for Healthcare Research and Quality. Prevention Quality Overall Composite Technical Specifications. *Prevention Quality Indicator 90*, Version 6.0, 2016. Available at: http://www.qualityindicators.ahrq.gov/Downloads/Modules/PQI/V60-ICD09/TechSpecs/PQI_90_Prevention_Quality_Overall_Composite.pdf; For claims prior to October 1, 2015, with ICD-9 codes, we used Version 5.0 of *Prevention Quality Indicator 90*. For claims after October 1, 2015 with ICD-10 codes, we used Version 6.0 of *Prevention Quality Indicator 90*.

Analytic Approach to Estimate Impacts of the NGACO Model

Exhibit A.10 summarizes the model specifications used for the 14 claims-based outcome measures for the 2016, 2017, and 2018 cohorts (37 NGACOs) in PY5. 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 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 outcome variables modeled with GLMs, we determined the appropriate distributional form using a modified Park test.[23] This test examined the empirical relationship between the mean and the variance to ascertain the appropriate distribution.

Exhibit A.10. Models Used for Specific Outcome Measures

Outcome Measure	Model Used
Spending	
Total Medicare spending	GLM: Gamma distribution and log link
Physician services spending	GLM: Poisson distribution and log link
Outpatient facility spending Acute care hospital facility spending Other post-acute care facility spending Home health spending	TPM: first part probit; second part GLM with gamma distribution and log link
SNF spending Hospice care spending Durable medical equipment spending	TPM: first part probit; second part GLM with Poisson distribution and log link
Utilization	
Acute care hospital admissions SNF days SNF stays Home health episodes	TPM: first part logit; second part GLM with negative binomial distribution and log link
E&M visits (excluding inpatient hospital and ED)	GLM; Poisson distribution and log link

NOTES: E&M = evaluation and management; ED = emergency department; GLM = generalized linear model; SNF = skilled nursing facility; ACS = Ambulatory Care Sensitive; TPM = two-part model.

Difference-in-Differences (DID) Regression Models for Estimating impacts in PY5 and cumulatively as of PY5. We estimated impacts using DID regression models for the 2016, 2017, and 2018 cohorts separately in PY5. We also ran separate DID regression models for each NGACO in PY5 to obtain impact estimates for the spending and utilization outcomes relative to an individual ACO's comparison group. The model-wide impact in PY5 was calculated by

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

weighting the impact estimates for the three cohorts by their respective proportion of NGACO beneficiaries in the year. The cumulative model-wide impact as of PY5 was calculated by weighting the impact estimates for the 2016 cohort in PY1; 2016 and 2017 cohorts in PY2; and 2016, 2017, and 2018 cohorts in PY3, PY4, and PY5 by the proportion of NGACO beneficiaries in each year and in each cohort. Aggregating impact estimates in this way assumes statistical independence between NGACO cohorts and PYs. We took a similar approach to calculate cumulative impacts for each NGACO as of PY5 for total spending by weighting their impact estimates for each PY by the respective proportion of beneficiaries a cohort had in each year. We would expect treatment effects to vary by PY for the three cohorts that started the model in different years. For this reason, we took the approach of estimating model-wide impacts cumulatively and in each PY using separate DID regression models for each cohort in a PY.[24]

We report impact estimates in a PY in percentage terms as increases or decreases in a given outcome for NGACOs relative to their counterfactual absent the model. While all outcomes are at the beneficiary level, we describe impacts as relative increases or decreases for NGACOs, as the intervention was at the NGACO level. We report three sets of impact estimates for PY5: 1) model-wide, 2) for each of the three cohorts, and 3) for each NGACO. We also report three sets of cumulative impact estimates as of PY5: 1) model-wide; 2) for each of the three cohorts; and 3) for NGACOs in the 2016, 2017, and 2018 cohorts that were active as of PY5.

Equation A.1 shows the general specification of the DID model that we used to estimate impacts of the NGACO model in a given PY, controlling for beneficiary demographic, clinical, and community characteristics, with year and hospital referral region (HRR) fixed effects.

$$g\left[E(Y_{ijkt})\right] = \beta_0 + \beta_1 NGACO_j + \delta_1 BY2_t + \delta_2 BY1_t + \delta_3 PY_t + \theta_1\, NGACO_j * PY_t + \Upsilon BENE_{ijkt} + \Lambda Community_{jkt} + \Pi HRR_k$$

Where:

- Y_{ijkt} is the outcome for the ith beneficiary in NGACO or comparison group j, in market k, in year t. We model Y with appropriate distributional form and link function g, based on the spending, utilization, or quality of care outcome, as discussed below.
- β_0 is the intercept.
- $NGACO_j$ is the binary indicator for being in the NGACO group in either PYs or BYs. It is set to the value of one if the beneficiary is aligned with an NGACO PY provider in a given PY. The coefficient β_1 captures the mean of the difference between the NGACO and comparison group that is constant over time.
- $BY2$, $BY1$, and PY are fixed effects for each year (with $BY3$ as reference) whose coefficients $(\delta_1, \delta_2, \delta_3)$ capture changes in the NGACO and comparison group over time.
- Coefficient θ_1 is the DID estimate for $NGACO_j * PY_t$, the binary indicator for being in the NGACO group in a given PY of the NGACO model. The θ_1 coefficient is the impact of NGACO

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[24] The alternative to pooling cohorts or PYs and running two-way fixed effects DID models has been shown to yield biased estimates when there is differential treatment timing and treatment effects vary by time. For more please see Goodman-Bacon, Andrew. "Difference-in-differences with variation in treatment timing." *Journal of Econometrics* (2021).

model on its providers' beneficiaries. Because most NGACOs previously participated in the Shared Savings Program or the Pioneer ACO Model, this estimate should be interpreted as the marginal effect of the NGACO model over prior Medicare ACO models.

- *BENE* and *Community* are sets of beneficiary and community characteristics with coefficient sets Υ and Λ, respectively, as discussed below.

- *HRR* is a fixed effect for each HRR with coefficient vector Π, to control for differences across markets.[25]

Because we are interested in estimating the average treatment effect for the NGACO group, our models included weights for the comparison to make it comparable to the NGACO group on the beneficiary and market-level covariates specified below.

We provide details below on the estimation of the cohort-level models based on Equation A.1. All models were estimated using Stata 16.[26]

Cohort-level Models. Impacts at the cohort level were estimated as follows:

- **Beneficiary-level covariates** included age, gender, race/ethnicity, disability, end-stage renal disease status, dual-eligibility, Part D coverage, number of months of alignment in the year, death in the year, and disease burden at the end of the preceding year (using indicators for 62 chronic conditions). We also included the square of months aligned because outcomes could increase nonlinearly based on the number of months a beneficiary was aligned with the NGACO or with a comparison group in a given baseline or performance year. We also included variables that accounted for NGACO and comparison beneficiaries' participation in other shared savings CMMI initiatives (CPC+, CPC, FAI, IAH, and MAPCP) during the BYs and PYs.[27]

- **Community-level covariates** included number of alignment-eligible providers within 10 miles per 1,000 population, percent of population in poverty, percent of population with a college education, and urban/rural status based on beneficiary ZIP code.

- **Market-level covariates** included indicators for each HRR. We clustered standard errors at the level of the NGACO's market for the treatment and comparison groups, because outcomes could be correlated within these clusters.[28]

Post-estimation Calculations. We performed the following four post-estimation calculations:

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[25] Our models were robust to controlling for differences across markets over time, using HRR and year interactions.

[26] StataCorp. 2019. *Stata Statistical Software: Release 16*. College Station, TX: StataCorp LP.

[27] We excluded variables that captured participation of NGACO and comparison beneficiaries in overlapping episodic CMMI initiatives (Oncology Care Model, Comprehensive Bundle Payments for Care Improvement, and Comprehensive Joint Replacement). Such participation indicated care that could take place based on certain health needs; for this reason, their inclusion would result in the failure of parallel trends for total spending for one or more cohorts. In addition, we did not flag beneficiaries in the comparison group who were assigned to Shared Savings Program ACOs because NGACO alignment rules disallowed NGACO beneficiaries from also being assigned to other ACOs, which resulted in the failure of parallel trends for total spending for one or more cohorts. Note that if beneficiaries in SSP ACOs were not aligned to SSP providers using the NG alignment algorithm, then the evaluation would include them in the comparison group in HRRs containing NGACOs.

[28] Bertrand M, Duflo E, Mullainathan S. How Much Should We Trust Differences-in-Differences Estimates. *Q J Econ.* 2003;119(1):249–275. Cameron AC, Miller DL. *Robust Inference with Clustered Data*. University of California, Department of Economics; 2010. Working Papers, No. 10(7).

- Because we used nonlinear models for the outcome variables, we employed the approach suggested by Puhani (2012) to express the DID theta coefficient in Equation A.1 as the estimated outcome for the treated NGACO group relative to its expected outcome absent the treatment.[29] We calculated these results using post-estimation predictions, computing the marginal effect for all treated beneficiaries and subtracting the marginal effect for these beneficiaries with the DID interaction term set to zero.[30] We computed confidence intervals using the delta method.[31]

- We expressed the estimated impact as a percentage of the expected outcome for the NGACO group in a given performance year absent the model. We computed the percentage change from the DID coefficient for outcomes estimated with log-linear models.[32] For outcomes estimated with two-part and logit models, we computed the predicted level of outcomes for NGACO beneficiaries in a given PY absent NGACO incentives by summing the adjusted mean for the comparison group in that PY and the adjusted difference between the NGACO and the comparison group in the BYs. We obtained the latter from the average predicted and adjusted outcomes for the NGACO and comparison group in the BYs, which we calculated post-estimation.

- We used post-estimation marginal effects to predict the average adjusted outcomes (i.e., the conditional means) for the NGACO and comparison group in the baseline period (all BYs) and PY. We report these for the NGACO and comparison group in Appendix D alongside the impact estimates, to understand whether impact estimates reflected improved performance for the NGACO group or deteriorating performance for the comparison group or both.

- Finally, we expressed impact estimates as PBPY for spending outcomes and per 1,000 beneficiaries per year for utilization and quality outcomes, respectively.

Testing the Assumption of Parallel Trends in the Baseline Years. A key assumption of the DID design is that the NGACO and the comparison group had similar trends in outcomes during the BYs before the onset of the NGACO incentives. The assumption of parallel trends allows the comparison group to establish a reliable representation of the NGACO group in a given PY in the absence of the NGACO model. We tested this assumption using **Equation A.2**, which extended Equation A.1 by including leading interaction terms for NGACO treatment effects in BY1 and BY2 (relative to BY3). We assessed whether the coefficient θ_{-2} for the leading interaction term in BY1 was significantly different from zero (p<0.05). If the coefficient was significantly different, the assumption of parallel trends did not hold.

Equation A.2 is a DID model with leading interaction terms, controlling for beneficiary, HRR, and community characteristics

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[29] Puhani PA. The treatment effect, the cross difference, and the interaction term in nonlinear "difference-in-differences" models. *Econ Lett*. 2012;115(1):85–87.

[30] Karaca-Mandic P, Norton EC, Dowd B. Interaction terms in nonlinear models. *Health Serv Res*. 2012;47(1pt1):255–274.

[31] Dowd BE, Greene WH, Norton EC. Computation of standard errors. *Health Serv Res*. 2014;49(2):731–750.

[32] For a log-linear model with a dummy variable D: $ln[E(Y)] = a + bX + cZ + \varepsilon$; if Z switches from 0 to 1, then the percentage impact of Z on Y is $100*[exp(c) - 1]$, where c is the coefficient on the dummy variable Z.

$$g[E(Y_{ijkt})] = \beta_0 + \beta_1 NGACO_j + \delta_1 BY2_t + \delta_2 BY1_t + \delta_3 PY_t + \theta_{-1} NGACO_j * BY2_t \\ + \theta_{-2} NGACO_j * BY1_t + \theta_1 NGACO_j * PY_t + \Upsilon BENE_{ijkt} + \Lambda Community_{jkt} + \Pi HRR_k$$

For this evaluation, we determined that the DID estimate for a PY was valid if the trends between the NGACO and comparison group were parallel between BY1 and BY3. This condition was checked by testing whether θ_{-2} was statistically different from zero at the five percent level (p<0.05). Our assumption allowed the NGACO providers and organizations to outperform or underperform on outcomes relative to the comparison group at mid-baseline (BY2 versus BY3). However, the NGACO and comparison groups were required to have similar trends in the year immediately prior to start of the NGACO model, to note whether the treatment group underwent any marked changes prior to start of the model.[33]

Calculating the Net Spending Impact of the NGACO Model. In addition to estimating the gross impact of the NGACO model on total Medicare Parts A and B spending, we also calculated the net spending impact of the NGACO model by accounting for shared savings or losses for NGACOs and if applicable, coordinated care reward (CCR) payments made to NGACO beneficiaries. The cumulative net spending impact of the NGACO model uses publicly available data on earned shared savings or losses across the 2016-2021 PYs and CCR payments made during the 2017 and 2018 PYs as well as cumulative gross savings impacts for the four years of the model.

Sensitivity Check. Our main analysis for gross spending did not adjust for differences in COVID among the NGACO and comparison beneficiaries after we balanced the two groups on their county-level COVID variables in a given year. We conducted the sensitivity check to include county-level COVID variables and diagnosis of COVID in the regression model for the 2016, 2017, and 2018 cohorts in PY5. Results from our sensitivity checks are presented in **Exhibit 2.6** in the main report and indicate that our gross spending impact estimates were robust to differences in severe cases of COVID that resulted in hospitalizations among the NGACO and comparison groups.

Estimation of Model-wide and Cohort-level Cumulative Impacts as of PY5. In **Exhibit A.11**, we summarize the number of ACO-years used to estimate cumulative impacts model-wide and for each cohort as of PY5 by combining the impact estimates for cohorts of NGACOs across PY1-PY5. To calculate the model-wide cumulative impact estimates as of PY5 for a given outcome measure, impact estimates for each cohort and PY were combined as an average weighted by the proportion of NGACO beneficiaries in each cohort and PY as shown in **Exhibit A.12**. The standard errors for model-wide cumulative impact estimates were likewise combined as a weighted average. Individual standard errors were converted into variances, the variances combined and squared by the proportion of NGACO beneficiaries in each cohort in each PY, then the standard error was computed using the combined variance and the cumulative total number of NGACO beneficiaries. Separate DID regression models were estimated for each NGACO cohort in a given PY up to PY5.

The **cumulative impact for each cohort as of PY5** for a given outcome measure was calculated as the weighted average of that cohort's DID impact estimates in all model PYs in which that

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[33] Ashenfelter O. Estimating the Effect of Training Programs on Earnings. *Rev Econ Stat.* 1978;60:47–50.

cohort was active. As noted above, the standard errors associated with the cumulative impact estimate were calculated as a weighted average, following a similar procedure used in calculating the model-wide cumulative impact.

Exhibit A.11. Estimation of Cumulative and Performance Year Impacts, Model-wide and for Cohorts

Cumulative Impact	PY5 Impact	PY4 Impact	PY3 Impact	PY2 Impact	PY1 Impact
Model-wide: 190 NGACO-years	Model-wide: 37 NGACOs	Model-wide: 41 NGACOs	Model-wide: 50 NGACOs	Model-wide: 44 NGACOs	Model-wide: 18 NGACOs
2016 Cohort: 70 NGACO-years	2016 Cohort: 11 NGACOs	2016 Cohort: 12 NGACOs	2016 Cohort: 13 NGACOs	2016 Cohort: 16 NGACOs	2016 Cohort: 18 NGACOs
2017 Cohort: 76 NGACO-years	2017 Cohort: 12 NGACOs	2017 Cohort: 15 NGACOs	2017 Cohort: 21 NGACOs	2017 Cohort: 28 NGACOs	
2018 Cohort: 44 NGACO-years	2018 Cohort: 14 NGACOs	2018 Cohort: 14 NGACOs	2018 Cohort: 16 NGACOs		

In calculating the cumulative estimates:

■ We assumed that DID estimates for cohorts in different PYs were statistically independent and that the impact estimates of different cohorts or NGACOs within the same performance year were independent. The assumptions were reasonable, given that different cohorts or NGACOs had different participating providers and aligned beneficiaries in each PY and associated baseline years.

■ Impact estimates were calculated and reported in PBPY, aggregate, and percentage terms to facilitate interpretation and comparisons. Conditional means for the NGACO and comparison groups in BYs and PY(s) were calculated in the same way as impact estimates.

■ We tested the significance of cumulative impact estimates by determining the two-sided p-value based on the normal cumulative distribution function z-score:

$$z - score = \frac{x - \mu}{\sigma}$$

where x is the cumulative DID estimate, μ is zero, and σ is the standard error of the cumulative DID estimate.

If any of the contributing impact estimates were uninterpretable due to failure of parallel trends, we considered the cumulative impact for the given outcome to be uninterpretable and not reported. **Exhibit A.12** presents the treatment group sizes for all cohorts and years, and their proportional contribution to the cumulative impact estimates.

Exhibit A.12. Treatment Group Sizes and Their Contributions to the Cumulative Impact Estimates

	Model-Wide cumulatively as of PY5	Model-Wide in PY5	2016 Cohort cumulatively as of PY5	2017 Cohort cumulatively as of PY5	2018 Cohort cumulatively as of PY5
Total Number of Beneficiary Years	5,335,416	1,023,167	2,239,173	2,301,075	795,168
2016 Cohort, PY5	354,308 (0.0664)	354,308 (0.3463)	354,308 (0.1582)		
2017 Cohort, PY5	409,890 (0.0768)	409,890 (0.4006)		409,890 (0.1781)	
2018 Cohort, PY5	258,969 (0.0485)	258,969 (0.2531)			258,969 (0.3257)
2016 Cohort, PY4	470,657 (0.0882)		470,657 (0.2102)		
2017 Cohort, PY4	484,152 (0.0907)			484,152 (0.2104)	
2018 Cohort, PY4	248,648 (0.0466)				248,648 (0.3127)
2016 Cohort, PY3	459,603 (0.0861)		459,603 (0.2053)		
2017 Cohort, PY3	652,244 (0.1222)			652,244 (0.2835)	
2018 Cohort, PY3	287,551 (0.0539)				287,551 (0.3616)
2016 Cohort, PY2	477,426 (0.0895)		477,426 (0.2132)		
2017 Cohort, PY2	754,789 (0.1415)			754,789 (0.3280)	
2016 Cohort, PY1	477,179 (0.0894)		477,179 (0.2131)		

Appendix B: Exhibits to Support Chapter 1

This Appendix presents supplemental exhibits that offer detailed descriptions of provider networks, organizational and provider characteristics, NGACO-aligned beneficiaries, and NGACO model features selected. Two exhibits support the summary-level descriptions presented in Chapter 1 and are as follows:

- NGACOs Participating in PY5 **(Exhibit B.1)**
- Beneficiary Characteristics in PY5: Comparing NGACO-Aligned and Non-Aligned FFS Beneficiaries **(Exhibit B.2)**

Exhibit B.1. NGACOs Participating in PY5

NGACO Organization Name	Abbreviation	States in the NGACO Market
2016 Cohort		
Accountable Care Coalition of Southeast Texas, Inc.	ACCST	TX
Bellin Health DBA Physician Partners, Ltd. (PPL)	Bellin	MI, WI
Cornerstone Health Enablement Strategic Solutions, LLC	CHESS	NC
Deaconess Care Integration	Deaconess	IN, KY
Henry Ford Physician Accountable Care Organization	Henry Ford	MI
Park Nicollet Health Services	Park Nicollet	MN
Pioneer Valley Accountable Care, LLC	Pioneer Valley	CT, MA
ThedaCare ACO, LLC	ThedaCare	WI
Triad HealthCare Network, LLC	Triad	NC
Trinity Health ACO Inc.	Trinity	IL, MI, NJ, OH
UnityPoint Accountable Care (formerly Iowa Health Accountable Care)	UnityPoint	IA, IL, MO
2017 Cohort		
Accountable Care Options, LLC	Accountable Care Options	FL
APA ACO, Inc. (formerly ApolloMed)	APA	CA, WA
Arizona Care Network, LLC	Arizona	AZ
Atrius Health, Inc.	Atrius	MA, NH, RI
Carilion Clinic Medicare Shared Savings Company, LLC	Carillion	NC, VA
Indiana University Health	Indiana U	IN
NW Momentum Health Partners ACO	PSW	WA
ProHealth Solutions, LLC	ProHealth	WI
Prospect ACO Northeast, LLC	ProspectNE	CT, RI
St. Luke's Clinic Coordinated Care, LTD	St. Luke's	ID, UT
UNC Senior Alliance, LLC	UNC	NC
Southwestern Health Resources Accountable Care Network (formerly University of Texas Southwestern Accountable Care Network)	UTSW	TX
2018 Cohort		
Accountable Care Coalition of Tennessee, LLC	ACC of TN	TN
Best Care Collaborative	Best Care Collab	FL
CareMount ACO	CareMount	CT, NY
Central Utah Clinic	Central Utah	NV, UT
CoxHealth Accountable Care, LLC	CoxHealth	MO
Franciscan Missionaries of Our Lady Health System Clinical Network, LLC	Franciscan	LA
Mary Washington Health Alliance LLC	Mary Washington	VA
NEQCA Accountable Care, Inc.	NEQCA	MA, RI
Primaria ACO, LLC	Primaria	IN

NGACO Organization Name	Abbreviation	States in the NGACO Market
Primary Care Alliance	Primary Care Alliance	FL
Reliance Next Gen ACO, LLC	Reliance	MI, OH
Reliant Medical Group, Inc.	Reliant	CT, MA, RI
Torrance Memorial Integrated Physicians, LLC	Torrance	CA
UW Health ACO, Inc.	UW Health	WI

Exhibit B.2. Beneficiary Characteristics in PY5: Comparing NGACO-Aligned and Non-Aligned FFS Beneficiaries

Characteristic	NGACO Beneficiaries in PY5	Non-NGACO FFS Beneficiaries in NGACO Markets in PY5
Number of beneficiaries	1,023,167	6,635,583
Mean age in years (standard deviation; SD)	74.1 (10.5)	73.2 (11.9)
Gender (%)		
Male	42.8	43.6
Race/Ethnicity (%)		
White	84.3	77.8
Black	5.9	7.8
Hispanic	3.3	6.4
Asian	3.6	4.2
Other	3.0	3.8
Disability/End-Stage Renal Disease (ESRD; %)		
Disability	9.7	14.2
ESRD	0.8	1.1
Coverage (%)		
Any Medicaid dual eligibility	14.8	24.0
Any Part D coverage	77.5	78.1
Clinical Characteristics		
Mean number of chronic conditions (SD)	5.6 (3.8)	5.8 (4.1)
Mortality in reference period (%)	4.0	4.9
Community Characteristics (ZIP Code Level)		
Median income ($; SD)	71,518 (27,748)	73,406 (30,291)
Below poverty line (%; SD)	11.3 (7.3)	12.0 (7.6)
Bachelor's degree or higher (%; SD)	35.2 (17.3)	34.7 (18.4)
Rurality (%)	16.2	21.3
Alignment-eligible providers within 10-mile radius of beneficiary ZIP code (per 1,000 population; SD) ‡	3.0 (1.1)	2.8 (1.2)

NOTES: Non-NGACO FFS beneficiaries were beneficiaries aligned with providers that were not NGACO participating or preferred providers or providers in SSP ACOs. Community characteristics are at the beneficiaries' ZIP code level. NGACO markets are HRRs where at least 1 percent of NGACO-aligned beneficiaries reside. ‡ Alignment-eligible providers per 1,000 persons based on the total population (not restricted to the Medicare population).
SOURCE: NORC analysis of Medicare enrollment, 2020 claims data, and ancillary data.

