ASPE ASSISTANT SECRETARY FOR PLANNING AND EVALUATION | OFFICE OF HEALTH POLICY

ISSUE BRIEF

HP-2025-04

# The Impact of Alternative Payment Models on Medicare Spending and Quality, 2012-2022

**Our research finds that alternative payment models tested by the Center for Medicare and Medicaid (CMS) Innovation Center and the Medicare Shared Savings Program (MSSP) have generated savings for beneficiaries in Traditional Medicare, including spillover effects to beneficiaries who were not in models.**

## KEY POINTS

- We evaluated both the Center for Medicare and Medicaid Services Innovation Center (CMS Innovation Center) models and the Medicare Shared Savings Program (MSSP) and found that they have generated gross savings for all beneficiaries in the Traditional Medicare program while demonstrating positive impacts on selected quality measures.
- Between 2012 and 2022, 19 selected CMS Innovation Center models generated an average annual savings ranging from $23 to $31 per beneficiary per year, amounting to $0.70-$1.0 billion in annual gross savings and total gross savings of $7.7 – $11.0 billion between 2012 and 2022.*
- Between 2012 and 2022, MSSP generated an average annual savings ranging from $68 to $94 per beneficiary per year, amounting to $2.1- $2.9 billion in annual gross savings and total gross savings of $23 – $31 billion between 2012 and 2022.
- Most of the estimated reductions in Medicare spending from Innovation Center models were attributed to counties that attained or maintained relatively high levels of model penetration over the study period.

* We note that changes in spending or savings referred to in this Brief are calculated from ASPE's statistical models. They do not represent potential overall changes to the federal budget or the official estimates of the CMS Office of the Actuary.

# BACKGROUND

The implementation of Alternative Payment Models (APMs) has the potential to influence healthcare spending and quality by shifting the focus from volume-based care to value-based care. APMs, such as those tested under the Centers for Medicare & Medicaid Services (CMS) Innovation Center and the Medicare Shared Savings Program (MSSP), aim to align provider incentives with outcomes, leading to reductions in unnecessary services and improvements in care coordination. Evidence from various APMs, including MSSP and CMS Innovation Center Accountable Care Organizations (ACOs), shows modest but meaningful savings in healthcare spending, particularly in high-cost areas and among beneficiaries with chronic conditions. These savings are achieved by reducing avoidable hospitalizations, emergency department visits, and duplicative testing. At the same time, APMs have demonstrated improvements in quality measures, such as preventive care utilization, chronic disease management, and patient satisfaction, underscoring their ability to enhance care while controlling costs. [1-7]

As we described in a recent Forefront blog [8] and Issue Brief [9], a more comprehensive evaluation of the CMS Innovation Center and APMs in general is needed to understand their current and potential impact on delivery system transformation and health care value. These papers emphasized the important role of the past and current models in testing, learning, and diffusing evidence on new methods of payment and care delivery. For example, any increase in federal spending that has occurred as a result of model testing should at least partly be considered in the context of an investment. That is, evaluations should account for the potential impacts of the current testing, learning, and the care transformations that have already occurred on the future trajectory of Medicare and health system spending and value.

It is of equal importance that we continue to develop and apply more robust methods to evaluate the impact of APMs. The current approach of model-specific evaluations that compare participants to a comparison group of non-participants may face increasing limitations. As wider model participation occurs in the future, it will become increasingly difficult to develop comparison groups of providers and beneficiaries who have not been exposed to APMs. In addition, the potential for spillover effects of care changes implemented in models being applied to non-participants means these traditional model evaluations are likely to underestimate the impact of APMs on spending and quality. Thus, we must face the challenge of estimating the impacts of APMs across all beneficiaries, regardless of whether they were aligned with APMs or not. Addressing these methodological challenges is critical for evaluating the CMS Innovation Center's and APMs role in driving healthcare transformation, improving quality, and controlling spending.[9]

In this brief, we take a first step towards exploring new ways of evaluating the impact of APMs. It examines the impact APMs have had on Medicare spending and other selected outcomes for all beneficiaries in the Traditional Medicare program (TM). The Brief begins by providing an overview of CMS Innovation Center and MSSP models and their growth between 2012 and 2022. Subsequently, the analysis calculates gross Medicare savings generated by CMS Innovation Center models and MSSP. By estimating gross savings, we are evaluating the models' effectiveness in reducing health service use but are not accounting for additional upfront payments made and shared savings to

participants. Our analysis compares current Innovation Center model and MSSP penetration rates to counterfactual scenarios, such as having no models implemented during this time (zero penetration rates) and setting penetration rates to the 90th percentile across all U.S. counties. It also assesses spending growth and savings in regions with high Innovation Center model penetration growth, comparing these areas to those with lower levels of CMS Innovation Center model penetration. Lastly, it analyzes the impact of CMS Innovation Center model and MSSP participation on other selected outcomes.

# OVERVIEW OF ALTERNATIVE PAYMENT MODELS

A variety of APMs have been implemented in TM since the CMS Innovation Center and MSSP were launched with the goal of reducing Medicare spending and improving or maintaining quality in the program. MSSP has focused on advancing accountable care by incentivizing the formation of Accountable Care Organizations (ACOs), with shared savings available for organizations that successfully reduce spending for TM beneficiaries. In later years, providers participating in MSSP could also enroll in Comprehensive Primary Care Plus (CPC+), a primary care medical home model that gave practices additional financial resources and flexibility to make investments, improve the quality of care, and reduce the number of unnecessary services their patients received. CMS Innovation Center models generally fall into several categories, including those focused on ACOs, and advanced primary care as well as disease-specific and state-based models.[10,11] Individual CMS Innovation Center models have been initiated and completed at various points over the last decade, with some authorized for expansion. In addition to differences in structure and goals, unlike individual CMS Innovation Center models, MSSP has been continuously active since 2012.

Table 1 provides an overview of the MSSP, and CMS Innovation Center models analyzed in this study. The models include MSSP, MSSP combined with CPC+, and 19 CMS Innovation Center models. These CMS Innovation Center models encompass a range of initiatives, including ACOs, Advanced Primary Care, the Maryland Global Payment Model, the Vermont Global Payment Model, Chronic condition models, and other innovative payment and care delivery models.[†]

While we evaluate spending and quality for beneficiaries, enrollment in MSSP or CMS Innovation Center models happens at the provider level. Beneficiaries are attributed to models through methodologies tailored to each model's design, including provider-driven, service utilization-based, geographic, and eligibility criteria-based attribution. In provider-driven attribution, beneficiaries are assigned based on receiving most primary care services from providers participating in ACOs or Advanced Primary Care models. For service utilization-based attribution, beneficiaries are attributed based on specific services received, such as chronic care management or episodes of care triggered by hospitalizations or procedures. Geographic attribution assigns beneficiaries based on location,

[†] The list of all CMMI innovation Center models is here (https://www.cms.gov/priorities/innovation/models. This analysis does not include Episode Based Models like the Bundled Payments for Care Improvement (BPCI) and Comprehensive Care for Joint Replacement (CJR) models. Roughly 1.2 million beneficiaries were attributed to in BPCI. [12]

often a state, as seen in models like the Maryland Total Cost of Care Model or Vermont Global Payment Model. Additionally, attribution may occur through predefined eligibility criteria (e.g., chronic conditions, dual eligibility, or Medicare enrollment) or voluntary alignment, where beneficiaries choose to align with participating providers. These approaches ensure the appropriate inclusion of beneficiaries in each model for the evaluation of care delivery and outcomes.