Appendix C: Exhibits to Support Chapter 2

This Appendix presents supplemental exhibits that provide descriptive characteristics of NGACO-aligned and comparison group beneficiaries and detailed impacts and trends in spending and utilization outcomes for the model and the three NGACO cohorts. The exhibits support the summary discussion of model impacts on spending and utilization presented in Chapter 2 and are as follows:

- Descriptive Characteristics of NGACO-Aligned and Propensity Score-Weighted Comparison Beneficiaries for the 2016 Cohort **(Exhibit C.1)**, the 2017 Cohort **(Exhibit C.2)**, and the 2018 Cohort **(Exhibit C.3)**
- Estimated Gross and Net Impacts of NGACO Model on Medicare Spending, Cumulative and by PY **(Exhibit C.4)**
- Trends in Unadjusted Gross Medicare Parts A and B Spending, Cumulative (PY1 to PY5) **(Exhibit C.5)**
- Estimated Impacts on Gross Medicare Spending and Estimated Aggregate Impacts by Cohort, Cumulative and by PY **(Exhibit C.6)**
- Estimated Impacts on Net Medicare Spending and Estimated Aggregate Impacts by Cohort, Cumulative and by PY **(Exhibit C.7)**
- Estimated Gross and Net Impacts by Cohort on Medicare Spending, Cumulative and by PY **(Exhibit C.8)**
- Estimated Model-wide Impacts on Medicare Spending for Acute Care Hospital, Professional Services, and Outpatient Facilities **(Exhibit C.9)**
- Estimated Model-wide Impacts on Medicare Spending for SNF, Other PAC Facilities, and Home Health **(Exhibit C.10)**
- Estimated Model-wide Impacts on Medicare Spending for Hospice and Durable Medical Equipment **(Exhibit C.11)**
- Estimated Model-wide Impacts on Utilization of Acute Care Hospital Stays, SNF Days, and SNF Stays **(Exhibit C.12)**
- Trends in Model-wide Utilization of Acute Care Hospital Stays, SNF Days, and SNF Stays **(Exhibit C.13)**
- Estimated Model-wide Impacts on Utilization of E&M Visits and Home Health Episodes **(Exhibit C.14)**
- Trends in Model-Wide Utilization of E&M Visits and Home Health Episodes **(Exhibit C.15)**
- Estimated Impacts on Medicare Spending Category by Cohort, Cumulative and by PY **(Exhibits C.16-C23)**
- Estimated Impacts on Utilization by Cohort, Cumulative and by PY **(Exhibits C.24-C.28)**
- Model-wide Unadjusted Telehealth Visits per 1,000 BPY **(Exhibit C.29)**

Exhibit C.1. Descriptive Characteristics of NGACO-Aligned and Propensity Score-Weighted Comparison Beneficiaries for the 2016 Cohort

Characteristics	Baseline Years		PY5		Differential Change
	NGACO	Comparison	NGACO	Comparison	
Number of beneficiaries	946491	946682	354308	367785	.
Total person-months	10892997	10985946	4124538	4287851	.
Variables Included in Propensity Score Models					
Mean months of alignment (±SD)	11.5 ± 1.9	11.6 ± 1.8	11.6 ± 1.6	11.7 ± 1.7	0.078***
Mean age (years ± SD)	73.0 ± 12.5	73.0 ± 12.7	73.5 ± 11.2	73.3 ± 11.4	0.258***
Gender (%)					
Male	41.7	41.6	42.8	42.9	-0.002
Race/Ethnicity (%)					
White	85.7	86.0	85.8	85.8	0.003*
Black	8.5	8.3	7.1	7.2	-0.003**
Hispanic	3.4	3.3	3.1	3.0	-0.002**
Asian	1.1	1.1	1.4	1.4	0.001
Other	1.3	1.3	2.7	2.6	0.001*
Disability/ESRD (%)					
Disability	16.1	16.1	11.8	12.3	-0.005***
ESRD	1.1	1.2	1.0	1.1	-0.000
Coverage (%)					
Any dual eligibility	19.8	20.2	15.3	16.0	-0.003*
Any Part D coverage	72.2	72.7	78.7	79.4	-0.001
Chronic Conditions					
Mean no. of chronic conditions (± SD)	4.8 ± 3.4	4.9 ± 3.5	5.5 ± 3.7	5.6 ± 3.9	-0.010
Alzheimer's/dementia (%)	8.3	8.8	7.8	8.3	-0.001
Chronic kidney disease (%)	16.6	16.9	25.8	26.5	-0.004*
COPD (%)	10.5	10.7	10.8	11.0	-0.000
Congestive heart failure (%)	12.9	13.1	13.5	13.9	-0.002
Diabetes (%)	28.1	28.1	26.8	26.9	-0.001
Ischemic heart disease (%)	26.7	26.8	25.0	25.4	-0.003
Depression (%)	17.6	17.8	21.4	21.8	-0.002
RA/OA (%)	30.7	30.8	35.3	35.2	0.002
Stroke/TIA (%)	3.4	3.5	3.1	3.1	0.001
Cancer (%)	8.8	8.9	9.9	9.8	0.002
Mortality (%)					
Death in reference period	4.2	5.0	4.3	4.8	0.003**
Community Characteristics					
Median income ($ ± SD)	56269.1 ± 21896.4	55905.1 ± 20848.7	68013.4 ± 26650.1	67488.6 ± 24830.9	160.751*
Below poverty line (% ± SD)	13.8 ± 8.8	13.7 ± 8.7	11.7 ± 7.5	11.5 ± 7.4	0.011
Bachelor's degree or higher (% ± SD)	27.9 ± 15.8	27.6 ± 15.5	32.6 ± 16.7	32.0 ± 16.1	0.302***

Characteristics	Baseline Years		PY5		Differential Change
	NGACO	Comparison	NGACO	Comparison	
Rurality (%)	23.4	23.2	22.3	21.2	0.009***
Alignment-eligible providers within 10-mile radius of beneficiary ZIP code (per 1,000 population ± SD)‡	1.8 ± 1.1	1.8 ± 1.1	3.1 ± 1.1	3.1 ± 1.2	0.039***
Variables Excluded from Propensity Score and Regression Models					
HRR Characteristics					
ACO penetration rate (% ± SD)	25.4 ± 16.4	25.7 ± 16.7	47.1 ± 10.4	47.4 ± 10.4	0.044
Medicare Advantage penetration rate (% ± SD)	28.9 ± 13.7	29.1 ± 13.8	40.9 ± 12.9	41.2 ± 13.1	-0.190
Hospital HHI (± SD)	3033.1 ± 1499.2	3075.9 ± 1525.3	3734.6 ± 1627.6	3828.2 ± 1672.6	-50.85
Practice HHI (± SD)	589.4 ± 556.8	589.7 ± 552.9	739.8 ± 578.2	748.3 ± 586.2	-8.14
Hospital beds (per 1,000 ± SD)	2.8 ± 0.8	2.8 ± 0.8	2.7 ± 0.8	2.7 ± 0.8	-0.0059
Alignment-eligible providers (per 1,000 population ± SD)	1.4 ± 0.3	1.4 ± 0.3	2.0 ± 0.5	2.0 ± 0.5	0.0069
Participation in Medicare ACOs (%)					
NGACO	0.0	0.0	100.0	0.0	0.0
Pioneer/SSP ACO	56.1	13.0	0.0	4.0	56.1
Participation in Other CMMI Initiatives (%)					
Financial Alignment Demonstration	0.0	0.0	0.0	0.0	0.0
Independence at Home	0.0	0.1	0.0	0.0	0.0
Comprehensive Primary Care Classic or Plus	0.8	0.3	0.0	6.6	0.8
Multi-payer Advanced Primary Care	0.0	0.0	0.0	0.0	0.0
Participation in Episodic CMS Initiatives (%)					
Bundled Payments for Care Improvement (BPCI) Initiative	0.5	0.5	0.0	2.0	0.5
Comprehensive Care for Joint Replacement (CJR) Model	0.0	0.0	0.0	0.0	0.0
Oncology Care Model	0.0	0.0	0.4	0.5	0.0

NOTES: $p < 0.1$* $p < 0.05$**, $p < 0.01$***. † Where the relative change is less than 0.1, we do not denote statistical significance. COPD = chronic obstructive pulmonary disease; ESRD = end-stage renal disease; HHI = Herfindahl-Hirschman Index, a measure of the degree of market concentration or competition (higher HHI means more concentrated market, while lower HHI means more competitive market). The denominator for ACO penetration rate is the number of Medicare FFS beneficiaries with Part A and B coverage; the denominator for the Medicare Advantage penetration rate is total number of Medicare beneficiaries with Part A and B coverage. SSP = Medicare Shared Savings Program; OA = osteoarthritis; RA = rheumatoid arthritis; SD = standard deviation; TIA = transient ischemic attack.

Community characteristics are at the ZIP code level. ‡ Alignment eligible providers per 1,000 persons based on the total population (not restricted to the Medicare population). Specified HRR characteristics are not included in propensity score (PS) or DID regression models; rather, we account for changes in these HRR characteristics over time by including HRR fixed effects, along with year fixed effects, in our PS and DID analysis. HRR characteristics are weighted to the proportion of NGACO and comparison beneficiaries in the HRRs in the BYs and PY.

SOURCE: NORC analysis of Medicare enrollment and claims data, 2013-2020 and ancillary data.

Exhibit C.2. Descriptive Characteristics of NGACO-Aligned and Propensity Score-Weighted Comparison Beneficiaries for the 2017 Cohort

Characteristics	Baseline Years		PY5		Differential Change
	NGACO	**Comparison**	**NGACO**	**Comparison**	
Number of beneficiaries	1065763	1054447	409890	410043	
Total person-months	12303293	12288570	4775513	4784393	.
Variables Included in Propensity Score Models					
Mean months of alignment (±SD)	11.5 ± 1.8	11.7 ± 1.7	11.7 ± 1.6	11.7 ± 1.6	0.093***
Mean age (years ± SD)	73.4 ± 11.5	73.4 ± 11.5	74.3 ± 10.1	74.3 ± 10.2	0.008
Gender (%)					
Male	41.8	41.9	42.7	42.9	-0.108
Race/Ethnicity (%)					
White	80.3	81.0	81.4	81.7	0.386***
Black	6.4	6.3	5.2	5.0	0.129*
Hispanic	4.6	4.4	4.1	4.0	-0.126**
Asian	6.9	6.5	6.3	6.3	-0.412***
Other	1.8	1.8	3.0	3.0	0.024
Disability/ESRD (%)					
Disability	12.9	12.8	8.4	8.5	-0.127
ESRD	1.1	1.1	0.8	0.9	-0.009
Coverage (%)					
Any dual eligibility	21.8	21.6	15.8	16.0	-0.476***
Any Part D coverage	72.4	73.0	77.3	77.7	0.233*
Chronic Conditions					
Mean no. of chronic conditions (± SD)	5.1 ± 3.6	5.2 ± 3.7	5.7 ± 3.8	5.7 ± 3.9	-0.015
Alzheimer's/dementia (%)	9.3	9.4	9.1	9.3	-0.113
Chronic kidney disease (%)	19.3	19.5	28.4	28.8	-0.247*
COPD (%)	10.7	10.8	10.7	10.9	-0.070
Congestive heart failure (%)	12.7	12.9	12.8	13.1	-0.046
Diabetes (%)	29.5	29.5	28.5	28.7	-0.215
Ischemic heart disease (%)	28.4	28.5	27.7	28.0	-0.170
Depression (%)	18.2	18.4	20.3	20.5	-0.054
RA/OA (%)	33.8	33.8	38.0	38.1	-0.048
Stroke/TIA (%)	3.6	3.6	3.3	3.4	-0.044
Cancer (%)	8.8	8.9	10.0	10.0	0.100
Mortality (%)					
Death in reference period	3.8	4.4	3.9	4.5	-0.048
Community Characteristics					
Median income ($ ± SD)	59642.7 ± 22801.1	59543.4 ± 22910.4	72385.9 ± 27235.7	72432.7 ± 27407.9	-146.125*
Below poverty line (% ± SD)	14.0 ± 8.6	13.9 ± 8.5	11.4 ± 7.1	11.3 ± 7.0	0.057**
Bachelor's degree or higher (% ± SD)	31.9 ± 16.8	31.8 ± 16.8	36.1 ± 17.5	35.6 ± 17.6	0.333***
Rurality (%)	16.1	16.6	15.1	15.8	-0.157

Characteristics	Baseline Years		PY5		Differential Change
	NGACO	Comparison	NGACO	Comparison	
Alignment-eligible providers within 10-mile radius of beneficiary ZIP code (per 1,000 population ± SD)‡	1.8 ± 1.2	1.8 ± 1.2	2.9 ± 1.1	2.9 ± 1.2	0.009**
Variables Excluded from Propensity Score and Regression Models					
HRR Characteristics					
ACO penetration rate (% ± SD)	27.0 ± 13.5	27.0 ± 13.6	45.1 ± 11.6	45.0 ± 11.5	0.167
Medicare Advantage penetration rate (% ± SD)	31.2 ± 10.8	31.0 ± 10.7	39.3 ± 9.6	39.3 ± 9.6	-0.093
Hospital HHI (± SD)	2354.9 ± 1768.2	2388.3 ± 1785.5	2600.6 ± 1767.3	2643.4 ± 1793.8	-9.42
Practice HHI (± SD)	367.1 ± 375.9	373.6 ± 383.1	399.4 ± 383.1	407.0 ± 390.6	-1.18
Hospital beds (per 1,000 ± SD)	2.4 ± 0.7	2.4 ± 0.7	2.3 ± 0.7	2.3 ± 0.7	-0.0036
Alignment-eligible providers (per 1,000 population ± SD)	1.4 ± 0.3	1.4 ± 0.3	1.9 ± 0.5	1.9 ± 0.5	0.0039
Participation in Medicare ACOs (%)					
NGACO	0.0	0.0	100.0	0.0	0.0
Pioneer/SSP ACO	54.2	14.0	0.0	4.9	54.2
Participation in Other CMMI Initiatives (%)					
Financial Alignment Demonstration	0.2	0.2	0.0	0.2	-
Independence at Home	0.1	0.2	0.0	0.1	-
Comprehensive Primary Care Classic or Plus	0.0	0.2	0.0	0.7	-
Multi-payer Advanced Primary Care	0.0	0.0	0.0	0.0	-
Participation in Episodic CMS Initiatives (%)					
Bundled Payments for Care Improvement (BPCI) Initiative	0.9	1.1	0.0	2.1	-
Comprehensive Care for Joint Replacement (CJR) Model	0.1	0.1	0.0	0.1	-
Oncology Care Model	0.2	0.2	0.9	1.1	-

NOTES: $p<0.1$* $p<0.05$** , $p<0.01$***. † Where the relative change is less than 0.1, we do not denote statistical significance. COPD = chronic obstructive pulmonary disease; ESRD = end-stage renal disease; HHI = Herfindahl-Hirschman Index, a measure of the degree of market concentration or competition (higher HHI means more concentrated market, while lower HHI means more competitive market). The denominator for ACO penetration rate is the number of Medicare FFS beneficiaries with Part A and B coverage; the denominator for the Medicare Advantage penetration rate is total number of Medicare beneficiaries with Part A and B coverage. SSP = Medicare Shared Savings Program; OA = osteoarthritis; RA = rheumatoid arthritis; SD = standard deviation; TIA = transient ischemic attack.

Community characteristics are at the ZIP code level. ‡ Alignment eligible providers per 1,000 persons based on the total population (not restricted to the Medicare population). Specified HRR characteristics are not included in propensity score (PS) or DID regression models; rather, we account for changes in these HRR characteristics over time by including HRR fixed effects along with year fixed effects, in our PS and DID analysis.

SOURCE: NORC analysis of Medicare enrollment and claims data, 2014-2020 and ancillary data.

Exhibit C.3. Descriptive Characteristics of NGACO-Aligned and Propensity Score-Weighted Comparison Beneficiaries for the 2018 Cohort

Characteristics	Baseline Years		PY5		Differential Change
	NGACO	Comparison	NGACO	Comparison	
Number of beneficiaries	728215	726679	258969	260688	-
Total person-months	8438241	8464309	3021281	3043169	-
Variables Included in Propensity Score Models					
Mean months of alignment (±SD)	11.6 ± 1.8	11.6 ± 1.7	11.7 ± 1.5	11.7 ± 1.6	0.053***
Mean age (years ± SD)	73.8 ± 11.2	73.8 ± 11.2	74.5 ± 10.2	74.4 ± 10.3	0.115***
Gender (%)					
Male	42.9	42.9	42.9	43.3	-0.003
Race/Ethnicity (%)					
White	86.4	86.4	87.0	86.9	0.000
Black	6.8	6.9	5.3	5.4	0.001
Hispanic	2.5	2.5	2.3	2.4	-0.001
Asian	2.2	2.1	2.2	2.1	-0.000
Other	2.1	2.1	3.2	3.2	-0.000
Disability/ESRD (%)					
Disability	12.1	12.0	8.7	8.9	-0.003**
ESRD	0.9	0.9	0.6	0.7	0.000
Coverage (%)					
Any dual eligibility	15.7	15.9	12.4	12.7	-0.001
Any Part D coverage	72.8	73.5	76.2	76.5	0.003*
Chronic Conditions					
Mean no. of chronic conditions (± SD)	5.2 ± 3.6	5.2 ± 3.7	5.7 ± 3.8	5.8 ± 3.9	0.011
Alzheimer's/dementia (%)	8.5	8.8	8.2	8.5	-0.000
Chronic kidney disease (%)	20.0	20.2	27.4	27.6	-0.000
COPD (%)	11.0	11.1	11.2	11.3	0.001
Congestive heart failure (%)	12.8	13.1	13.3	13.5	0.000
Diabetes (%)	28.5	28.5	27.1	27.0	0.001
Ischemic heart disease (%)	29.2	29.5	28.6	29.0	-0.002
Depression (%)	17.8	17.9	20.6	20.6	0.001
RA/OA (%)	33.8	33.9	36.7	36.6	0.002
Stroke/TIA (%)	3.8	3.9	3.5	3.5	0.000
Cancer (%)	9.6	9.6	10.6	10.7	-0.000
Mortality (%)					
Death in reference period	3.9	4.5	3.9	4.4	0.000
Community Characteristics					
Median income ($ ± SD)	64482.6 ± 27207.7	64017.0 ± 26380.5	74941.0 ± 29435.7	74928.2 ± 29636.7	-452.884***
Below poverty line (% ± SD)	12.8 ± 8.6	12.8 ± 8.8	10.8 ± 7.3	10.7 ± 7.3	0.129***
Bachelor's degree or higher (% ± SD)	34.0 ± 17.3	34.2 ± 17.5	37.3 ± 17.3	37.2 ± 17.8	0.196***
Rurality (%)	11.1	11.5	9.3	10.0	-0.002

Characteristics	Baseline Years		PY5		Differential Change
	NGACO	Comparison	NGACO	Comparison	
Alignment-eligible providers within 10-mile radius of beneficiary ZIP code (per 1,000 population ± SD)‡	2.1 ± 1.3	2.1 ± 1.4	3.2 ± 1.1	3.2 ± 1.2	-0.006
Variables Excluded from Propensity Score and Regression Models					
HRR Characteristics					
ACO penetration rate (% ± SD)	29.3 ± 14.0	29.4 ± 13.9	43.6 ± 14.3	43.6 ± 14.4	0.021
Medicare Advantage penetration rate (% ± SD)	33.4 ± 9.8	33.4 ± 9.8	39.9 ± 9.4	39.9 ± 9.4	-0.078
Hospital HHI (± SD)	2223.6 ± 1250.7	2227.6 ± 1253.3	2497.0 ± 1221.0	2511.0 ± 1237.0	-10.02
Practice HHI (± SD)	495.7 ± 558.6	499.1 ± 565.1	551.9 ± 570.1	560.1 ± 582.8	-4.76
Hospital beds (per 1,000 ± SD)	2.5 ± 0.5	2.5 ± 0.5	2.4 ± 0.5	2.3 ± 0.5	0.0050
Alignment-eligible providers (per 1,000 population ± SD)	1.7 ± 0.5	1.7 ± 0.5	2.1 ± 0.5	2.1 ± 0.5	0.0071
Participation in Medicare ACOs (%)					
NGACO	0.0	0.0	100.0	0.0	-
Pioneer/SSP ACO	48.1	11.0	0.0	4.8	-
Participation in Other CMMI Initiatives (%)					
Financial Alignment Demonstration	0.0	0.0	0.0	0.0	-
Independence at Home	0.0	0.0	0.0	0.0	-
Comprehensive Primary Care Classic or Plus	1.3	3.1	0.1	5.5	-
Multi-payer Advanced Primary Care	0.0	0.0	0.0	0.0	-
Participation in Episodic CMS Initiatives (%)					
Bundled Payments for Care Improvement (BPCI) Initiative	1.7	1.4	0.0	1.9	-
Comprehensive Care for Joint Replacement (CJR) Model	0.3	0.3	0.0	0.2	-
Oncology Care Model	0.4	0.3	0.6	0.7	-

NOTES: p<0.1* p<0.05**, p<0.01***. † Where the relative change is less than 0.1, we do not denote statistical significance. COPD = chronic obstructive pulmonary disease; ESRD = end-stage renal disease; HHI = Herfindahl-Hirschman Index, a measure of the degree of market concentration or competition (higher HHI means more concentrated market, while lower HHI means more competitive market). The denominator for ACO penetration rate is the number of Medicare FFS beneficiaries with Part A and B coverage; the denominator for the Medicare Advantage penetration rate is total number of Medicare beneficiaries with Part A and B coverage. SSP = Medicare Shared Savings Program; OA = osteoarthritis; RA = rheumatoid arthritis; SD = standard deviation; TIA = transient ischemic attack.

Community characteristics are at the ZIP code level. ‡ Alignment eligible providers per 1,000 persons based on the total population (not restricted to the Medicare population). Specified HRR characteristics are not included in propensity score (PS) or DID regression models; rather, we account for changes in these HRR characteristics over time by including HRR fixed effects, along with year fixed effects, in our PS and DID analysis.

SOURCE: NORC analysis of Medicare enrollment and claims data, 2015-2020 and ancillary data.

Exhibit C.4 presents a detailed breakdown of the impact estimates, adjusted mean Medicare spending for the NGACO and comparison groups during the baseline and performance periods, and shared savings payouts and net estimated impacts.

Exhibit C.4. Estimated Gross and Net Impacts of NGACO Model on Medicare Spending, Cumulative and by PY

| | Number of Beneficiaries | Mean Adjusted Spending PBPY | | | | Gross Impact Estimate | | Shared Savings | | Net Impact Estimate | |
		NGACO Group in Baseline Period ($)	NGACO Group in Performance Period ($)	Comparison Group in Baseline Period ($)	Comparison Group in Performance Period ($)	PBPY ($) (95% CI)	Aggregate ($ in Millions) (95% CI)	PBPY ($)	Aggregate ($ in Millions)	Estimate PBPY ($) (95% CI)	Aggregate ($ in Millions) (95% CI)
Cumulative	5,335,416	13,680.61	13,410.35	13,941.59	13,867.24	-195.91**** (-256.05, -135.76)	-1,045.25**** (-1,366.14, -724.36)	268.34	1,431.71	72.43** (12.29, 132.58)	386.46** (65.58, 707.35)
PY5	1,023,167	13,083.19	12,068.38	13,347.69	12,693.80	-360.93**** (-546.39, -175.47)	-369.29**** (-559.05, -179.53)	498.23	509.77	137.30 (-48.16, 322.76)	140.48 (-49.28, 330.24)
PY4	1,203,457	13,716.48	13,728.70	13,964.26	14,237.84	-261.37**** (-407.50, -115.23)	-314.54**** (-490.41, -138.68)	364.53	438.69	103.17 (-42.97, 249.30)	124.16 (-51.71, 300.02)
PY3	1,399,398	13,957.76	13,899.37	14,188.63	14,295.50	-165.27**** (-269.53, -61.01)	-231.27**** (-377.17, -85.37)	174.09	243.61	8.82 (-95.44, 113.08)	12.34 (-133.56, 158.24)
PY2	1,232,215	13,931.46	13,785.31	14,265.80	14,172.65	-53.00 (-135.13, 29.13)	-65.31 (-166.51, 35.90)	161.23	198.67	108.23*** (26.10, 190.36)	133.36*** (32.16, 234.56)
PY1	477,179	13,410.52	13,082.52	13,596.19	13,404.08	-125.95* (-256.32, 4.42)	-60.10* (-122.31, 2.11)	85.85	40.97	-50.03 (-190.68, 90.62)	-23.87 (-91.00, 43.24)

NOTES: Estimated impacts PBPY significant at *p<0.1, **p<0.05, ***p<0.01, ****p<0.005. Estimated gross impact is the DID estimate, or the difference between the NGACO and comparison mean adjusted spending in the PYs and BYs. Cumulative impact is the summary impact from PY1 through PY4 of the model. Mean adjusted spending for the NGACO and comparison groups in the baseline and PY(s) are the conditional means from the DID regressions. Estimated net impact is the gross impact less shared savings payments to NGACOs and CCR payouts to aligned beneficiaries in the PY(s). Significant impacts at the p<0.1 level appear in shaded cells. Lower spending impact estimates are shaded in green; higher spending estimates are shaded in orange. PBPY estimate is the impact estimate per beneficiary per year. Aggregate estimate is the impact estimate for all aligned beneficiaries in PY(s).

Exhibit C.5. Trends in Unadjusted Gross Medicare Parts A and B Spending, Cumulative (PY1 through PY5)
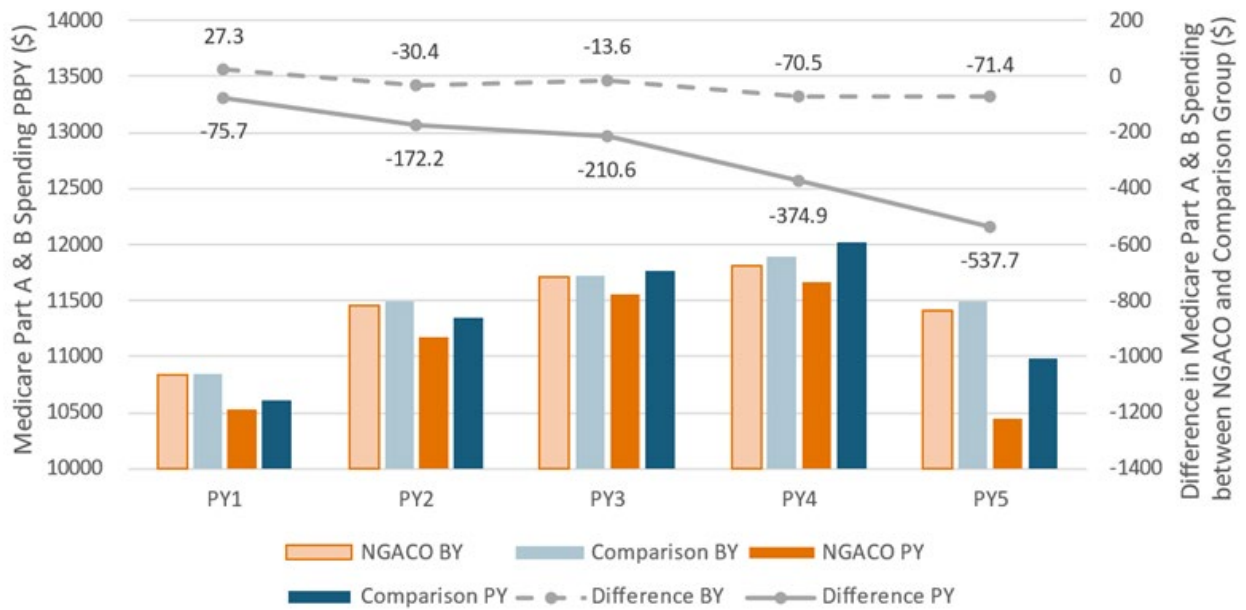
NOTES: Unadjusted total Medicare spending per beneficiary per year (PBPY) displayed in bars and the left-hand side Y-axis for the NGACO group [orange bars] and comparison group [blue bars] in the performance years (PY) [darker bars] and respective baseline years (BYs) [lighter bars], for PY1 through PY5 of the model. Difference in unadjusted spending between the NGACO and comparison group displayed in gray lines and the right-hand side Y-axis in PYs [solid gray line] and BYs [dashed gray line]. See Exhibit 2.3 for graph on adjusted total spending.
SOURCE: NORC analysis of NGACO and comparison group enrollment, claims, and model programmatic data.

Exhibit C.6. Estimated Impacts on Gross Medicare Spending and Estimated Aggregate Impacts by Cohort, Cumulative and by PY

Gross Spending by Cohort

		% Impact	Aggregate Impact
Cumulative	-$50.3	-0.4%	-$112.6M
PY5	$127.9	1.2%	$45.3M
PY4	-$150.2	-1.2%	-$69.8M
PY3	-$105.1	-0.8%	-$46.6M
PY2	$54.3	0.4%	$24.5M
PY1	-$135.9*	-1.0%	-$64.8M
Cumulative	-$276.7***	-2.0%	-$636.6M
PY5	-$598.6***	-5.0%	-$245.3M
PY4	-$352.1***	-2.5%	-$168.2M
PY3	-$198.7**	-1.4%	-$125.0M
PY2	-$120.8**	-0.9%	-$86.3M
Cumulative	-$372.3***	-3.0%	-$296.0M
PY5	-$653.7***	-5.7%	-$169.3M
PY4	-$295.1*	-2.3%	-$72.4M
PY3	-$185.5***	-1.5%	-$51.5M

2016 Cohort (PY1–PY5, Cumulative); 2017 Cohort (PY2–PY5, Cumulative); 2018 Cohort (PY3–PY5, Cumulative)

Impact Estimate for Gross Spending ($PBPY) and 90% CI

x-axis: -$500, $0, $500

● 2016 Cohort   ● 2017 Cohort   ○ 2018 Cohort
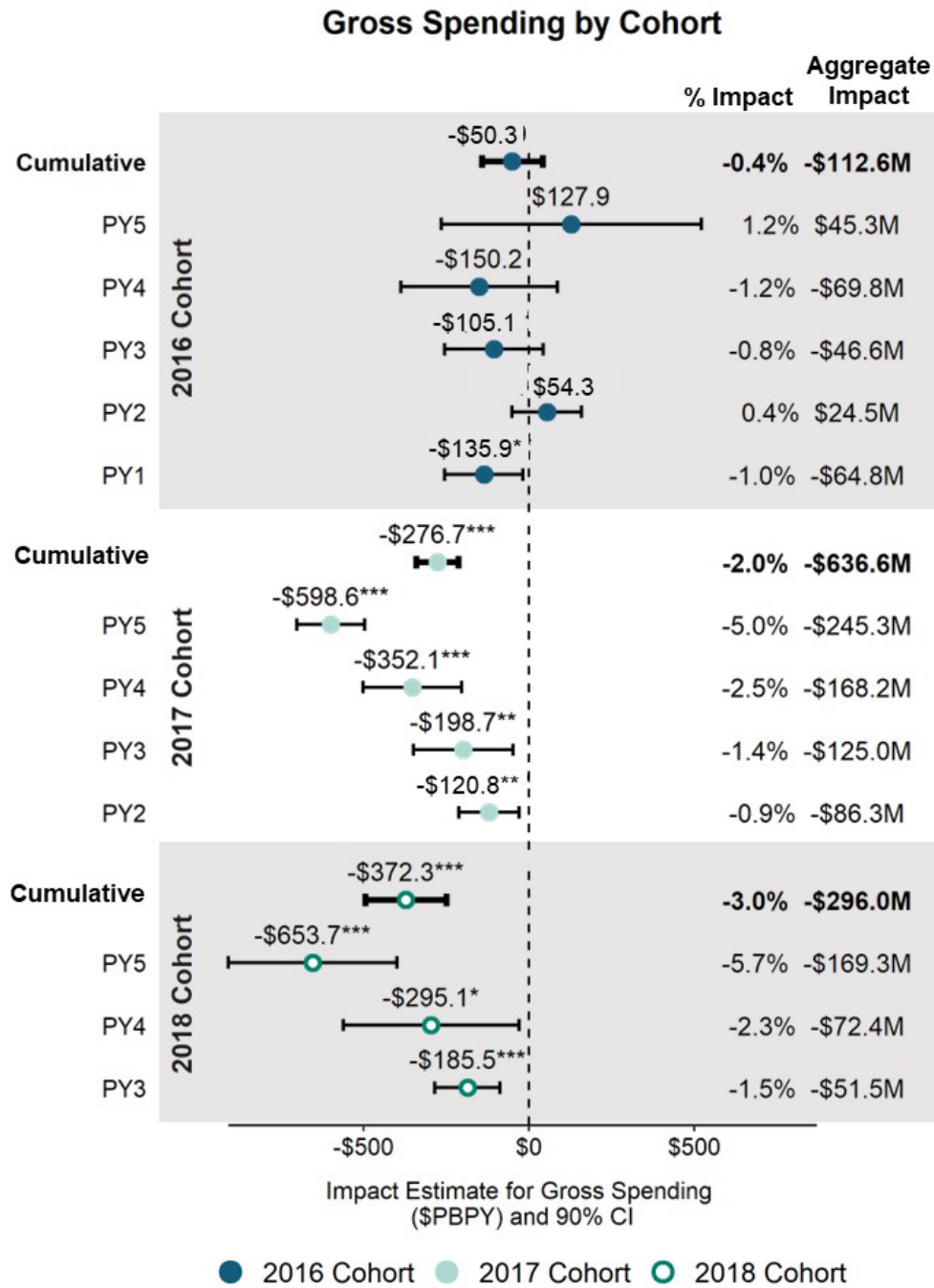
NOTES: Estimated impacts PBPY significant at *p<0.1, **p<0.05, ***p<0.01, ***#p<0.005. Estimated gross spending impact is the DID estimate of the NGACO model on Medicare Parts A and B spending. We show 90% CIs as bars around the estimates. Impact for the cohorts in each PY reflects impacts for their NGACOs and providers active in the model in the PY. Cumulative impact is the summary impact from PY1 through PY5 of the model.
SOURCE: NORC analysis of NGACO and comparison group enrollment, claims, and model programmatic data.

Net Spending by Cohort

		% Impact	Aggregate Impact
2016 Cohort			
Cumulative	$186.8***	**1.4%**	**$418.2M**
PY5	$448.3*	3.7%	$158.8M
PY4	$160.1	1.2%	$75.3M
PY3	$174.7*	1.3%	$80.3M
PY2	$267.3***	2.0%	$127.6M
PY1	-$50.3	-0.4%	-$23.9M
2017 Cohort			
Cumulative	-$62.9	**-0.4%**	**-$144.8M**
PY5	-$89.5	-0.7%	-$36.7M
PY4	-$47.4	-0.3%	-$22.9M
PY3	-$139.4	-0.9%	-$90.9M
PY2	$7.6	0.1%	$5.8M
2018 Cohort			
Cumulative	$142.2*	**1.1%**	**$113.1M**
PY5	$70.8	0.6%	$18.3M
PY4	$288.6*	2.2%	$71.8M
PY3	$80.0	0.6%	$23.0M

Impact Estimate for Net Spending ($PBPY) and 90% CI

● 2016 Cohort ● 2017 Cohort ○ 2018 Cohort

NOTES: Estimated impacts PBPY significant at *p<0.1, **p<0.05, ***p<0.01, ***#p<0.005. Estimated net spending impact is the sum of the gross impact and CMS's payouts to NGACOs for shared savings and CCR. We show 90% CIs as bars around the estimates. Impact for the cohorts in each PY reflects impacts for their NGACOs and providers active in the model in the PY. Cumulative impact is the summary impact from PY1 through PY5 of the model.
SOURCE: NORC analysis of NGACO and comparison group enrollment, claims, and model programmatic data.

Exhibit C.8. Estimated Gross and Net Impacts by Cohort on Medicare Spending, Cumulative and by PY

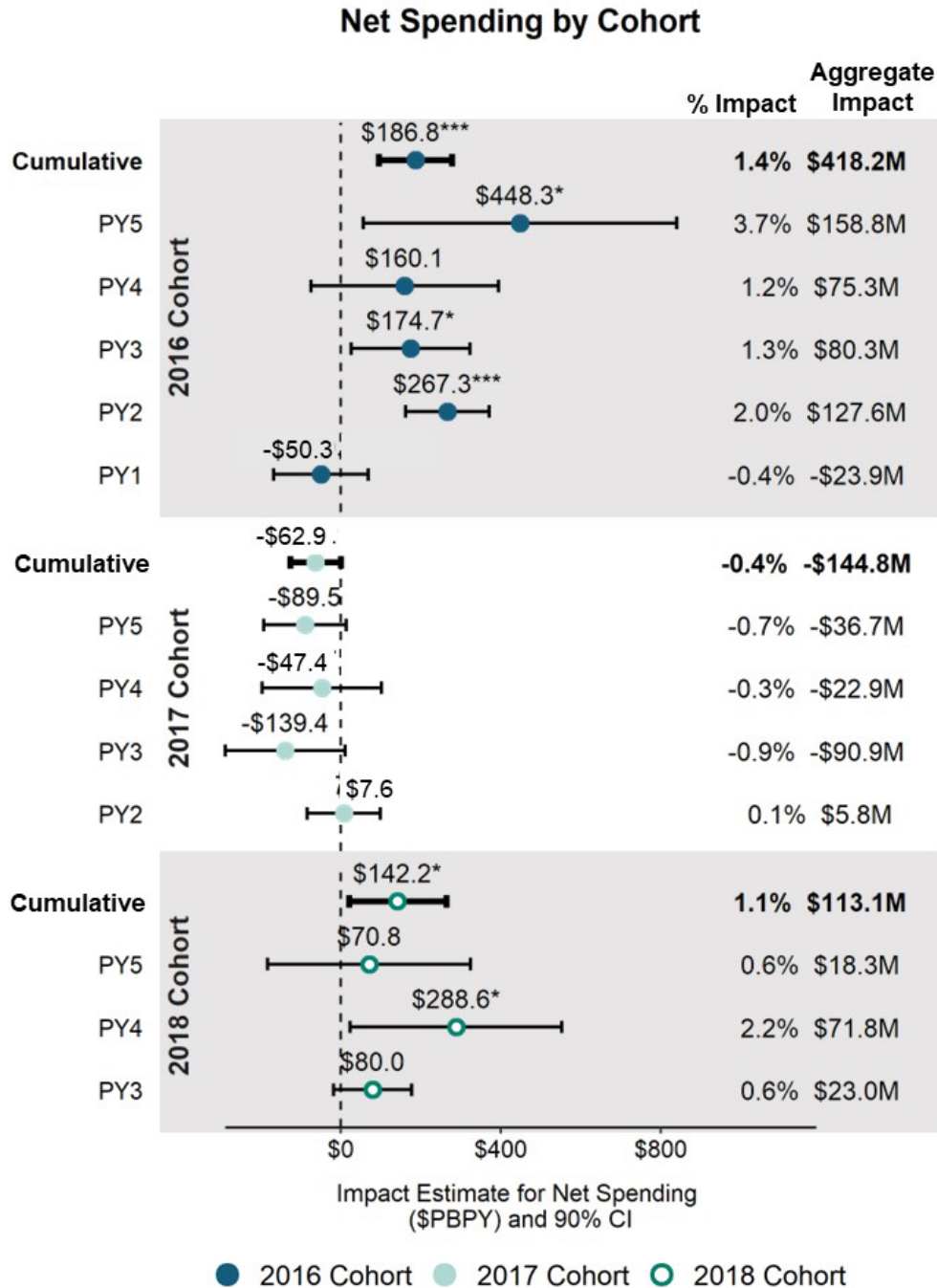|	Number of Beneficiaries	Mean Adjusted Spending PBPY				Gross Impact Estimate		Shared Savings		Net Impact Estimate	
		NGACO Group in Baseline Period	NGACO Group in Performance Period	Comparison Group in Baseline Period	Comparison Group in Performance Period	PBPY ($) (95% CI)	Aggregate ($ in Millions) (95% CI)	PBPY ($)	Aggregate ($ in Millions)	PBPY ($) (95% CI)	Aggregate ($ in Millions) (95% CI)
2016 2016 Cohort											
Cumulative	2,239,173	13,099.02	13,123.13	13,320.85	13,395.25	-50.29 (-159.11, 58.53)	-112.61 (-356.27, 131.05)	237.05	530.79	186.76**** (77.94, 295.58)	418.19**** (174.53, 661.85)
PY5	354,308	12,515.93	12,321.71	12,726.63	12,404.47	127.94 (-338.83, 594.71)	45.33 (-120.05, 210.71)	320.35	113.50	448.29* (-18.49, 915.06)	158.83* (-6.55, 324.21)
PY4	470,657	12,996.05	13,477.51	13,202.02	13,833.70	-148.21 (-424.59, 128.17)	-69.76 (-199.84, 60.32)	310.29	146.04	160.06 (-120.08, 440.21)	75.34 (-56.52, 207.19)
PY3	459,603	13,232.98	13,365.39	13,445.37	13,682.85	-101.35 (-271.73, 69.04)	-46.58 (-124.89, 31.73)	279.76	128.58	174.68* (-1.97, 351.33)	80.28* (-904.34, 161.47)
PY2	477,426	13192.96	13175.91	13483.91	13412.60	51.35 (-66.56, 169.27)	24.52 (-31.78, 80.81)	213.02	101.70	267.28**** (142.69, 391.87)	127.61**** (68.13, 187.09)
PY1	477,179	13,410.52	13,082.52	13,596.19	13,404.08	-125.95 * (-256.32, 4.42)	-60.10 * (-122.31, 2.11)	85.85	40.97	-50.03 (-190.68, 90.62)	87 (-91.00, 43.24)
2016 2017 Cohort											
Cumulative	2,301,075	14,396.87	13,947.42	14,723.77	14,550.99	-276.67**** (-352.16, -201.18)	-636.64**** (-810.35, -462.93)	213.74	491.82	-62.93 (-138.43, 12.56)	-144.82 (-318.53, 28.89)
PY5	409,890	13,561.31	12,109.45	13,895.63	13,042.33	-598.56**** (-720.89, -476.23)	-245.34**** (-295.49, -195.20)	509.07	208.66	-89.49 (-211.82, 32.84)	-36.68 (-86.82, 13.46)
PY4	484,152	14,634.66	14,369.37	14,932.69	15,019.48	-347.35**** (-522.44, -172.25)	-168.17**** (-252.94, -83.39)	304.69	147.51	-47.39 (-224.87, 130.09)	-22.94 (-108.87, 62.98)
PY3	652,244	14,743.49	14,530.77	15,046.78	15,032.80	-191.69** (-363.97, -19.40)	-125.03** (-237.40, -12.66)	59.31	38.68	-139.43 (-318.05, 39.19)	-90.94 (-207.45, 25.56)
PY2	754,789	14,398.58	14,170.77	14,760.37	14,653.41	-114.37** (-217.04, -11.70)	-86.32** (-163.82, -8.83)	128.46	96.96	7.62 (-100.86, 116.10)	5.75 (-76.12, 87.63)
2016 2018 Cohort											
Cumulative	795,168	13,245.59	12,664.96	13,426.10	13,217.73	-372.26**** (-517.97, -226.54)	-296.00**** (-411.87, -180.14)	514.48	409.10	142.23* (-3.48, 287.94)	113,09* (-2.77, 228.96)
PY5	258,969	13,102.54	11,656.79	13,330.11	12,538.02	-653.65**** (-956.31, -350.99)	-169.28**** (-247.65, -90.90)	724.44	187.61	70.79 (-231.87, 373.45)	18.33 (-60.05, 96.71)
PY4	248,648	13,292.36	12,956.72	13,521.42	13,480.88	-291.14* (-602.54, 20.26)	-72.39* (-149.82, 5.04)	583.72	145.14	288.61* (-27.03, 604.25)	71.76* (-6.72, 150.25)

	Number of Beneficiaries	Mean Adjusted Spending PBPY				Gross Impact Estimate		Shared Savings		Net Impact Estimate	
		NGACO Group in Baseline Period	NGACO Group in Performance Period	Comparison Group in Baseline Period	Comparison Group in Performance Period	PBPY ($) (95% CI)	Aggregate ($ in Millions) (95% CI)	PBPY ($)	Aggregate ($ in Millions)	PBPY ($) (95% CI)	Aggregate ($ in Millions) (95% CI)
PY3	287,551	13,333.97	13,320.63	13,430.12	13,602.34	-178.96**** (-291.32, -66.61)	-51.46 **** (-83.77, -19.15)	265.53	76.35	79.98 (-36.51, 196.47)	23.00 (-10.50, 56.50)

NOTES: Estimated impacts PBPY significant at *p<0.1, **p<0.05, ***p<0.01, ****p<0.005. Estimated gross impact is the DID estimate, or the difference between the NGACO and comparison mean adjusted spending in the PY(s) and baseline years. Cumulative impact is the summary impact from PY1 through PY4 of the model for the respective cohorts. Mean adjusted spending for the NGACO and comparison groups in the baseline and PY(s) are the conditional means from the DID regressions. Estimated net impact is the gross impact less shared savings payments to NGACOs and CCR payouts to aligned beneficiaries in the PYs. Significant impacts at the p<0.1 level appear in shaded cells. Lower spending impact estimates are shaded in green, and higher spending estimates are shaded in orange. PBPY estimate is the impact estimate PBPY for the respective cohorts. Aggregate estimate is impact estimate for all aligned beneficiaries in PY(s) for the respective cohorts.

Exhibit C.9. Estimated Model-wide Impacts on Medicare Spending for Acute Care Hospital, Professional Services, and Outpatient Facilities

Model-wide Outpatient Spending

		% Impact
Cumulative	-$34.3**§	-1.4%
PY5	-$55.4	-2.3%
PY4	-$47.4	-1.8%
PY3	-$12.8	-0.5%
PY2	-$24.0	-1.0%
PY1	-$45.2§	-1.9%

Impact Estimate for Outpatient Spending ($PBPY) and 90% CI

● Cumulative   ● By PY

Model-wide Acute Care Hospital Spending

		% Impact
Cumulative	-$42.2****	-1.0%
PY5	-$61.7**	-1.6%
PY4	-$94.1****	-2.3%
PY3	-$14.3	-0.3%
PY2	-$11.9	-0.3%
PY1	-$29.6	-0.7%

Impact Estimate for Acute Care Hospital Spending ($PBPY) and 90% CI

Model-wide Professional Services Spending

		% Impact
Cumulative	-$41.1****	-1.3%
PY5	-$99.3****	-3.4%
PY4	-$51.7**	-1.6%
PY3	-$38.7**	-1.2%
PY2	-$7.9	-0.2%
PY1	$17.4	0.5%

Impact Estimate for Professional Services Spending ($PBPY) and 90% CI
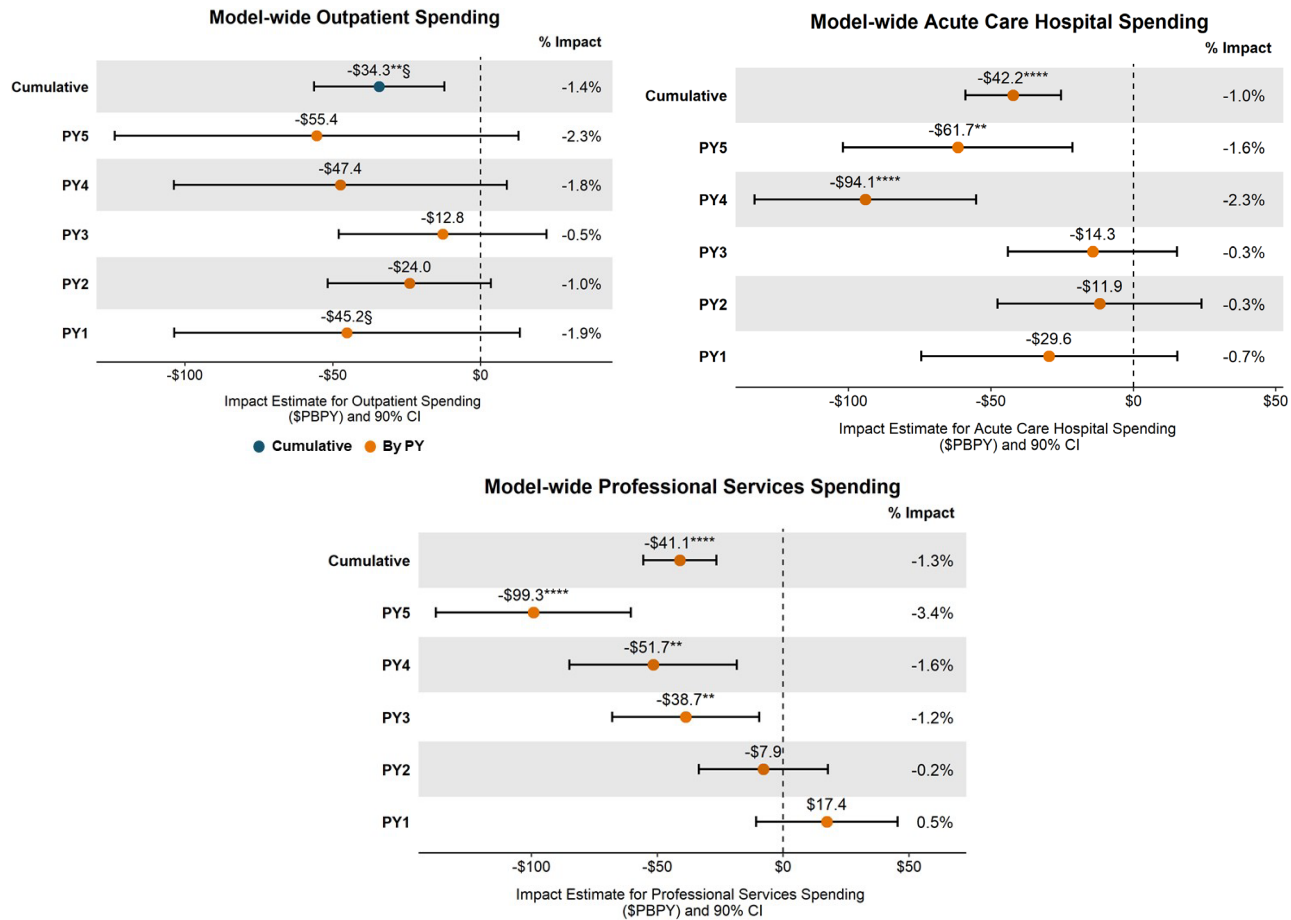
NOTES: Estimated impacts PBPY for spending significant at *p<0.1, **p<0.05, ***p<0.01, ****p<0.005. Impact estimates are the DID estimates for Medicare spending for acute care hospital facilities, professional services, and outpatient facilities. CIs at 90% level are displayed as bars around the impact estimates. Percentage impact is the impact relative to expected spending for NGACO beneficiaries in PY(s) absent the model

SOURCE: NORC analysis of NGACO and comparison group enrollment and claims data.

Exhibit C.10. Estimated Model-wide Impacts on Medicare Spending for SNF, Other PAC Facilities, and Home Health

Model-wide SNF Spending

		% Impact
Cumulative	-$32.0****§	-3.1%
PY5	-$77.5****§	-8.4%
PY4	-$40.0****	-4.0%
PY3	-$21.0**	-2.0%
PY2	-$8.5	-0.8%
PY1	-$6.8	-0.6%

Impact Estimate for SNF Spending ($PBPY) and 90% CI

Model-wide Other Post-Acute Care Facility Spending

		% Impact
Cumulative	-$17.2****	-4.1%
PY5	-$19.4****	-5.0%
PY4	-$24.2****	-6.0%
PY3	-$11.0*	-2.6%
PY2	-$15.6**	-3.6%
PY1	-$17.1	-3.3%

Impact Estimate for Other Post-Acute Care Facility Spending ($PBPY) and 90% CI

Model-wide Home Health Spending

		% Impact
Cumulative	-$16.8****§	-2.3%
PY5	-$27.8****§	-4.5%
PY4	-$23.4****§	-3.2%
PY3	-$17.2****§	-2.2%
PY2	-$2.1§	-0.3%
PY1	-$13.3*§	-1.7%

Impact Estimate for Home Health Spending ($PBPY) and 90% CI
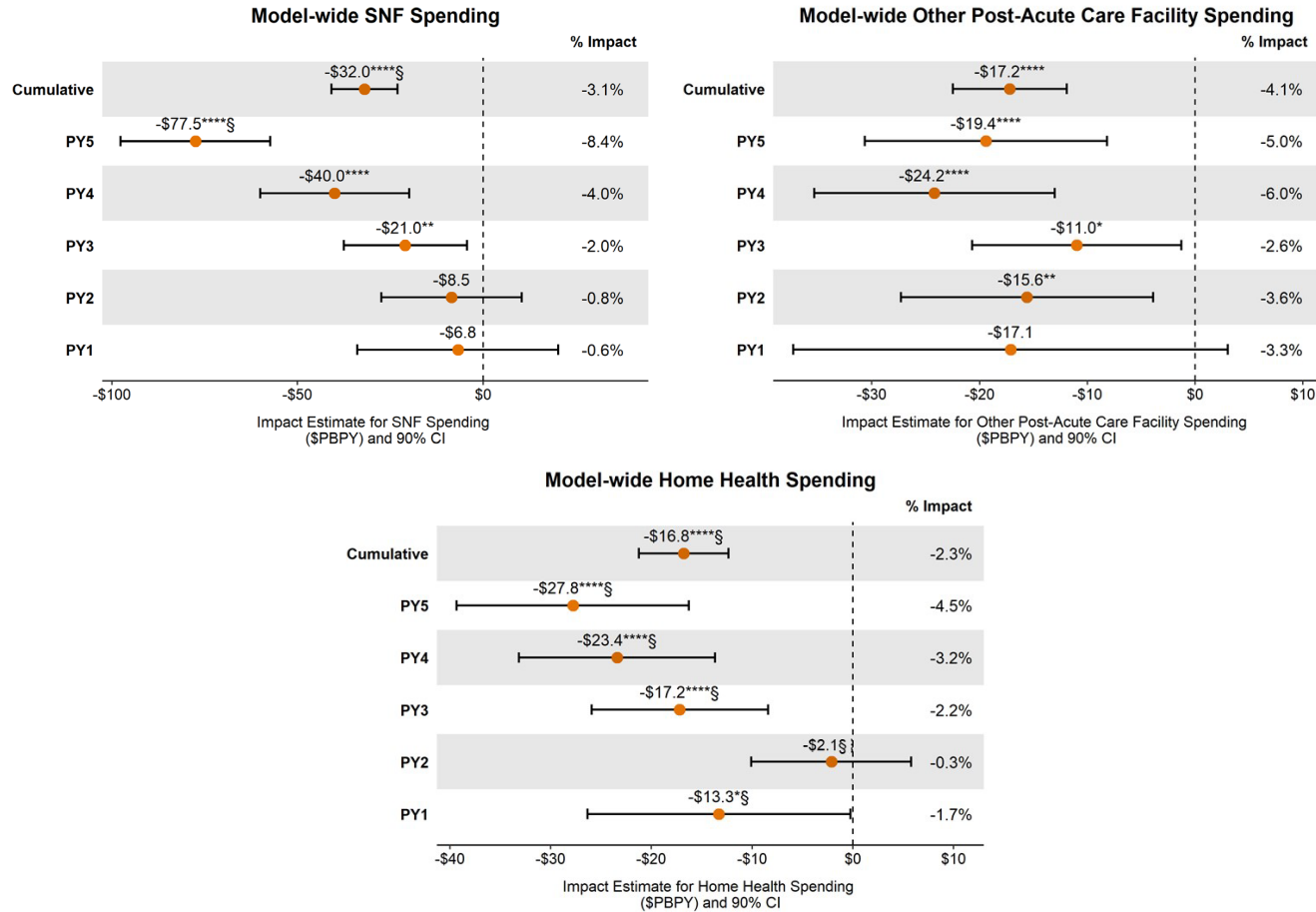
NOTES: Estimated impacts PBPY for spending significant at *p<0.1, **p<0.05, ***p<0.01,****p<0.005. Impact estimates are the DID estimates for Medicare spending for skilled nursing facilities, other post-acute care facilities (including inpatient rehabilitation facilities and long-term care hospitals), and home health. CIs at 90% level are displayed as bars around the impact estimates. Percentage impact is the impact relative to expected spending for NGACO beneficiaries in PY(s) absent the model. § Denotes failure of parallel trends assumption for outcome across BYs; we report impacts for the outcome because total spending passed the parallel trends assumption.
SOURCE: NORC analysis of NGACO and comparison group enrollment and claims data.

Exhibit C.11. Estimated Model-wide Impacts on Medicare Spending for Hospice and Durable Medical Equipment
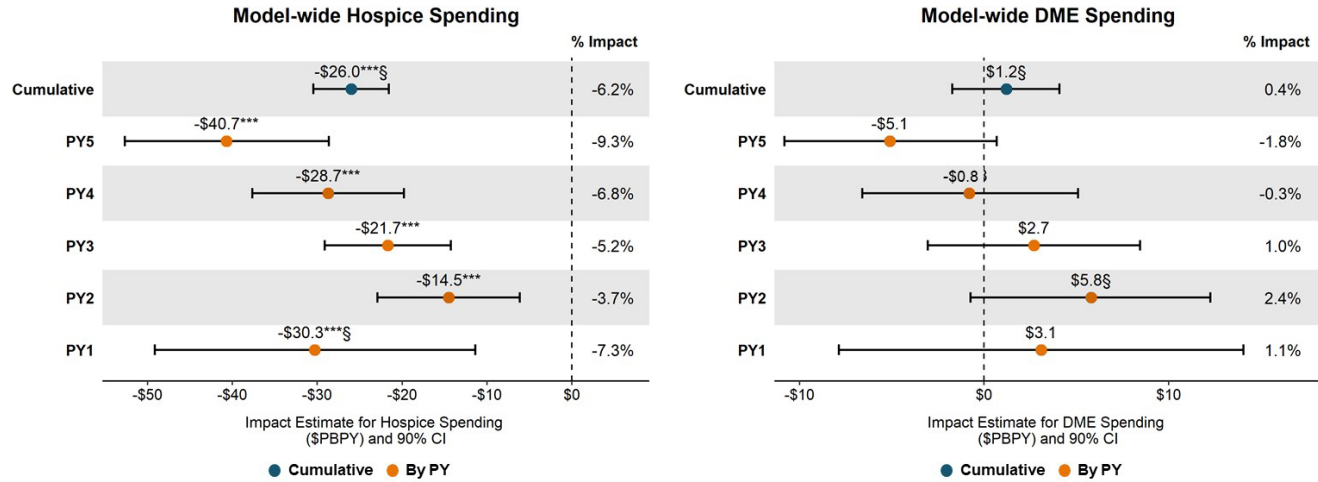
NOTES: Estimated impacts PBPY for spending significant at *p<0.1, **p<0.05, ***p<0.01, ****p<0.005. Impact estimates are the DID estimates for Medicare spending for hospice and durable medical equipment (DME). CIs at 90% level are displayed as bars around the impact estimates. Percentage impact is the impact relative to expected spending for NGACO beneficiaries in PY(s) absent the model. § Denotes failure of parallel trends assumption for outcome across baseline years; we report impacts for the outcome because total spending passed the parallel trends assumption.
SOURCE: NORC analysis of NGACO and comparison group enrollment and claims data.

Exhibit C.12. Estimated Model-wide Impacts on Utilization of Acute Care Hospital Stays, SNF Days, and SNF Stays
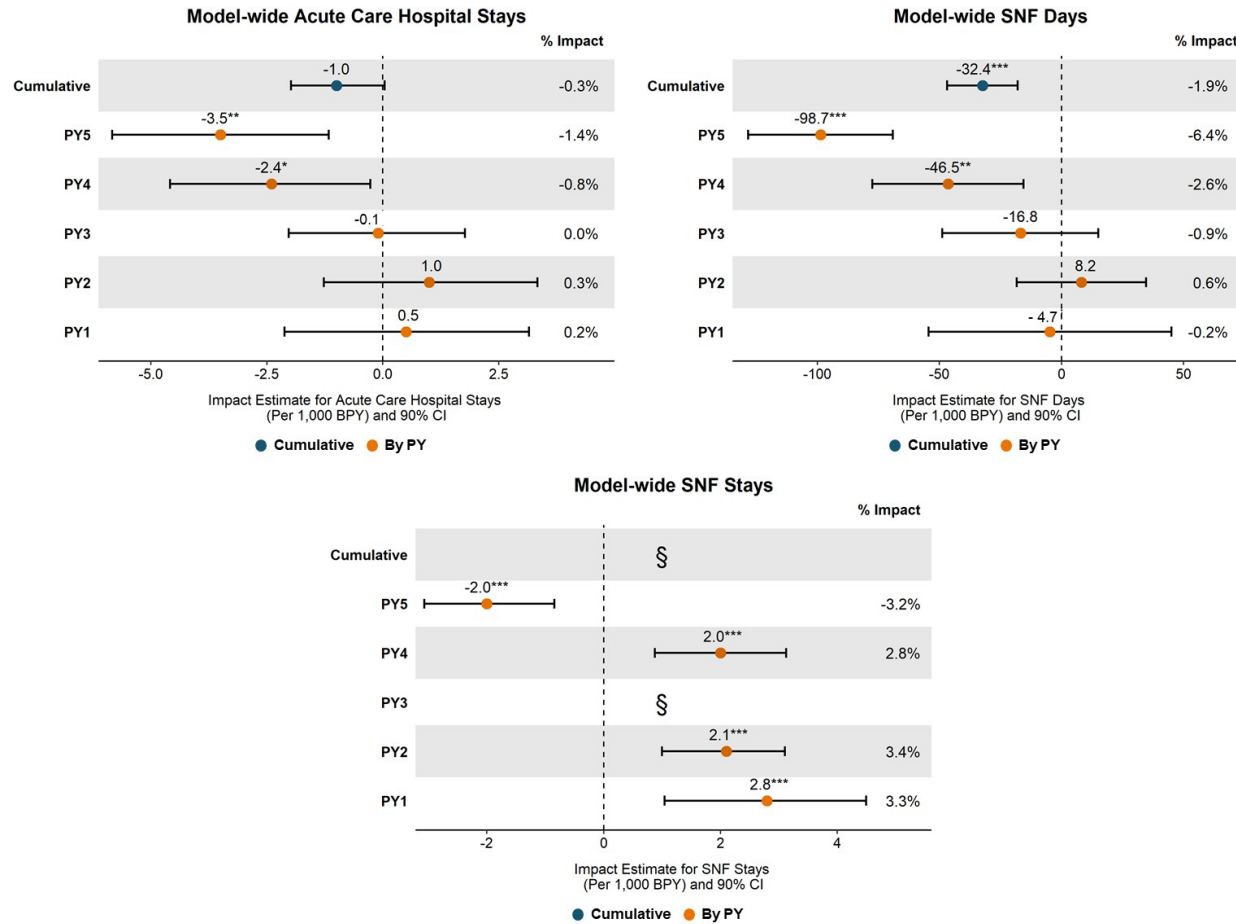
NOTES: Estimated impacts for utilization per 1,000 BPY significant at *p<0.1, **p<0.05, ***p<0.01. Impact estimates are the DID estimates for utilization for acute care hospital stays, SNF days, and SNF stays. CIs at 90% level are displayed as bars around the impact estimates. Percentage impact is the impact relative to expected utilization for NGACO beneficiaries in PY(s) absent the model. § Denotes failure of parallel trends assumption for outcome across baseline years, where estimated impact is uninterpretable and not reported. **SOURCE:** NORC analysis of NGACO and comparison group enrollment, claims, and model programmatic data.

Exhibit C.13. Trends in Model-wide Utilization of Acute Care Hospital Stays, SNF Days, and SNF Stays
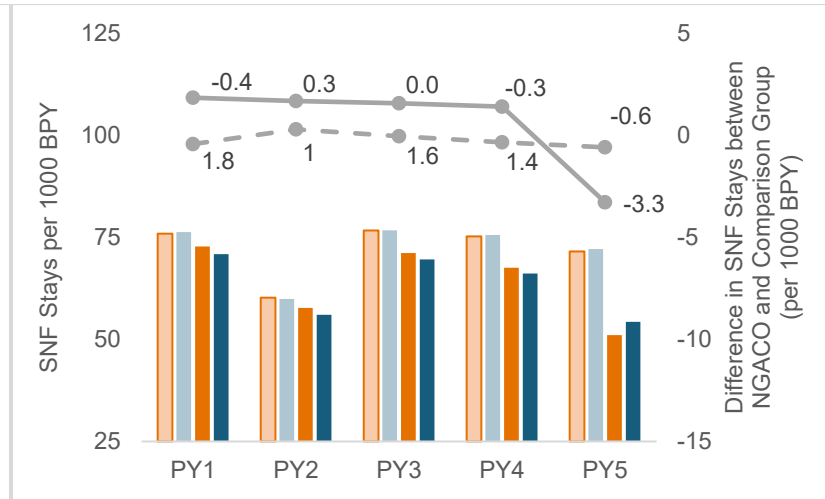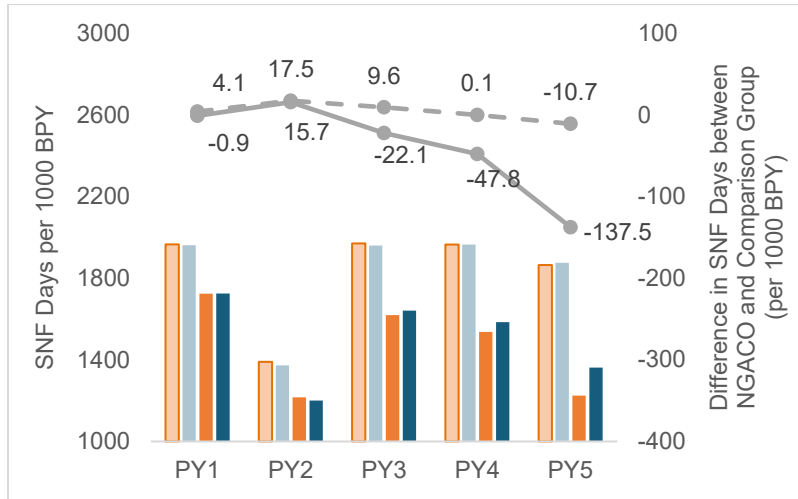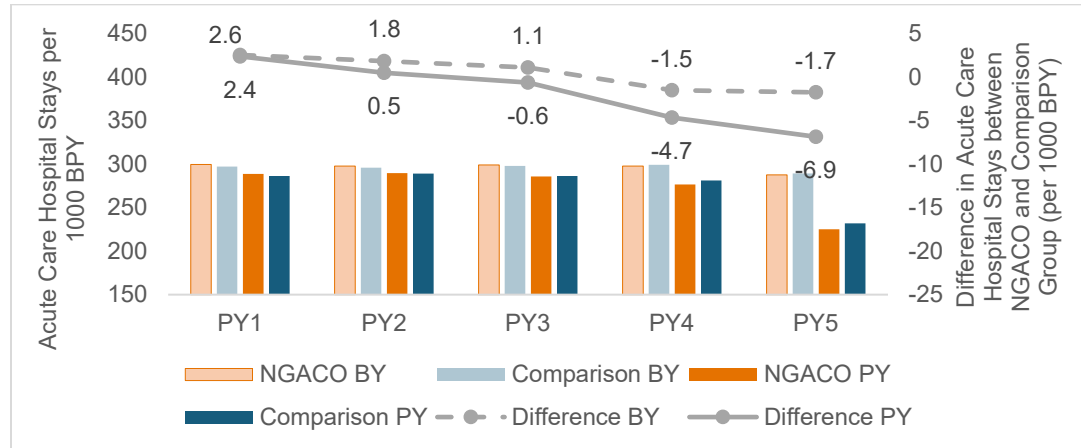
NOTES: Unadjusted utilization per 1,000 beneficiaries per year (BPY) displayed in bars and the left-hand side Y-axis for the NGACO group [orange bars] and comparison group [blue bars] in the PYs [darker bars] and respective BYs [lighter bars], for PY1 through PY5 of the model. Difference in unadjusted utilization between the NGACO and comparison group displayed in gray lines and the right-hand side Y-axis in PYs [solid gray line] and BYs [dashed gray line].
SOURCE: NORC analysis of NGACO and comparison group enrollment, claims, and model programmatic data.

Exhibit C.14. Estimated Model-wide Impacts on Utilization of E&M Visits and Home Health Episodes
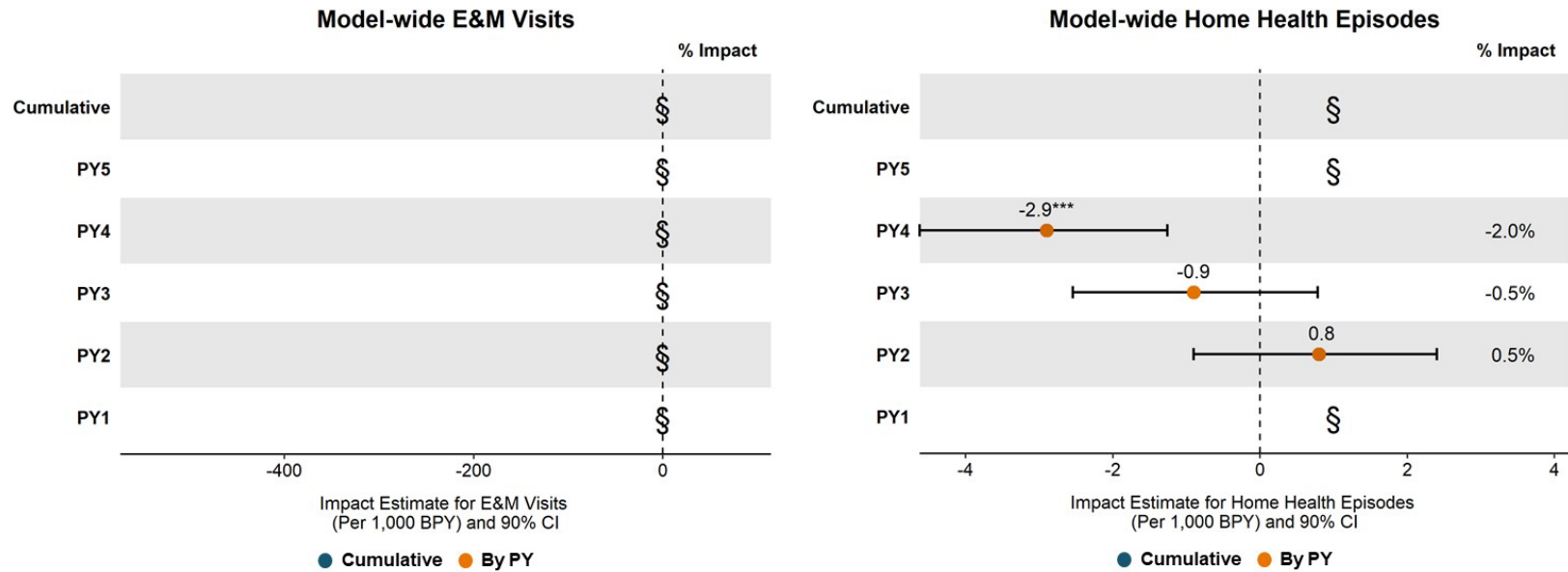
Model-wide E&M Visits

Model-wide Home Health Episodes

NOTES: Estimated impacts for utilization per 1,000 BPY significant at *p<0.1, **p<0.05, ***p<0.01. Impact estimates are the DID estimates for utilization for evaluation and management (E&M) visits and home health episodes. CIs at 90% level are displayed as bars around the impact estimates. Percentage impact is the impact relative to expected utilization for NGACO beneficiaries in PY(s) absent the model. § Denotes failure of parallel trends assumption for outcome across baseline years, where estimated impact is uninterpretable and not reported.

SOURCE: NORC analysis of NGACO and comparison group enrollment, claims, and model programmatic data.

Exhibit C.15. Trends in Model-wide Utilization of E&M Visits and Home Health Episodes
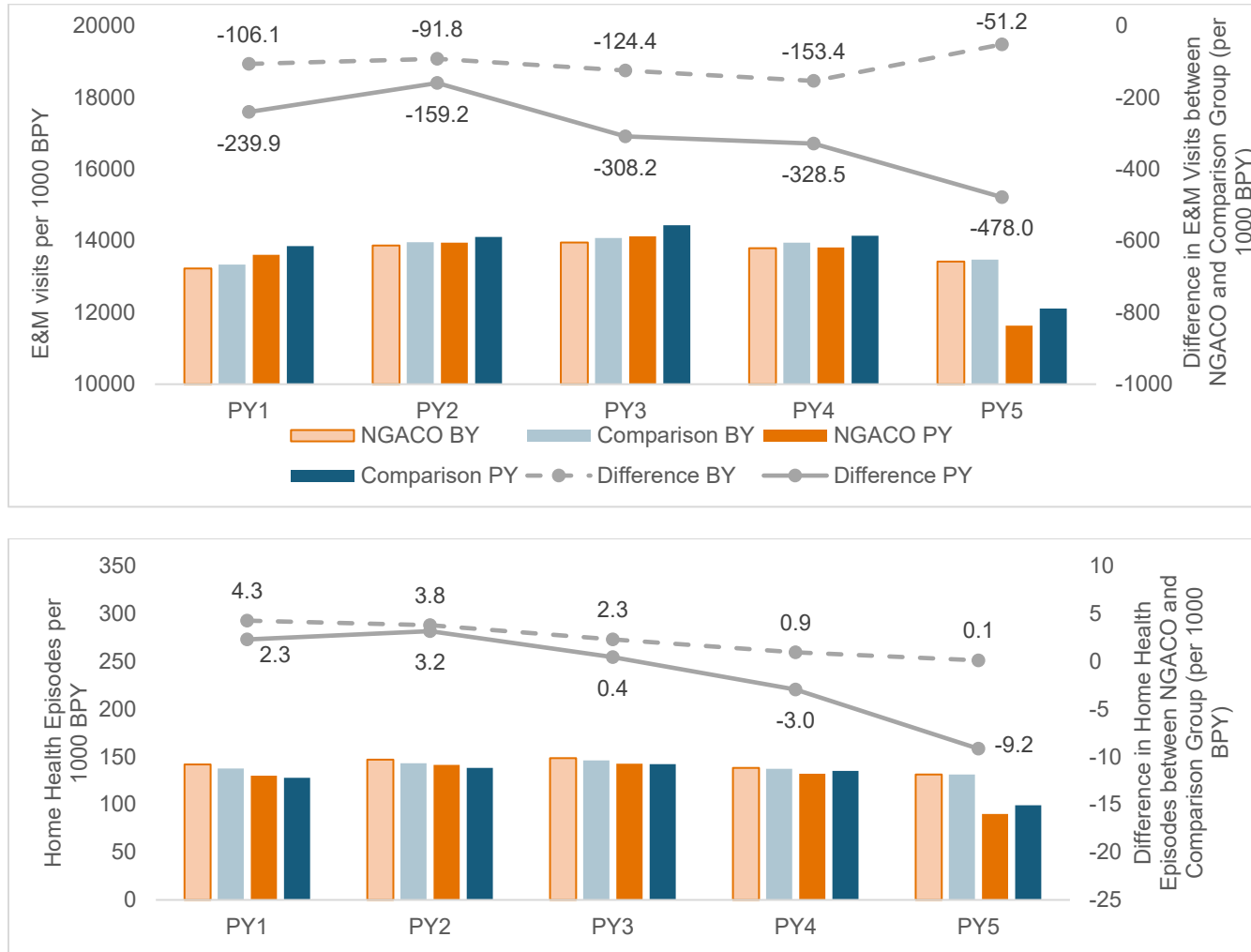
NOTES: Unadjusted utilization per 1000 beneficiaries per year (BPY) displayed in bars and the left-hand side Y-axis for the NGACO group [orange bars] and comparison group [blue bars] in the PYs [darker bars] and respective BYs [lighter bars], for PY1 through PY5 of the model. Difference in unadjusted utilization between the NGACO and comparison group displayed in gray lines and the right-hand side Y-axis in PYs [solid gray line] and BYs [dashed gray line].
SOURCE: NORC analysis of NGACO and comparison group enrollment, claims, and model programmatic data.

Exhibit C.16. Estimated Impacts on Acute Care Hospital Spending by Cohort, Cumulative and by PY
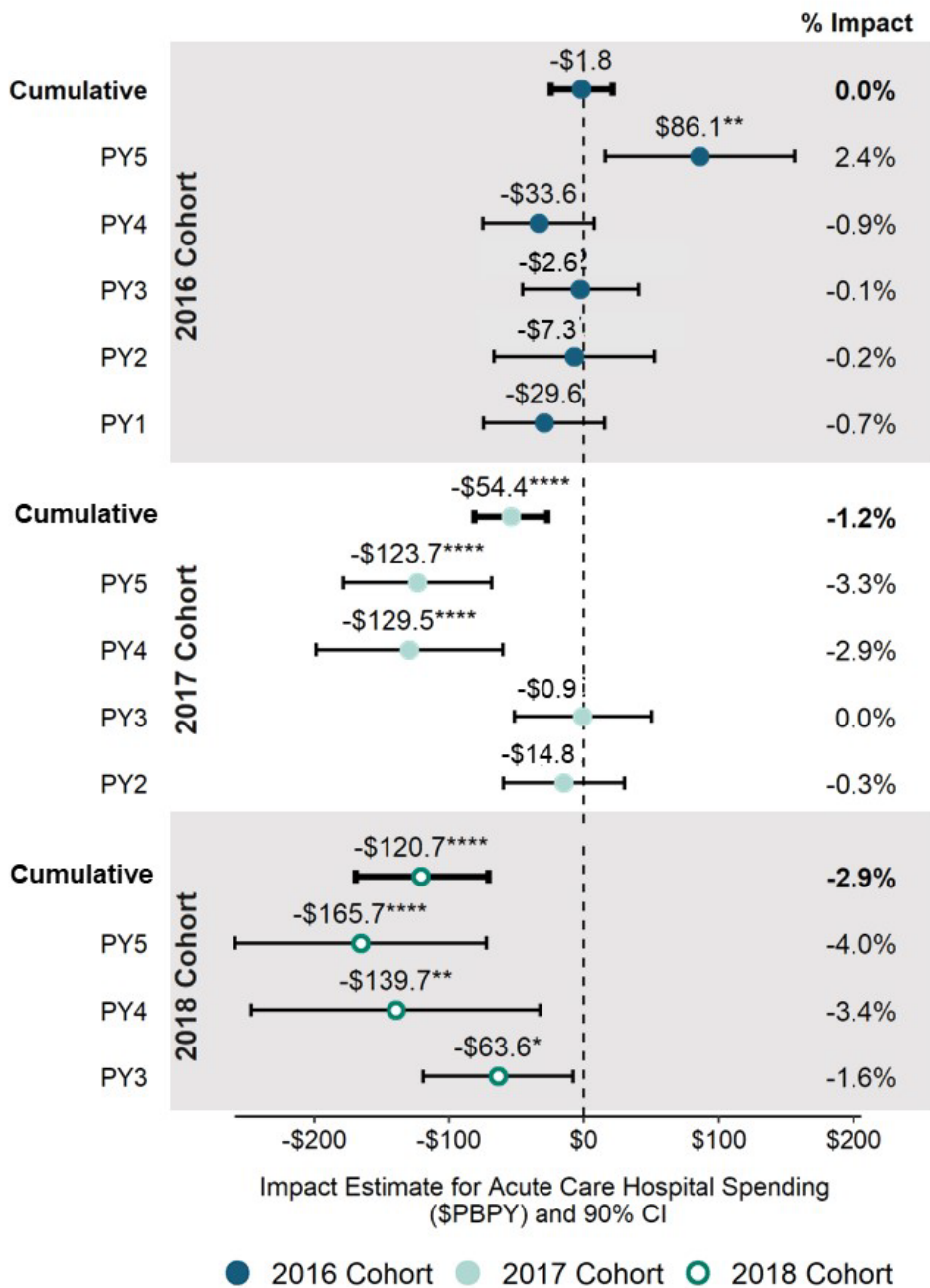
NOTES: Estimated impacts PBPY for spending significant at *p<0.1, **p<0.05, and ***p<0.01, and ****p<0.005. Impact estimates are the DID estimates for Medicare acute care hospital spending. CIs at 90% level are displayed as bars around the impact estimates. Percentage impact is the impact relative to expected average spending for NGACO beneficiaries in PY(s) absent the model. § Denotes uninterpretable impact estimate due to failure of parallel trends assumption for outcome across BY.
SOURCE: NORC analysis of NGACO and comparison group enrollment, claims, and model programmatic data.

Exhibit C.17. Estimated Impacts on Outpatient Spending by Cohort, Cumulative and by PY

% Impact

2016 Cohort

	Estimate	% Impact
Cumulative	-$18.2§	**-0.7%**
PY5	-$19.5§	-0.7%
PY4	-$42.8	-1.5%
PY3	$3.2	0.1%
PY2	$13.6	0.6%
PY1	-$45.2§	-1.9%

2017 Cohort

	Estimate	% Impact
Cumulative	-$45.3****	**-1.8%**
PY5	-$74.5	-3.2%
PY4	-$44.6	-1.7%
PY3	-$24.8	-1.0%
PY2	-$47.8****	-2.0%

2018 Cohort

	Estimate	% Impact
Cumulative	-$47.6*	**-1.9%**
PY5	-$74.6	-3.1%
PY4	-$61.8	-2.4%
PY3	-$11.2	-0.5%

Impact Estimate for Outpatient Spending ($PBPY) and 90% CI

● 2016 Cohort ● 2017 Cohort ○ 2018 Cohort

NOTES: Estimated impacts PBPY for spending significant at *p<0.1, **p<0.05, ***p<0.01, and ****p<0.005. Impact estimates are the DID estimates for Medicare outpatient spending. CIs at 90% level are displayed as bars around the impact estimates. Percentage impact is the impact relative to expected average spending for NGACO beneficiaries in PY(s) absent the model. § Denotes uninterpretable impact estimate due to failure of parallel trends assumption for outcome across BY.
SOURCE: NORC analysis of NGACO and comparison group enrollment, claims, and model programmatic data.

Exhibit C.18. Estimated Impacts on Professional Services Spending by Cohort, Cumulative and by PY

% Impact

2016 Cohort

	Impact	% Impact
Cumulative	$5.3	0.2%
PY5	$39.5	1.6%
PY4	-$4.6	-0.2%
PY3	-$11.1	-0.4%
PY2	-$6.7	-0.2%
PY1	$17.4	0.5%

2017 Cohort

	Impact	% Impact
Cumulative	-$70.6****	-2.1%
PY5	-$179.5****	-5.8%
PY4	-$95.3***	-2.7%
PY3	-$55.6*	-1.7%
PY2	-$8.7	-0.3%

2018 Cohort

	Impact	% Impact
Cumulative	-$86.4****	-2.7%
PY5	-$162.2****	-5.3%
PY4	-$55.9	-1.7%
PY3	-$44.5**	-1.4%

Impact Estimate for Professional Services Spending ($PBPY) and 90% CI

● 2016 Cohort   ● 2017 Cohort   ○ 2018 Cohort

NOTES: Estimated impacts PBPY for spending significant at *p<0.1, **p<0.05, ***p<0.01, and ****p<0.005. Impact estimates are the DID estimates for Medicare professional services spending. CIs at 90% level are displayed as bars around the impact estimates. Percentage impact is the impact relative to expected average spending for NGACO beneficiaries in PY(s) absent the model. § Denotes uninterpretable impact estimate due to failure of parallel trends assumption for outcome across BYs.
SOURCE: NORC analysis of NGACO and comparison group enrollment, claims, and model programmatic data.

Exhibit C.19. Estimated Impacts on SNF Spending by Cohort, Cumulative and by PY

% Impact

2016 Cohort

	Impact Estimate	% Impact
Cumulative	-$36.7****	**-3.8%**
PY5	-$76.1***	-9.0%
PY4	-$47.1**	-5.3%
PY3	-$33.0	-3.6%
PY2	-$30.4	-3.0%
PY1	-$6.8	-0.6%

2017 Cohort

	Impact Estimate	% Impact
Cumulative	-$25.6****§	**-2.4%**
PY5	-$71.8****§	-7.9%
PY4	-$39.5**	-3.5%
PY3	-$22.0**	-2.0%
PY2	$5.3	0.5%

2018 Cohort

	Impact Estimate	% Impact
Cumulative	-$37.1****	**-3.7%**
PY5	-$88.5****	-8.5%
PY4	-$27.4	-2.9%
PY3	$0.7	0.1%

Impact Estimate for SNF Spending ($PBPY) and 90% CI

● 2016 Cohort   ● 2017 Cohort   ○ 2018 Cohort

NOTES: Estimated impacts PBPY for spending significant at *p<0.1, **p<0.05, ***p<0.01, and ****p<0.005. Impact estimates are the DID estimates for Medicare SNF spending. CIs at 90% level are displayed as bars around the impact estimates. Percentage impact is the impact relative to expected average spending for NGACO beneficiaries in PY(s) absent the model. § Denotes uninterpretable impact estimate due to failure of parallel trends assumption for outcome across BYs.
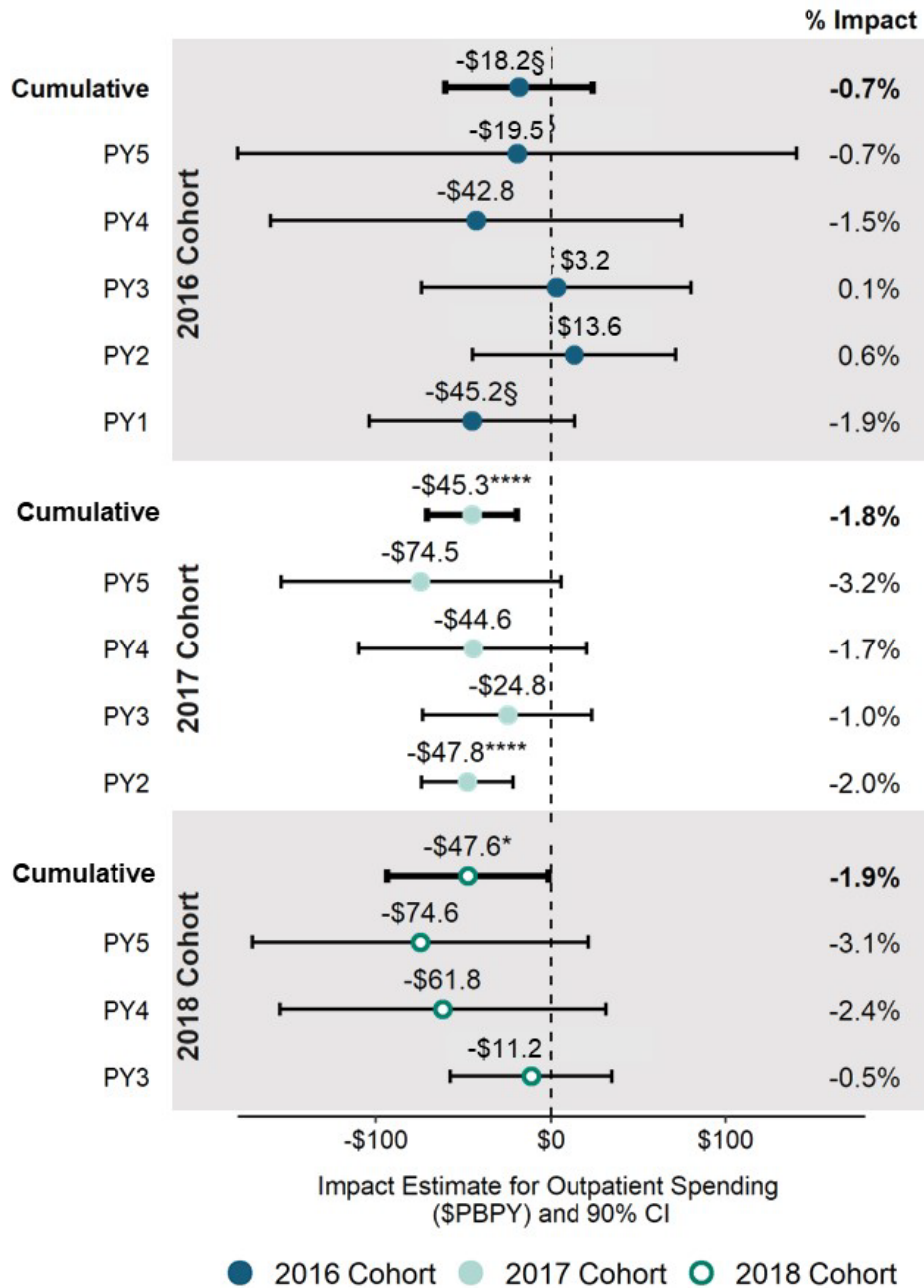**SOURCE:** NORC analysis of NGACO and comparison group enrollment, claims, and model programmatic data.

Exhibit C.20. Estimated Impacts on Other PAC Facility Spending by Cohort, Cumulative and by PY

% Impact

2016 Cohort

	Impact	% Impact
Cumulative	-$15.9****	**-3.6%**
PY5	-$19.7	-5.1%
PY4	-$19.6*	-5.0%
PY3	-$19.2**	-4.6%
PY2	-$5.2	-1.1%
PY1	-$17.1	-3.3%

2017 Cohort

	Impact	% Impact
Cumulative	-$20.0****	**-4.8%**
PY5	-$23.1**	-6.0%
PY4	-$25.9**	-6.1%
PY3	-$11.2	-2.7%
PY2	-$22.2****	-5.3%

2018 Cohort

	Impact	% Impact
Cumulative	-$12.6*	**-3.2%**
PY5	-$13.2	-3.4%
PY4	-$29.7**	-7.5%
PY3	$2.7	0.7%

Impact Estimate for Other Post-Acute Care Facility Spending
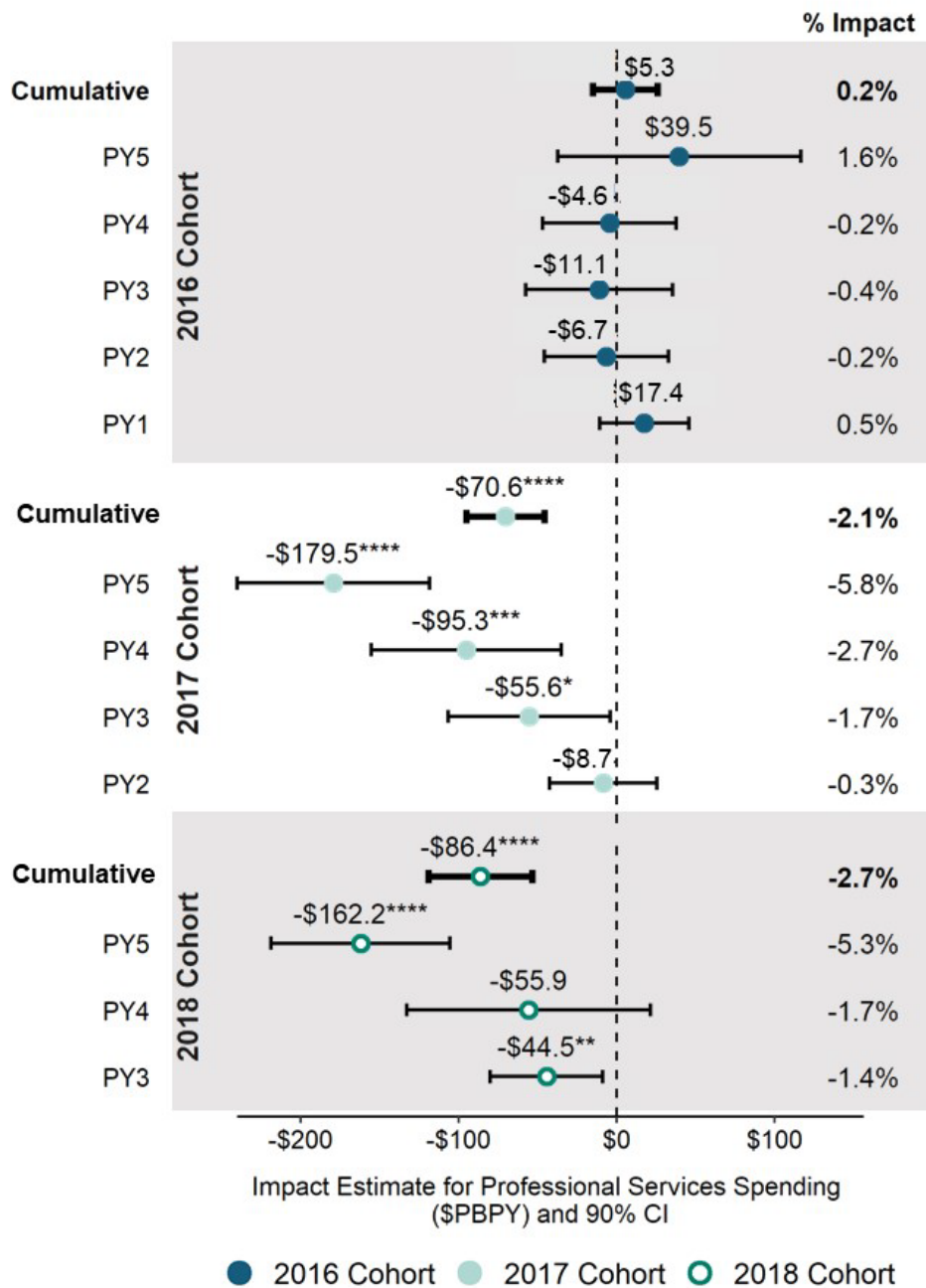($PBPY) and 90% CI

● 2016 Cohort   ● 2017 Cohort   ○ 2018 Cohort

NOTES: Estimated impacts PBPY for spending significant at *p<0.1, **p<0.05, ***p<0.01, and ****p<0.005. Impact estimates are the DID estimates for Medicare other PAC spending. CIs at 90% level are displayed as bars around the impact estimates. Percentage impact is the impact relative to expected average spending for NGACO beneficiaries in PY(s) absent the model. § Denotes uninterpretable impact estimate due to failure of parallel trends assumption for outcome across BYs.
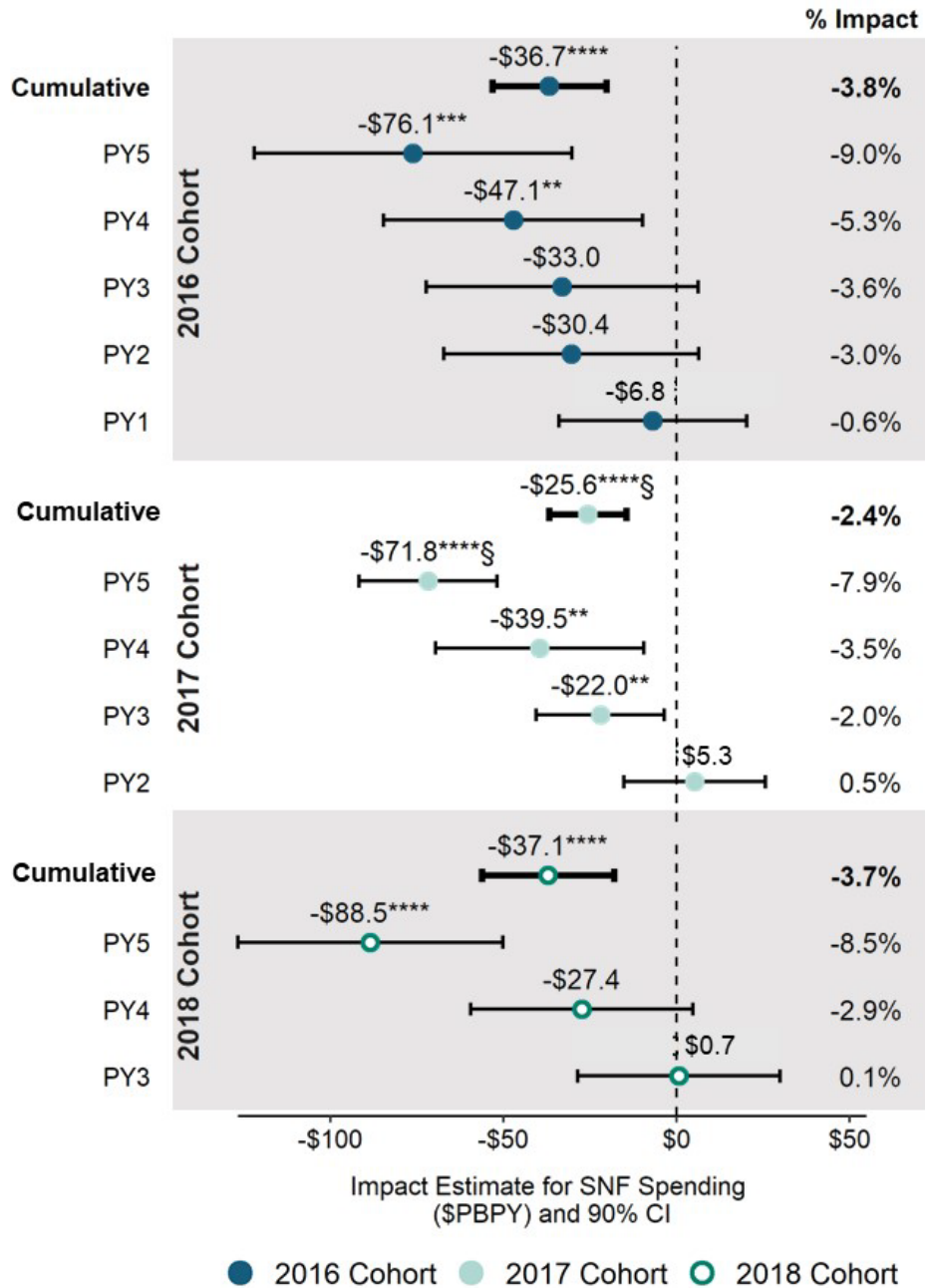**SOURCE:** NORC analysis of NGACO and comparison group enrollment, claims, and model programmatic data.

Exhibit C.21. Estimated Impacts on Home Health Spending by Cohort, Cumulative and by PY

% Impact

2016 Cohort

		% Impact
Cumulative	-$10.6***§	**-1.6%**
PY5	-$12.3§	-2.4%
PY4	-$10.3	-1.7%
PY3	-$14.8*§	-2.1%
PY2	-$3.0§	-0.4%
PY1	-$13.3*§	-1.7%

2017 Cohort

Cumulative	-$18.2****§	**-2.2%**
PY5	-$37.4****§	-5.5%
PY4	-$31.3***§	-3.7%
PY3	-$15.7*§	-1.8%
PY2	-$1.6	-0.2%

2018 Cohort

Cumulative	-$30.1****	**-4.4%**
PY5	-$33.9****	-5.3%
PY4	-$32.9****	-4.7%
PY3	-$24.2****	-3.4%

Impact Estimate for Home Health Spending ($PBPY) and 90% CI

● 2016 Cohort ● 2017 Cohort ○ 2018 Cohort

NOTES: Estimated impacts PBPY for spending significant at *p<0.1, **p<0.05, ***p<0.01, and ****p<0.005. Impact estimates are the DID estimates for Medicare home health spending. CIs at 90% level are displayed as bars around the impact estimates. Percentage impact is the impact relative to expected average spending for NGACO beneficiaries in PY(s) absent the model. § Denotes uninterpretable impact estimate due to failure of parallel trends assumption for outcome across BYs.
SOURCE: NORC analysis of NGACO and comparison group enrollment, claims, and model programmatic data.
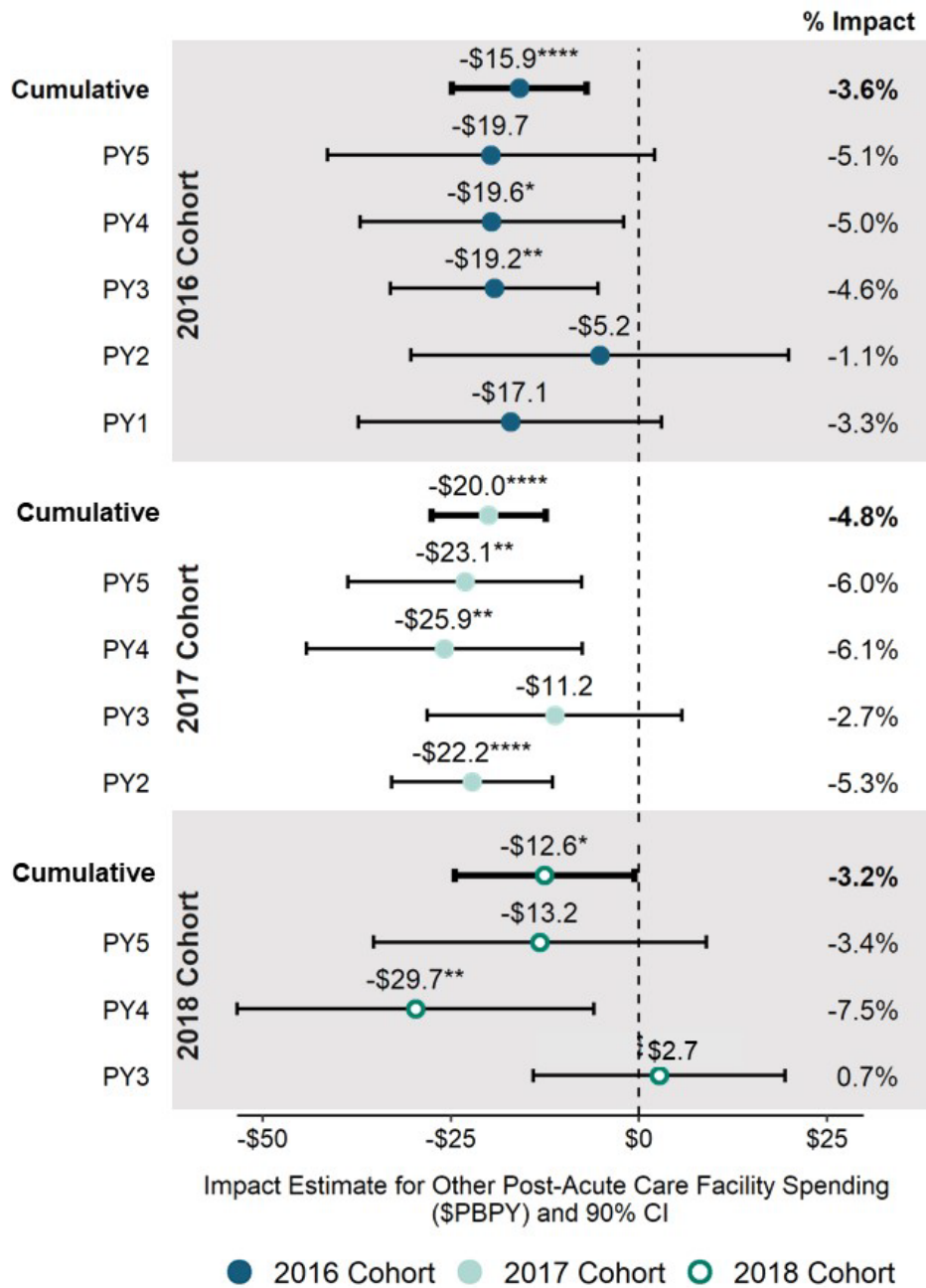
Exhibit C.22. Estimated Impacts on Hospice Spending by Cohort, Cumulative and by PY

NOTES: Estimated impacts PBPY for spending significant at *p<0.1, **p<0.05, ***p<0.01, and ****p<0.005. Impact estimates are the DID estimates for Medicare hospice spending. CIs at 90% level are displayed as bars around the impact estimates. Percentage impact is the impact relative to expected average spending for NGACO beneficiaries in PY(s) absent the model. § Denotes uninterpretable impact estimate due to failure of parallel trends assumption for outcome across BYs.
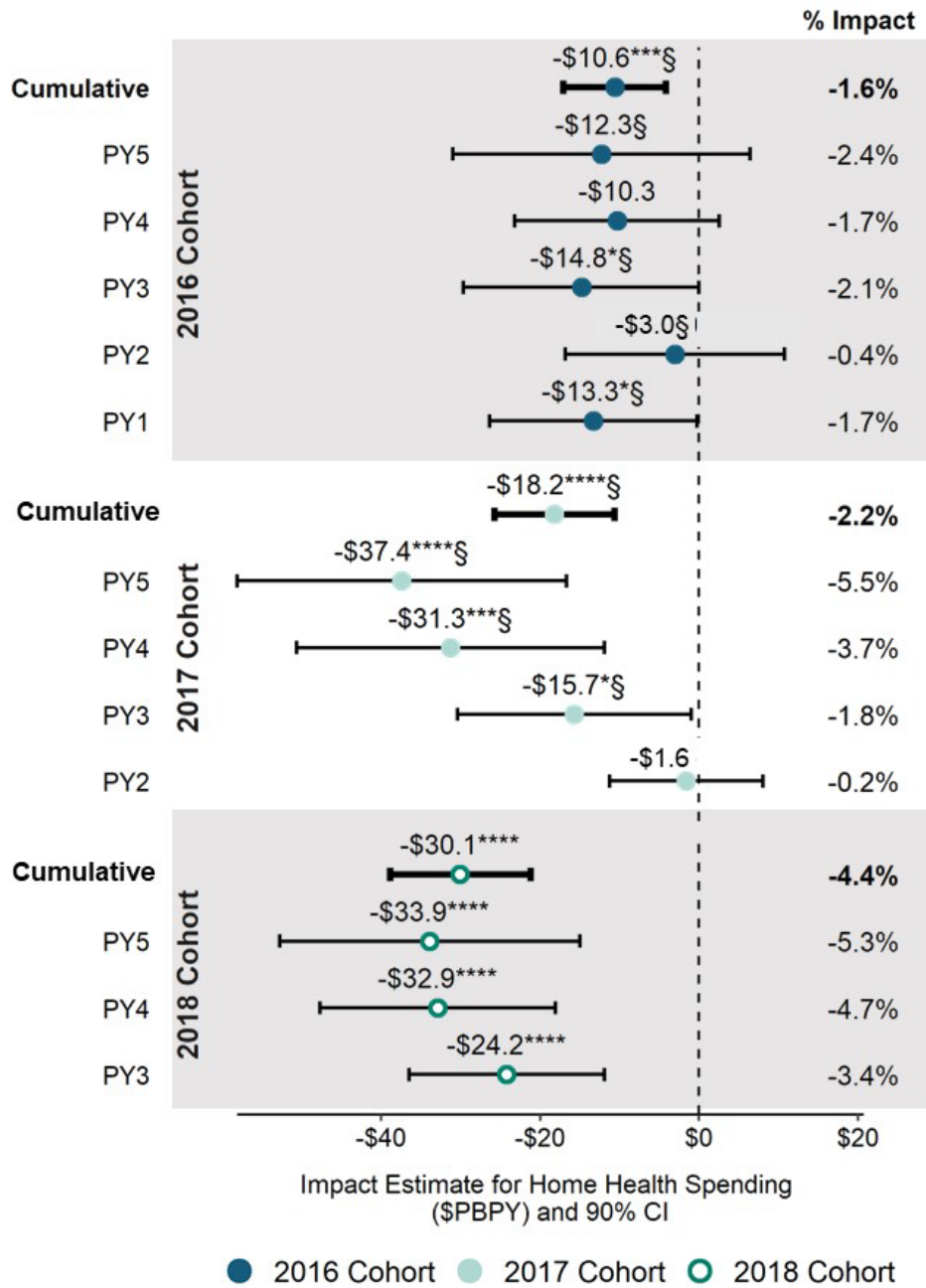**SOURCE**: NORC analysis of NGACO and comparison group enrollment, claims, and model programmatic data.

Exhibit C.23. Estimated Impacts on DME Spending by Cohort, Cumulative and by PY
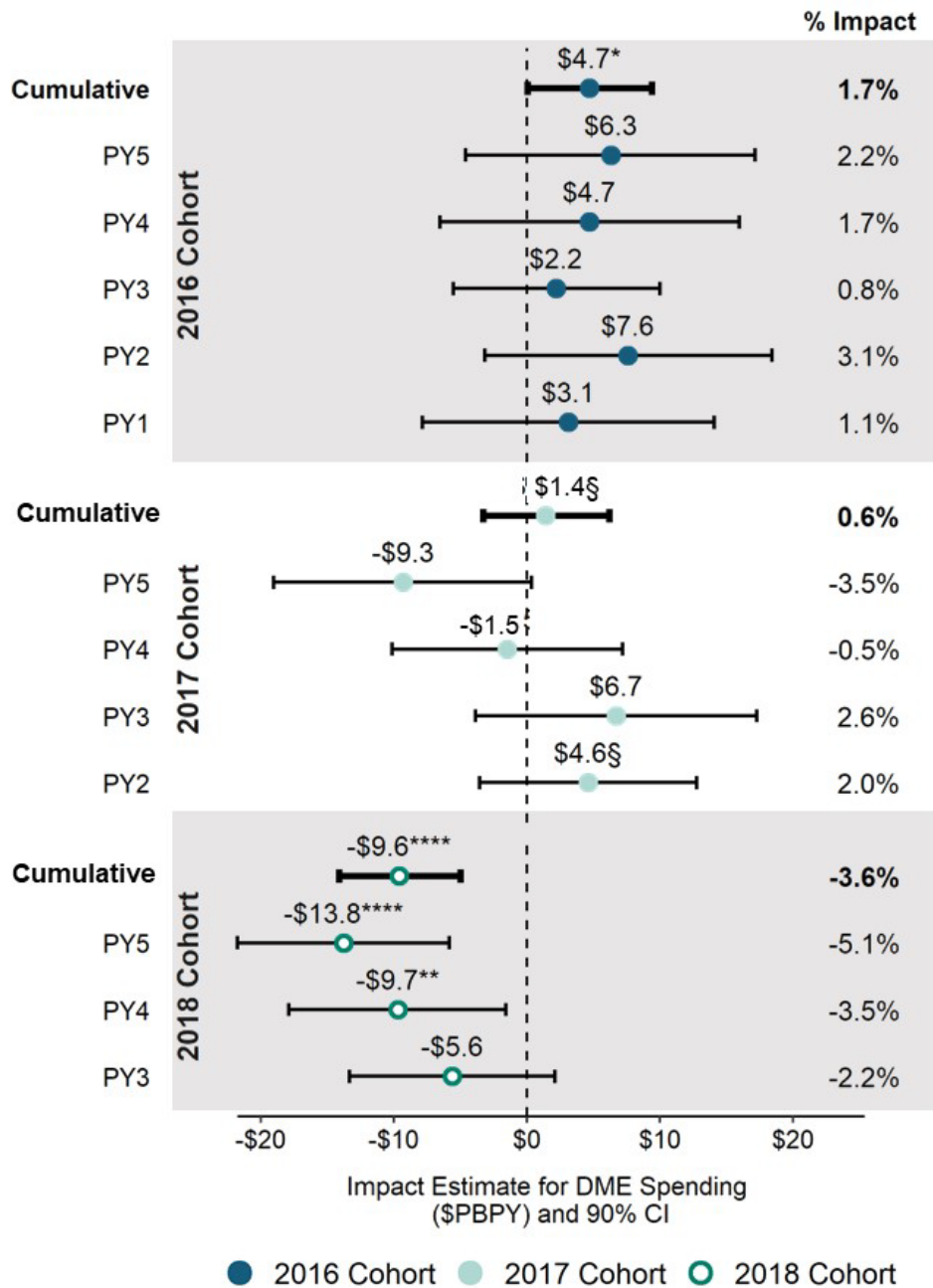
NOTES: Estimated impacts PBPY for spending significant at *p<0.1, **p<0.05, ***p<0.01, and ****p<0.005. Impact estimates are the DID estimates for Medicare DME spending. CIs at 90% level are displayed as bars around the impact estimates. Percentage impact is the impact relative to expected average DME spending for NGACO beneficiaries in PY(s) absent the model. § Denotes uninterpretable impact estimate due to failure of parallel trends assumption for outcome across BYs.
SOURCE: NORC analysis of NGACO and comparison group enrollment, claims, and model programmatic data.
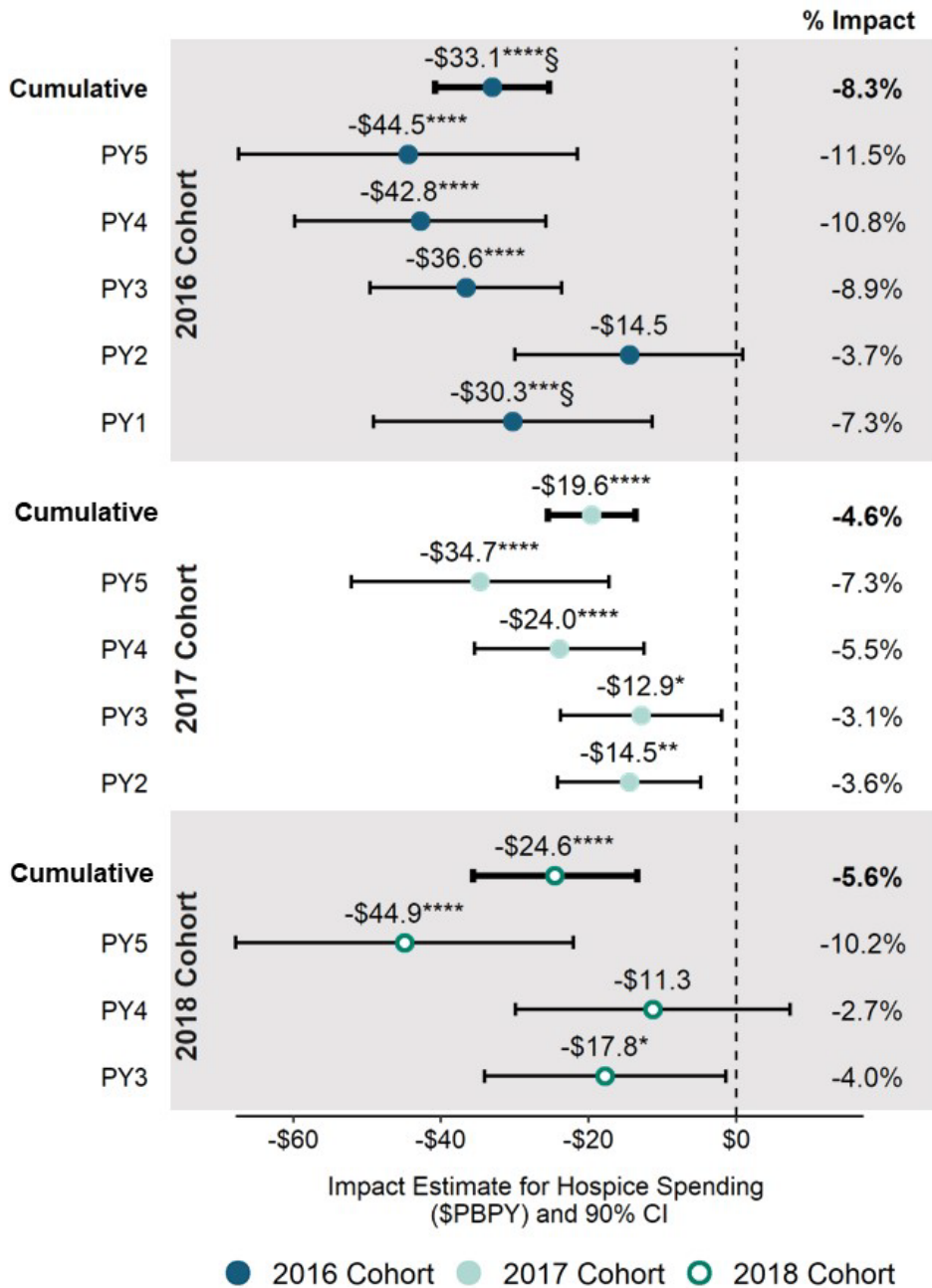
Exhibit C.24. Estimated Impacts on Acute Care Hospital Stays by Cohort, Cumulative and by PY

NOTES: Estimated impacts per 1,000 BPY for utilization significant at *p<0.1, **p<0.05, ***p<0.01, and ****p<0.005. Impact estimates are the DID estimates for number of acute care hospital stays. CIs at 90% level are displayed as bars around the impact estimates. Percentage impact is the impact relative to expected number of acute care hospital stays for NGACO beneficiaries in PY(s) absent the model. § Denotes uninterpretable impact estimate due to failure of parallel trends assumption for outcome across BYs.

SOURCE: NORC analysis of NGACO and comparison group enrollment, claims, and model programmatic data.

Exhibit C.25. Estimated Impacts on SNF Days by Cohort, Cumulative and by PY

NOTES: Estimated impacts per 1,000 BPY for utilization significant at *p<0.1, **p<0.05, ***p<0.01, and ****p<0.005. Impact estimates are the DID estimates for number of SNF days. CIs at 90% level are displayed as bars around the impact estimates. Percentage impact is the impact relative to number of SNF days for NGACO beneficiaries in PY(s) absent the model. § Denotes uninterpretable impact estimate due to failure of parallel trends assumption for outcome across BYs.

SOURCE: NORC analysis of NGACO and comparison group enrollment, claims, and model programmatic data.

Exhibit C.26. Estimated Impacts on SNF Stays by Cohort, Cumulative and by PY
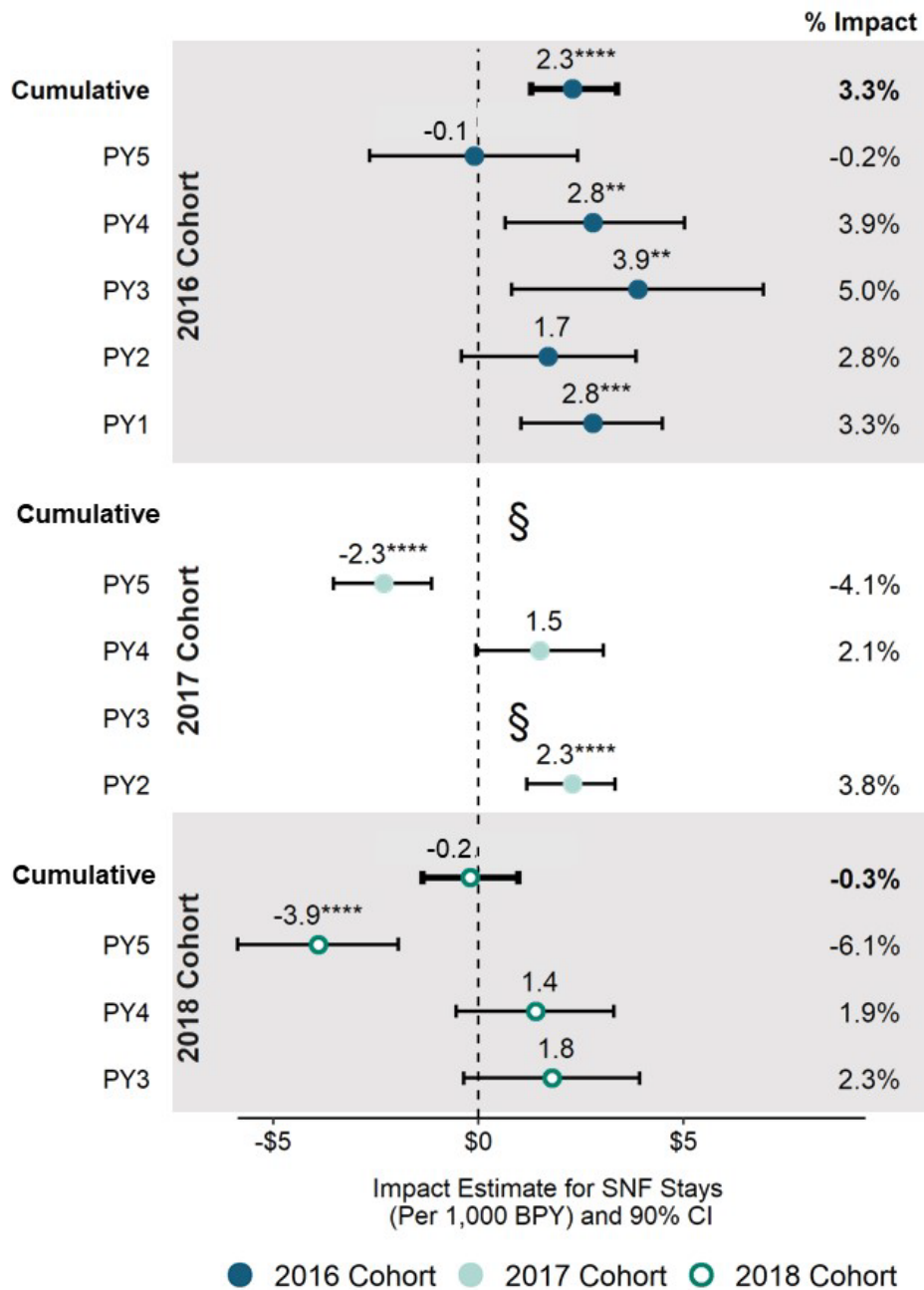
NOTES: Estimated impacts per 1,000 BPY for utilization significant at *p<0.1, **p<0.05, ***p<0.01, and ****p<0.005. Impact estimates are the DID estimates for number of SNF stays. CIs at 90% level are displayed as bars around the impact estimates. Percentage impact is the impact relative to expected number of SNF stays for NGACO beneficiaries in PY(s) absent the model. § Denotes uninterpretable impact estimate due to failure of parallel trends assumption for outcome across BYs.

SOURCE: NORC analysis of NGACO and comparison group enrollment, claims, and model programmatic data.

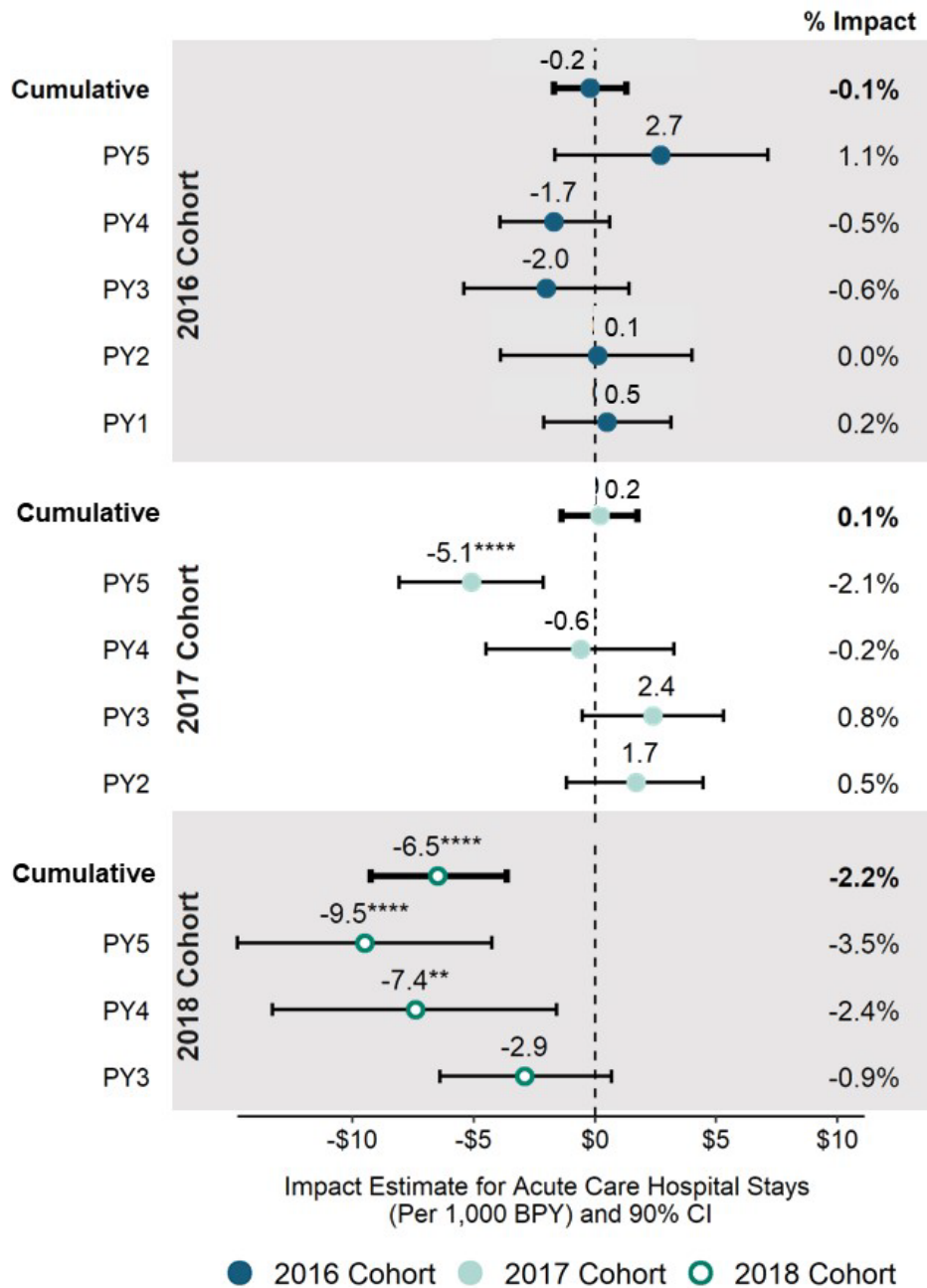**Exhibit C.27.** Estimated Impacts on E&M Visits by Cohort, Cumulative and by PY
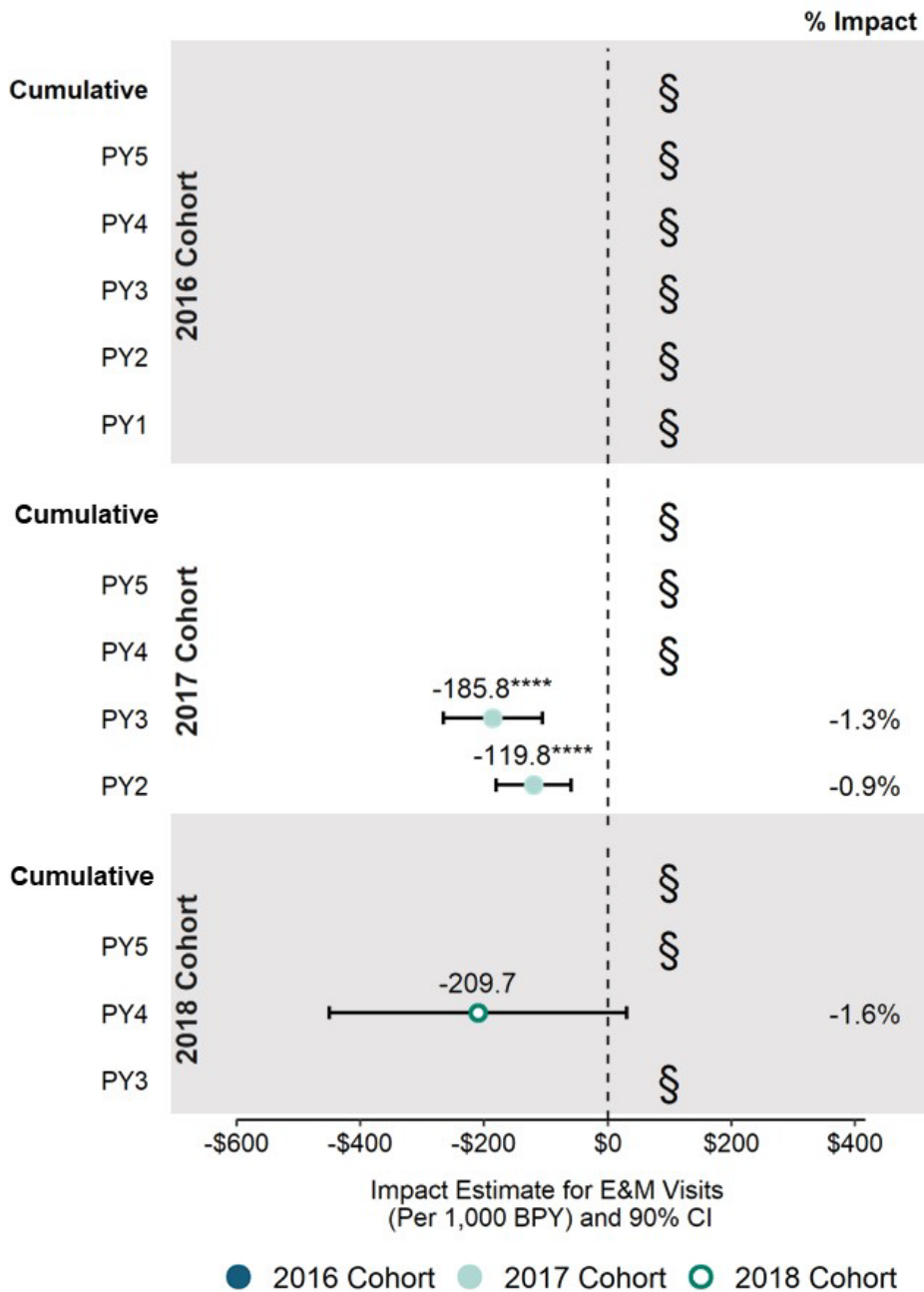
NOTES: Estimated impacts per 1,000 BPY for utilization significant at *p<0.1, **p<0.05, ***p<0.01, and ****p<0.005. Impact estimates are the DID estimates for number of evaluation and management (E&M) visits. CIs at 90% level are displayed as bars around the impact estimates. Percentage impact is the impact relative to expected number of E&M visits for NGACO beneficiaries in PY(s) absent the model. § Denotes uninterpretable impact estimate due to failure of parallel trends assumption for outcome across BYs.

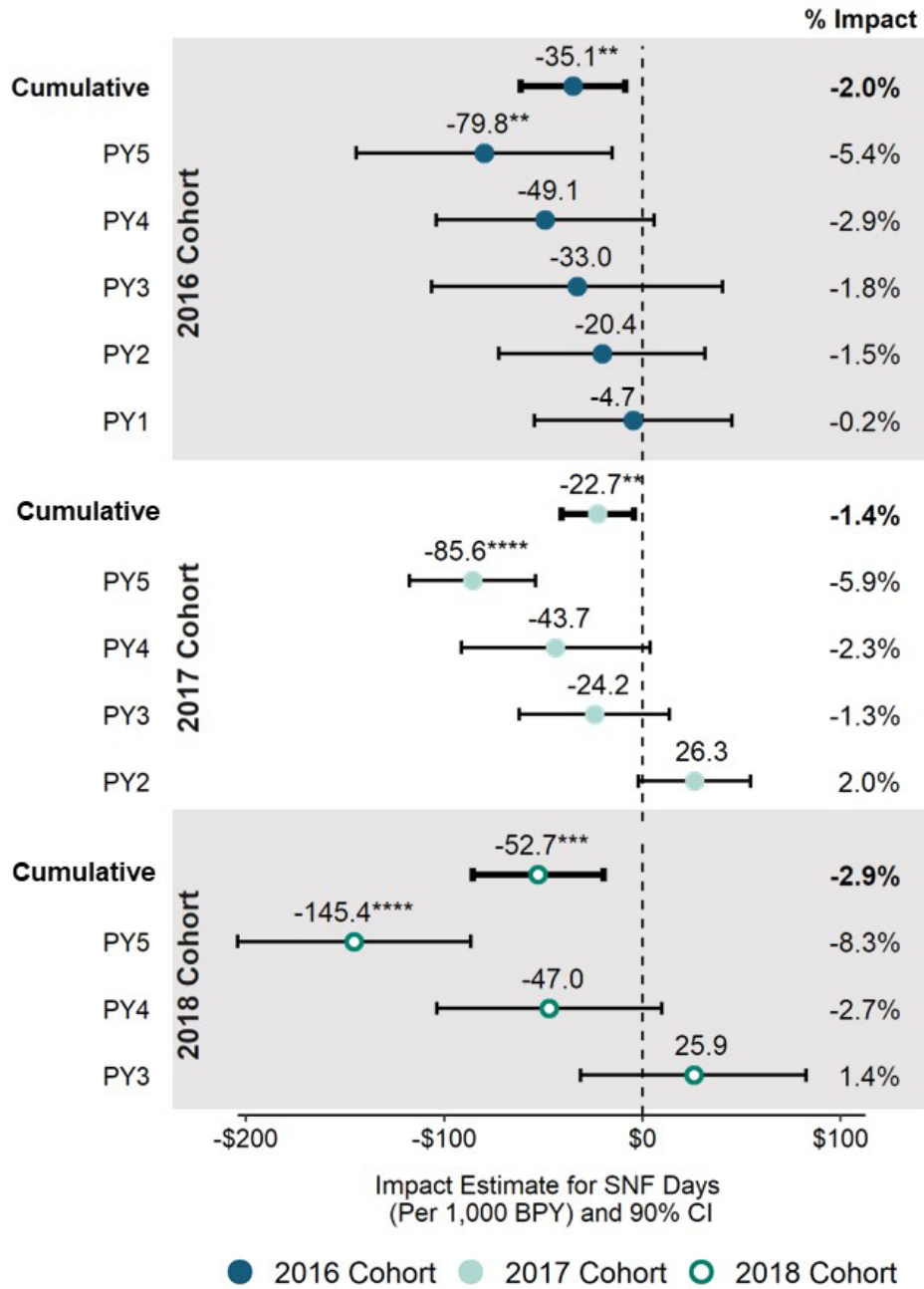**SOURCE:** NORC analysis of NGACO and comparison group enrollment, claims, and model programmatic data.

Exhibit C.28. Estimated Impacts on Home Health Episodes by Cohort, Cumulative and by PY
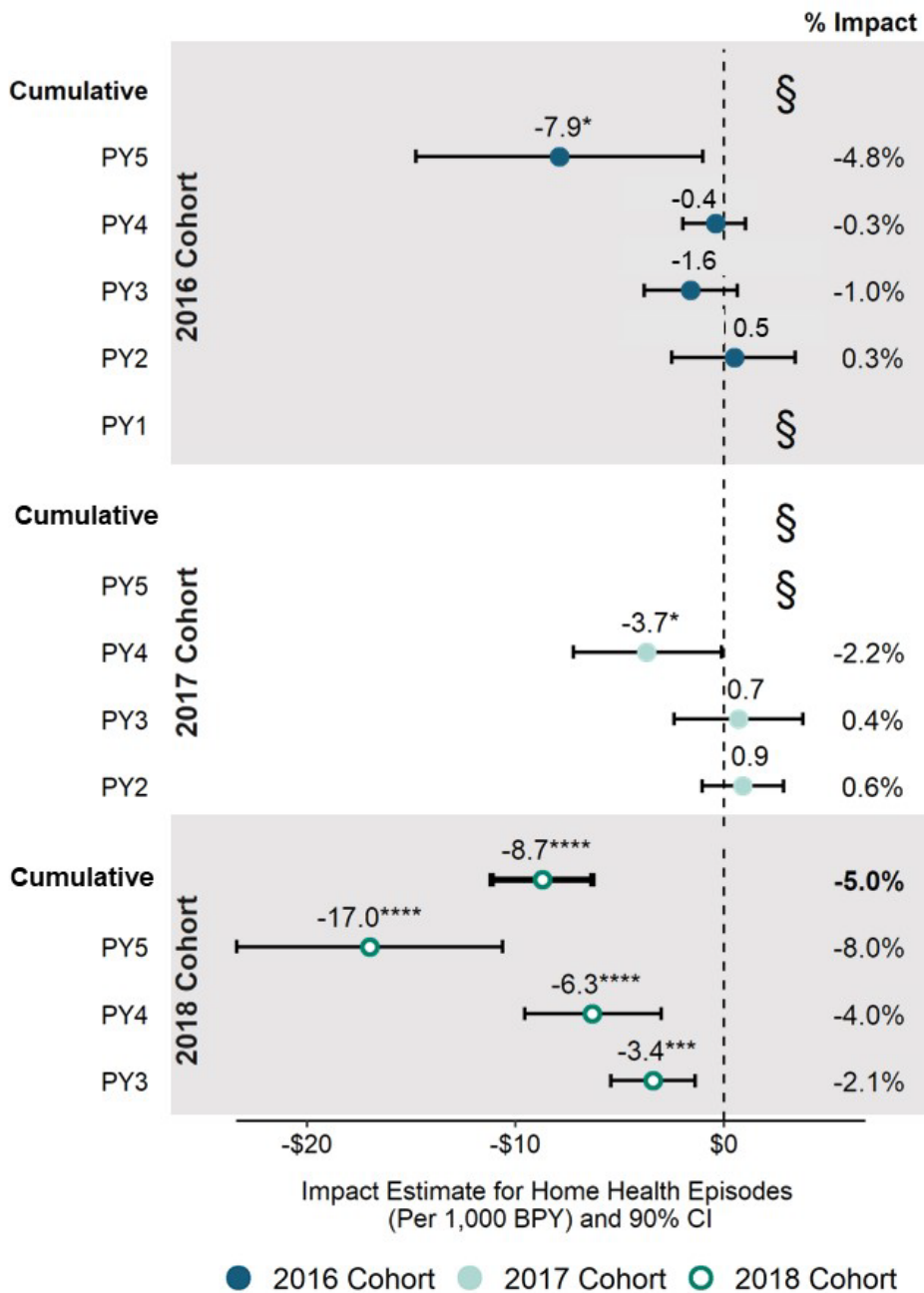
NOTES: Estimated impacts per 1,000 BPY for utilization significant at *p<0.1, **p<0.05, ***p<0.01, and ****p<0.005. Impact estimates are the DID estimates for number of home health episodes. CIs at 90% level are displayed as bars around the impact estimates. Percentage impact is the impact relative to expected number of home health episodes for NGACO beneficiaries in PY(s) absent the model. § Denotes uninterpretable impact estimate due to failure of parallel trends assumption for outcome across BY.

SOURCE: NORC analysis of NGACO and comparison group enrollment, claims, and model programmatic data.

Exhibit C.29. Model-wide Unadjusted Telehealth Visits per 1,000 BPY

| Telehealth Visits	Rates per 1,000 BPY	BY 2013	BY 2014	BY 2015	BY 2016	BY 2017	PY5 (2020)
All	NGACO	6.80	4.90	5.71	3.86	2.74	1,632.05
	Comparison	7.48	7.58	7.97	5.59	5.19	1,644.30
E&M	NGACO	6.08	4.37	5.31	3.66	2.13	1,539.60
	Comparison	6.96	7.29	7.52	5.08	4.49	1,535.47

NOTES: Unadjusted utilization of all telehealth visits and evaluation and management (E&M) telehealth visits per 1,000 beneficiaries per year (BPY) displayed for NGACO and comparison group in PY5 and respective BYs. As defined in Appendix Exhibit A.9, telehealth visits include services rendered on physician and outpatient claims.

SOURCE: NORC analysis of NGACO and comparison group enrollment, claims, and model programmatic data.

# Appendix D: Exhibits to Support Claims- Based Analyses

The exhibits below support the findings of the claims-based analyses presented in our fifth evaluation report. The exhibits comprise a set of tables that present DID estimates model-wide and for the three cohorts in PY5 (2020) and cumulatively, including PY1 (2016), PY2 (2017), PY3 (2018), PY4 (2019), and PY5 (2020). We present estimated impacts on spending and utilization for all outcome measures included in the main report, model-wide and for the three cohorts. We also present conditional means for the BYs and PYs and aggregate estimates.

This appendix is organized as follows:

- Estimated Model-wide Impacts on Medicare Spending and Utilization, Cumulative (PY1 through PY5) **(Exhibit D.1)**
- Estimated Model-wide Impacts on Medicare Spending and Utilization in PY5 **(Exhibit D.2)**
- Estimated Cumulative Impacts by Cohort on Medicare Spending, Utilization, and Quality of Care, by PY(s) **(Exhibits D.3 −D.5)**
- Estimated Impacts by Cohort on Medicare Spending, Utilization, and Quality of Care in PY5 **(Exhibits D.6 −D.8)**

In each table, the DID estimate is the estimated relative change per beneficiary per year (PBPY) for spending or per 1,000 beneficiaries per year (BPY) for utilization counts and quality of care outcomes. The "% Impact" is the percentage impact relative to expected outcome for the NGACO group in PY(s), absent the NGACO model. The aggregate impact is the estimated relative change for all beneficiaries aligned with the NGACO in PY(s).

Spending outcomes reflect Medicare paid amounts in 2020 dollars. For providers in NGACOs that opted for population-based payments, we used the amount Medicare would have paid for these services. Medicare spending in facilities settings—outpatient, acute care hospital, skilled nursing facility (SNF), and other post-acute care (PAC) facilities—excludes spending for professional services. Other PAC facilities included long-term care hospitals and inpatient rehabilitation hospitals.

	Baseline Years		2020		Cumulative Model-wide through PY5 (2016 through 2020)							
					Difference-in-Differences (DID)							
	NGACO mean	Comparison mean	NGACO mean	Comparison mean	DID Estimate	NGACO Diff.	Comp Diff.	95% Confidence Interval (CI)	% Impact	p	Aggregate	Aggregate CI
Spending ($)												
Total Gross Medicare spending (Parts A and B)	13,680.61	13,941.59	13,410.35	13,867.24	-195.91 ***	-270.26	-74.35	-256.05 , -135.76	-1.505	0.000	-1,045,250,335 ***	-1,366,140,110 , -724,360,560
Acute care hospital facility	4,165.15	4,188.70	4,114.53	4,180.27	-42.21 ***	-50.62	-8.43	-62.21 , -22.20	-1.015	0.000	-225,184,044 ***	-331,911,805 , -118,456,284
SNF	1,148.63	1,166.89	990.53	1,040.76	-31.96 *** §	-158.10	-126.13	-42.57 , -21.35	-3.126	0.000	-170,522,616 *** §	-227,124,378 , -113,920,855
Other post-acute care facility	451.65	443.62	405.39	414.54	-17.19 ***	-46.26	-29.08	-23.49 , -10.89	-4.068	0.000	-91,721,302 ***	-125,348,115 , -58,094,489
Outpatient facility	2,263.89	2,314.39	2,489.04	2,573.82	-34.28 ** §	225.15	259.43	-60.54 , -8.01	-1.358	0.011	-182,882,097 ** §	-323,012,575 , -42,751,619
Professional services	3,239.26	3,248.26	3,244.86	3,294.98	-41.12 ***	5.60	46.72	-58.46 , -23.79	-1.305	0.000	-219,418,974 ***	-311,921,293 , -126,916,655
Home health	766.78	774.47	724.75	749.24	-16.80 *** §	-42.03	-25.23	-22.09 , -11.51	-2.266	0.000	-89,650,252 *** §	-117,870,673 , -61,429,832
Hospice	366.53	383.21	390.65	433.36	-26.02 *** §	24.12	50.15	-31.32 , -20.72	-6.245	0.000	-138,840,327 *** §	-167,120,523 , -110,560,131
Durable medical equipment	285.08	280.22	265.19	259.16	1.18 §	-19.89	-21.06	-2.29 , 4.64	0.446	0.505	6,282,243 §	-12,195,193 , 24,759,678
Utilization (per 1,000 beneficiaries per year)												
Acute care stays	316.45	317.85	299.82	302.19	-0.97	-16.63	-15.66	-2.17 , 0.24	-0.322	0.115	-5,170	-6,435,294 , 6,424,955
SNF days	2,024.53	2,070.27	1,661.53	1,739.63	-32.36 ***	-363.00	-330.64	-49.58 , -15.14	-1.910	0.000	-172,658 ***	-92,070,584 , 91,725,268

NOTES: Cumulative difference-in-differences (DID) impact estimates significant at *p<0.1, **p<0.05, and ***p<0.01. § denotes uninterpretable impact estimate due to failure of parallel trends assumption across BYs. To understand factors influencing total gross spending, we report impacts for all spending categories because the baseline trends for total gross spending were parallel. Percentage impact is relative to expected average outcome for NGACO beneficiaries in PYs, absent the model. Aggregate estimate is the cumulative DID impact estimate for all beneficiaries across the five PYs. "Other post-acute care facility" includes inpatient rehabilitation facilities and long-term care hospital facilities. Outpatient facility includes hospital outpatient, emergency department, and comprehensive outpatient rehabilitation facilities. Professional services include physician, other professional, and ancillary services rendered under Part B. E&M = evaluation and management; SNF = skilled nursing facility.

Exhibit D.2. Estimated Model-wide Impacts on Medicare Spending and Utilization in PY5

| | Baseline Years | | | | Cumulative Model-wide in PY5 | | | | | | | |
| | 2013-2017 | | 2020 | | Difference-in-Differences (DID) | | | | | | | |
	NGACO mean	Comparison mean	NGACO mean	Comparison mean	DID Estimate	NGACO Diff.	Comp Diff.	95% CI	% Impact	p	Aggregate	Aggregate CI
Spending ($)												
Total Gross Medicare spending (Parts A and B)	13,083.19	13,347.69	12,068.38	12,693.80	-360.93 ***	-1014.81	-653.89	-546.39 , -175.47	-3.137	0.000	-369,289,543 ***	-559,047,918 , -179,531,168
Acute care hospital facility	4,014.14	4,040.20	3,747.41	3,835.16	-61.69 **	-266.73	-205.04	-109.73 , -13.65	-1.620	0.012	-63,119,912 **	-112,269,615 , -13,970,210
SNF	1,103.01	1,120.24	840.44	935.19	-77.51 *** §	-262.57	-185.05	-101.56 , -53.46	-8.444	0.000	-79,306,537 *** §	-103,911,432 , -54,701,642
Other post-acute care facility	433.90	435.90	369.67	391.08	-19.41 ***	-64.23	-44.82	-32.79 , -6.04	-4.990	0.004	-19,864,393 ***	-33,548,003 , -6,180,783
Outpatient facility	2,310.63	2,333.83	2,405.86	2,484.50	-55.44	95.23	150.67	-136.85 , 25.97	-2.253	0.182	-56,727,265	-140,021,634 , 26,567,104
Professional services	3,123.87	3,142.63	2,975.19	3,093.22	-99.27 ***	-148.68	-49.41	-145.47 , -53.08	-3.442	0.000	-101,574,307 ***	-148,836,265 , -54,312,349
Home health	723.18	743.28	584.47	632.37	-27.81 *** §	-138.71	-110.91	-41.55 , -14.07	-4.542	0.000	-28,454,591 *** §	-42,512,999 , -14,396,184
Hospice	362.36	376.18	395.16	449.65	-40.67 ***	32.80	73.47	-55.00 , -26.34	-9.331	0.000	-41,610,004 ***	-56,270,813 , -26,949,195
Durable medical equipment	286.52	280.53	271.43	270.50	-5.07	-15.09	-10.03	-11.93 , 1.79	-1.833	0.148	-5,185,334	-12,202,691 , 1,832,023
Utilization (per 1,000 beneficiaries per year)												
Acute care stays	310.43	312.79	250.62	256.48	-3.50 **	-59.81	-56.31	-6.28 , -0.72	-1.378	0.014	-3,582 **	-2,849,987 , 2,842,822
SNF days	2,112.46	2,164.44	1,439.31	1,590.03	-98.74 ***	-673.15	-574.41	-134.09 , -63.39	-6.420	0.000	-101,032 ***	-36,270,160 , 36,068,096
SNF stays	78.82	79.86	58.24	61.23	-1.96 ***	-20.58	-18.63	-3.28 , -0.63	-3.249	0.004	-2,001 ***	-1,359,191 , 1,355,189

NOTES: Difference-in-differences (DID) impact estimates significant at *p<0.1, **p<0.05, and ***p<0.01. § denotes uninterpretable impact estimate due to failure of parallel trends assumption across baseline years. To understand factors influencing total gross spending, we report impacts for all spending categories because the baseline trends for total gross spending were parallel. Percentage impact is relative to expected average outcome for NGACO beneficiaries in PY5, absent the model. Aggregate estimate is the cumulative DID impact estimate for all beneficiaries in PY5. "Other post-acute care facility" includes inpatient rehabilitation facilities and long-term care hospital facilities. Outpatient facility includes hospital outpatient, emergency department, and comprehensive outpatient rehabilitation facilities. Professional services include physician, other professional, and ancillary services rendered under Part B. E&M = evaluation and management; SNF = skilled nursing facility.

Exhibit D.3. Estimated Cumulative Impacts for 2016 Cohort on Medicare Spending and Utilization, PY1 through PY5

	Base Years				2016 Cohort in PY1 (2016), PY2 (2017), PY3 (2018), PY4 (2019), and PY5 (2020)							
	2013-2015		2016-2020		Difference-in-Differences (DID)							
	NGACO mean	Comparison mean	NGACO mean	Comparison mean	DID Estimate	NGACO Diff.	Comp Diff.	95% CI	% Impact	p	Aggregate	Aggregate CI
Spending ($)												
Total Gross Medicare spending (Parts A and B)	13,099.02	13,320.85	13,123.13	13,395.25	-50.29	24.11	74.40	-159.11 , 58.53	-0.402	0.365	-112,606,667	-356,266,482 , 131,053,148
Acute care hospital facility	4,071.96	4,091.77	3,965.42	3,987.06	-1.83	-106.54	-104.71	-29.14 , 25.48	-0.046	0.896	-4,093,072	-65,250,594 , 57,064,451
SNF	1,157.53	1,173.11	935.97	988.22	-36.67 ***	-221.56	-184.89	-56.34 , -16.99	-3.770	0.000	-82,100,548 ***	-126,165,477 , -38,035,619
Other post-acute care facility	471.20	444.82	424.87	414.43	-15.93 ***	-46.33	-30.39	-26.60 , -5.27	-3.614	0.003	-35,673,429 ***	-59,553,038 , -11,793,819
Outpatient facility	2,282.13	2,343.95	2,561.77	2,641.75	-18.16 §	279.64	297.80	-68.77 , 32.45	-0.704	0.482	-40,653,884 §	-153,976,845 , 72,669,076
Professional services	3,045.25	3,044.59	3,105.13	3,099.19	5.28	59.88	54.60	-19.19 , 29.76	0.178	0.672	11,825,948	-42,978,814 , 66,630,710
Home health	743.17	742.02	668.95	678.43	-10.64 *** §	-74.22	-63.59	-18.31 , -2.97	-1.566	0.007	-23,822,323 *** §	-41,003,103 , -6,641,543
Hospice	359.48	365.74	367.28	406.64	-33.09 *** §	7.80	40.90	-42.31 , -23.88	-8.266	0.000	-74,104,648 *** §	-94,736,349 , -53,472,947
Durable medical equipment	308.74	301.20	278.19	265.92	4.72 *	-30.55	-35.28	-0.83 , 10.28	1.727	0.096	10,577,464 *	-1,859,742 , 23,014,669
Utilization (per 1,000 beneficiaries per year)												
Acute care stays	332.96	333.01	310.23	310.48	-0.20	-22.73	-22.53	-1.97 , 1.57	-0.065	0.823	-453	-3,966,326 , 3,965,419
SNF days	2,165.51	2,196.09	1,678.52	1,744.16	-35.07 **	-486.99	-451.93	-66.52 , -3.62	-2.047	0.029	-78,525 **	-70,504,323 , 70,347,274
SNF stays	81.91	82.82	74.16	72.73	2.33 ***	-7.75	-10.09	1.08 , 3.59	3.251	0.000	5,228 ***	-2,797,412 , 2,807,869

NOTES: Cumulative difference-in-differences (DID) impact estimates significant at *p<0.1, **p<0.05, and ***p<0.01. § denotes uninterpretable impact estimate due to failure of parallel trends assumption across baseline years. To understand factors influencing total gross spending, we report impacts for all spending categories because the baseline trends for total gross spending were parallel. Percentage impact is relative to expected average outcome for NGACO beneficiaries (2016 Cohort) in PYs, absent the model. Aggregate estimate is the cumulative DID impact estimate for all beneficiaries (2016 cohort) across the five PYs. "Other post-acute care facility" includes inpatient rehabilitation facilities and long-term care hospital facilities. Outpatient facility includes hospital outpatient, emergency department, and comprehensive outpatient rehabilitation facilities. Professional services include physician, other professional, and ancillary services rendered under Part B. E&M = evaluation and management; SNF = skilled nursing facility.

Exhibit D.4. Estimated Cumulative Impacts for 2017 Cohort on Medicare Spending and Utilization, PY2 through PY5

	Base Years				2017 Cohort in PY2 (2017), PY3 (2018), PY4 (2019), and PY5 (2020)							
	2014-2016		2017-2020		Difference-in-Differences (DID)							
	NGACO mean	Comparison mean	NGACO mean	Comparison mean	DID Estimate	NGACO Diff.	Comp Diff.	95% CI	% Impact	p	Aggregate	Aggregate CI
Spending ($)												
Total Gross Medicare spending (Parts A and B)	14,396.87	14,723.77	13,947.42	14,550.99	-276.67 ***	-449.45	-172.78	-352.16 , -201.18	-2.010	0.000	-636,637,916 ***	-810,348,511 , -462,927,320
Acute care hospital facility	4,286.28	4,311.38	4,304.09	4,383.57	-54.38 ***	17.81	72.19	-86.51 , -22.25	-1.248	0.001	-125,141,161 ***	-199,076,484 , -51,205,838
SNF	1,151.97	1,178.36	1,052.28	1,104.29	-25.60 ***	-99.69	-74.07	-38.88 , -12.33	-2.375	0.000	-58,915,561 ***	-89,468,126 , -28,362,996
Other post-acute care facility	442.11	446.20	394.13	418.22	-20.00 ***	-47.98	-27.98	-29.04 , -10.97	-4.830	0.000	-46,031,291 ***	-66,826,151 , -25,236,431
Outpatient facility	2,242.92	2,286.34	2,444.96	2,533.73	-45.34 ***	202.04	247.39	-75.77 , -14.92	-1.821	0.003	-104,340,758 ***	-174,357,388 , -34,324,128
Professional services	3,399.78	3,432.19	3,361.05	3,464.08	-70.63 ***	-38.73	31.89	-100.04 , -41.22	-2.126	0.000	-162,526,844 ***	-230,208,631 , -94,845,057
Home health	802.00	809.75	801.93	827.91	-18.22 *** §	-0.07	18.16	-27.24 , -9.20	-2.221	0.000	-41,918,589 *** §	-62,671,273 , -21,165,904
Hospice	368.42	395.06	405.75	452.03	-19.64 ***	37.33	56.97	-26.68 , -12.59	-4.616	0.000	-45,181,795 ***	-61,403,800 , -28,959,789
Durable medical equipment	269.43	267.61	254.54	251.28	1.44 §	-14.89	-16.33	-4.19 , 7.08	0.571	0.615	3,323,497 §	-9,635,600 , 16,282,594
Utilization (per 1,000 beneficiaries per year)												
Acute care stays	300.43	303.11	292.64	295.14	0.18	-7.79	-7.97	-1.69 , 2.05	0.061	0.851	414	-4,307,373 , 4,308,201
SNF days	1,861.89	1,932.38	1,612.18	1,705.36	-22.69 **	-249.71	-227.02	-44.42 , -0.96	-1.388	0.041	-52,217 **	-50,049,001 , 49,944,568
SNF stays	70.94	72.39	66.30	66.68	§	-4.64	-5.71	0.35 , 1.78	1.629	0.004	§	-1,645,323 , 1,650,215
E&M visits	14,216.70	14,284.15	13,659.51	13,984.21	§	-557.19	-299.94	-318.56 , -195.94	-1.906	0.000	§	-141,668,474 , 140,484,582
Home health episodes	156.37	154.69	173.57	176.33	-4.43 **	17.20	21.64	-7.81 , -1.06	-2.491	0.010	-10,205 **	-7,776,198 , 7,755,789

NOTES: Cumulative difference-in-differences (DID) impact estimates significant at *p<0.1, **p<0.05, and ***p<0.01. § denotes uninterpretable impact estimate due to failure of parallel trends assumption across BYs. To understand factors influencing total gross spending, we report impacts for all spending categories because the baseline trends for total gross spending were parallel. Percentage impact is relative to expected average outcome for NGACO beneficiaries in PYs, absent the model. Aggregate estimate is the cumulative DID impact estimate for all beneficiaries (2017 cohort) across four PYs. "Other post-acute care facility" includes inpatient rehabilitation facilities and long-term care hospital facilities. Outpatient facility includes hospital outpatient, emergency department, and comprehensive outpatient rehabilitation facilities. Professional services include physician, other professional, and ancillary services rendered under Part B. E&M = evaluation and management; SNF = skilled nursing facility.

Exhibit D.5. Estimated Cumulative Impacts for 2018 Cohort on Medicare Spending and Utilization, PY3 through PY5

| | Base Years | | | | 2018 Cohort in PY3 (2018), PY4 (2019), and PY5 (2020) | | | | | | | |
| | 2015-2017 | | 2018-2020 | | Difference-in-Differences (DID) | | | | | | | |
	NGACO mean	Comparison mean	NGACO mean	Comparison mean	DID Estimate	NGACO Diff.	Comp Diff.	95% CI	% Impact	p	Aggregate	Aggregate CI
Spending ($)												
Total Gross Medicare spending (Parts A and B)	13,245.59	13,426.10	12,664.96	13,217.73	-372.26 ***	-580.63	-208.37	-517.97 , -226.54	-3.030	0.000	-296,005,753 ***	-411,871,068 , -180,140,439
Acute care hospital facility	4,077.06	4,106.61	3,985.84	4,136.05	-120.67 ***	-91.22	29.44	-179.44 , -61.89	-2.938	0.000	-95,949,811 ***	-142,684,598 , -49,215,024
SNF	1,113.89	1,116.17	965.49	1,004.88	-37.11 ***	-148.40	-111.29	-59.90 , -14.31	-3.701	0.001	-29,506,508 ***	-47,633,345 , -11,379,670
Other post-acute care facility	424.23	432.77	383.11	404.26	-12.60 *	-41.12	-28.51	-26.83 , 1.64	-3.183	0.083	-10,016,582 *	-21,334,735 , 1,301,571
Outpatient facility	2,273.23	2,312.29	2,411.82	2,498.53	-47.65 *	138.59	186.24	-102.35 , 7.06	-1.937	0.088	-37,887,455 *	-81,386,064 , 5,611,155
Professional services	3,321.09	3,289.52	3,302.11	3,356.96	-86.42 ***	-18.98	67.44	-125.63 , -47.21	-2.711	0.000	-68,718,078 ***	-99,899,688 , -37,536,469
Home health	731.40	763.77	658.57	721.00	-30.07 ***	-72.83	-42.77	-40.63 , -19.51	-4.366	0.000	-23,909,341 ***	-32,308,091 , -15,510,591
Hospice	380.92	398.15	412.78	454.59	-24.59 ***	31.86	56.44	-37.84 , -11.34	-5.623	0.000	-19,553,884 ***	-30,087,114 , -9,020,654
Durable medical equipment	263.73	257.64	259.40	262.89	-9.58 ***	-4.33	5.25	-15.03 , -4.13	-3.562	0.001	-7,618,718 ***	-11,953,848 , -3,283,588
Utilization (per 1,000 beneficiaries per year)												
Acute care stays	316.30	317.78	291.30	299.23	-6.45 ***	-25.00	-18.55	-9.79 , -3.11	-2.167	0.000	-5,130 ***	-2,662,446 , 2,652,187
SNF days	2,098.16	2,115.00	1,756.51	1,826.07	-52.71 ***	-341.65	-288.93	-92.20 , -13.23	-2.914	0.009	-41,916 ***	-31,438,686 , 31,354,854
SNF stays	80.39	80.56	71.15	71.51	-0.19	-9.24	-9.05	-1.58 , 1.20	-0.267	0.788	-151	-1,104,661 , 1,104,359
Home health episodes	157.69	161.78	166.33	179.14	-8.72 ***	8.64	17.36	-11.60 , -5.84	-4.981	0.000	-6,934 ***	-2,300,633 , 2,286,765

NOTES: Cumulative difference-in-differences (DID) impact estimates significant at *p<0.1, **p<0.05, and ***p<0.01. § denotes uninterpretable impact estimate due to failure of parallel trends assumption across BYs. Percentage impact is relative to expected average outcome for NGACO beneficiaries (2018 Cohort) in PYs, absent the model. Aggregate estimate is the cumulative DID impact estimate for all beneficiaries (2018 cohort) across three PYs. "Other post-acute care facility" includes inpatient rehabilitation facilities and long-term care hospital facilities. Outpatient facility includes hospital outpatient, emergency department, and comprehensive outpatient rehabilitation facilities. Professional services include physician, other professional, and ancillary services rendered under Part B. E&M = evaluation and management; SNF = skilled nursing facility.

Exhibit D.6. Estimated Impacts of 2016 Cohort on Medicare Spending and Utilization in PY5

| | Baseline years | | | | 2016 Cohort in PY5 | | | | | | | |
| | 2013-2015 | | 2020 | | Difference-in-Differences (DID) | | | | | | | |
	NGACO mean	Comparison mean	NGACO mean	Comparison mean	DID Estimate	NGACO Diff.	Comp Diff.	95% CI	% Impact	p	Aggregate	Aggregate CI
Spending ($)												
Total Gross Medicare spending (Parts A and B)	12515.93	12726.63	12321.71	12404.47	127.94	-194.22	-322.16	-338.83, 594.71	1.17	0.591	45329480	-120051264 ,210710224
Acute care hospital facility	3980.78	4002.91	3693.44	3629.45	86.12**	-287.34	-373.46	2.81, 169.42	2.387	0.043	30511400	994207 ,60028596
SNF	1092.12	1119.58	767.23	870.81	-76.12***	-324.89	-248.77	-130.59, -21.64	-9.02	0.006	-26969408	-46269976 ,-7668838
Other post-acute care facility	419.59	415.58	369.07	384.72	-19.67	-50.52	-30.86	-45.47, 6.14	-5.05	0.135	-6968464	-16111421 ,2174493
Outpatient facility	2393.32	2391.71	2613.05	2630.89	-19.45	219.73	239.18	-209.53, 170.62	-0.73	0.841	-6892471	-74238664 ,60453724
Professional services	2823.42	2851.75	2803.88	2792.68	39.54	-19.54	-59.07	-51.85, 130.92	1.56	0.397	14007574	-18372110 ,46387256
Home health	661.15	666.87	504.81	522.81	-12.28 §	-156.34	-144.06	-34.51, 9.94	-2.37	0.279	-4352304	-12226193 ,3521584
Hospice	333.22	331.15	341.63	384.01	-44.46***	8.41	52.86	-71.71, -17.21	-11.5	0.001	-15751625	-25406248 ,-6097001
Durable medical equipment	316.53	306.03	295.56	278.78	6.27	-20.97	-27.25	-6.65, 19.19	2.167	0.342	2221198	-2357780 ,6800176
Utilization (per 1,000 beneficiaries per year)												
Acute care stays	331.12	331.86	264.26	262.26	2.75	-66.86	-69.60	-2.47, 7.96	1.050	0.302	973	-874 ,2821
SNF days	2217.56	2265.35	1397.31	1524.93	-79.82**	-820.25	-740.42	-156.59, -3.05	-5.40	0.042	-28282	-55482 ,-1081
SNF stays	83.38	84.43	61.35	62.5	-0.10	-22.03	-21.93	-3.12, 2.91	-0.16	0.946	-37	-1105 ,1031
Home health episodes	144.02	143.5	157.28	164.63	-7.88*	13.26	21.13	-16.05, 0.3	-4.77	0.059	-2792	-5688, 105

NOTES: Difference-in-differences (DID) impact estimates significant at *p<0.1, **p<0.05, and ***p<0.01. § denotes uninterpretable impact estimate due to failure of parallel trends assumption across BYs. To understand factors influencing total gross spending, we report impacts for all spending categories because the baseline trends for total gross spending were parallel. Percentage impact is relative to expected average outcome for NGACO beneficiaries (2016 Cohort) in PY5, absent the model. Aggregate estimate is the cumulative DID impact estimate for all beneficiaries (2016 Cohort) in PY5. "Other post-acute care facility" includes inpatient rehabilitation facilities and long-term care hospital facilities. Outpatient facility includes hospital outpatient, emergency department, and comprehensive outpatient rehabilitation facilities. Professional services include physician, other professional, and ancillary services rendered under Part B. E&M = evaluation and management; SNF = skilled nursing facility.

Exhibit D.7. Estimated Impacts of 2017 Cohort on Medicare Spending and Utilization in PY5

| | Baseline years | | | | 2017 Cohort in PY5 | | | | | | | |
| | 2014-2016 | | 2020 | | Difference-in-Differences (DID) | | | | | | | |
	NGACO mean	Comparison mean	NGACO mean	Comparison mean	DID Estimate	NGACO Diff.	Comp Diff.	95% CI Lower	% Impact	p	Aggregate	Aggregate CI
Spending ($)												
Total Gross Medicare spending (Parts A and B)	13561.31	13895.63	12109.45	13042.33	-598.56***	-1451.86	-853.30	-720.89, -476.23	-4.97	0.000	-245343888	-295485152, -195202624
Acute care hospital facility	3905.84	3921.48	3625.39	3764.76	-123.73***	-280.45	-156.72	-189.22, -58.24	-3.30	0.000	-50717004	-77561368, -23872642
SNF	1070.28	1083.65	833	918.17	-71.80***§	-237.28	-165.48	-95.5, -48.09	-7.93	0.000	-29429276	-39146320, -19712234
Other post-acute care facility	446.97	449.66	364.31	390.14	-23.14**	-82.66	-59.52	-41.63, -4.66	-5.97	0.014	-9486204	-17062640, -1909770
Outpatient facility	2224.81	2264.15	2270.47	2384.29	-74.47	45.66	120.14	-169.73, 20.79	-3.17	0.125	-30526352	-69572568, 8519867
Professional services	3269.56	3295.74	3023.9	3229.57	-179.48***	-245.66	-66.17	-251.92, -107.04	-5.83	0.000	-73566704	-103259336, -43874072
Home health	762.42	783.43	638.29	696.7	-37.40***§	-124.13	-86.73	-62.03, -12.78	-5.53	0.003	-15331494	-25424964, -5238023
Hospice	387.16	415.45	442.39	505.37	-34.70***	55.23	89.92	-55.42, -13.98	-7.27	0.001	-14222370	-22715640, -5729099
Durable medical equipment	277.95	274.13	258.3	263.83	-9.35	-19.65	-10.30	-20.86, 2.16	-3.49	0.111	-3831419	-8548580, 885741
Utilization (per 1,000 beneficiaries per year)												
Acute care stays	289.55	292.44	233.07	241.07	-5.11***	-56.48	-51.37	-8.63, -1.58	-2.14	0.004	-2094	-3538, -650
SNF days	2000.11	2072.82	1371.41	1529.72	-85.60***	-628.70	-543.10	-123.45, -47.76	-5.87	0.000	-35087	-50600, -19575
SNF stays	74.35	75.5	54.43	57.9	-2.33***	-19.92	-17.60	-3.74, -0.91	-4.09	0.001	-953	-1535, -371

NOTES: Difference-in-differences (DID) impact estimates significant at *p<0.1, **p<0.05, and ***p<0.01. § denotes uninterpretable impact estimate due to failure of parallel trends assumption across baseline years. To understand factors influencing total gross spending, we report impacts for all spending categories because the baseline trends for total gross spending were parallel. Percentage impact is relative to expected average outcome for NGACO beneficiaries (2017 Cohort) in PY5, absent the model. Aggregate estimate is the cumulative DID impact estimate for all beneficiaries (2017 Cohort) in PY5. "Other post-acute care facility" includes inpatient rehabilitation facilities and long-term care hospital facilities. Outpatient facility includes hospital outpatient, emergency department, and comprehensive outpatient rehabilitation facilities. Professional services include physician, other professional, and ancillary services rendered under Part B. E&M = evaluation and management; SNF = skilled nursing facility.

Exhibit D.8. Estimated Impacts of 2018 Cohort on Medicare Spending and Utilization in PY5

| | Baseline years | | | | 2018 Cohort in PY5 | | | | | | | |
| | 2015-2017 | | 2020 | | Difference-in-Differences (DID) | | | | | | | |
	NGACO mean	Comparison mean	NGACO mean	Comparison mean	DID Estimate	NGACO Diff.	Comp Diff.	95% CI	% Impact	p	Aggregate	Aggregate CI
Spending ($)												
Total Gross Medicare spending (Parts A and B)	13102.54	13330.11	11656.79	12538.02	-653.65***	-1445.75	-792.09	-956.31, -350.99	-5.69	0.000	-169275152	-247653600, -90896704
Acute care hospital facility	4231.30	4279.12	4014.39	4228.01	-165.71***	-216.82	-51.11	-276.54, -54.88	-3.96	0.003	-42914308	-71616264, -14212350
SNF	1169.70	1179.07	952.38	1050.21	-88.46***	-217.32	-128.86	-133.9, -43.02	-8.49	0.000	-22907852	-34675012, -11140692
Other post-acute care facility	432.80	441.92	378.96	401.27	-13.17	-53.82	-40.65	-39.43, 13.09	-3.35	0.326	-3409725	-10210062, 3390612
Outpatient facility	2333.33	2364.92	2336.68	2442.82	-74.56	3.35	77.90	-188.97, 39.85	-3.09	0.201	-19308444	-48936308, 10319418
Professional services	3304.32	3298.24	3132.46	3288.61	-162.24***	-171.86	-9.63	-229.52, -94.96	-5.29	0.000	-42015176	-59438968, -24591386
Home health	745.94	784.27	608.27	680.46	-33.87***	-137.67	-103.81	-56.31, -11.43	-5.27	0.003	-8770792	-14581290, -2960294
Hospice	362.96	375.65	393.64	451.26	-44.93***	30.68	75.61	-72.12, -17.74	-10.2	0.001	-11636009	-18678116, -4593903
Durable medical equipment	259.04	255.79	259.18	269.74	-13.81***	0.14	13.95	-23.28, -4.33	-5.05	0.004	-3575113	-6029595, -1120630
Utilization (per 1,000 beneficiaries per year)												
Acute care stays	315.18	318.9	259.73	272.96	-9.51***	-55.45	-45.94	-15.73999977	-3.53	0.003	-2462	-4075, -848
SNF days	2146.49	2171.38	1604.25	1774.57	-145.43***	-542.24	-396.81	-215.3399963	-8.31	0.000	-37663	-55766, -19560
SNF stays	79.67	80.51	60.03	64.78	-3.91***	-19.64	-15.73	-6.230000019	-6.10	0.001	-1012	-1614, -409
Home health episodes	158.79	164.16	194.84	217.21	-17.00***	36.05	53.05	-24.56999969	-8.02	0.000	-4402	-6364, -2441

NOTES: Difference-in-differences (DID) impact estimates significant at *p<0.1, **p<0.05, and ***p<0.01. § denotes uninterpretable impact estimate due to failure of parallel trends assumption across BY. Percentage impact is relative to expected average outcome for NGACO beneficiaries (2018 Cohort) in PY5, absent the model. Aggregate estimate is the cumulative DID impact estimate for all beneficiaries (2018 Cohort) in PY5. "Other post-acute care facility" includes inpatient rehabilitation facilities and long-term care hospital facilities. Outpatient facility includes hospital outpatient, emergency department, and comprehensive outpatient rehabilitation facilities. Professional services include physician, other professional, and ancillary services rendered under Part B. E&M = evaluation and management; SNF = skilled nursing facility.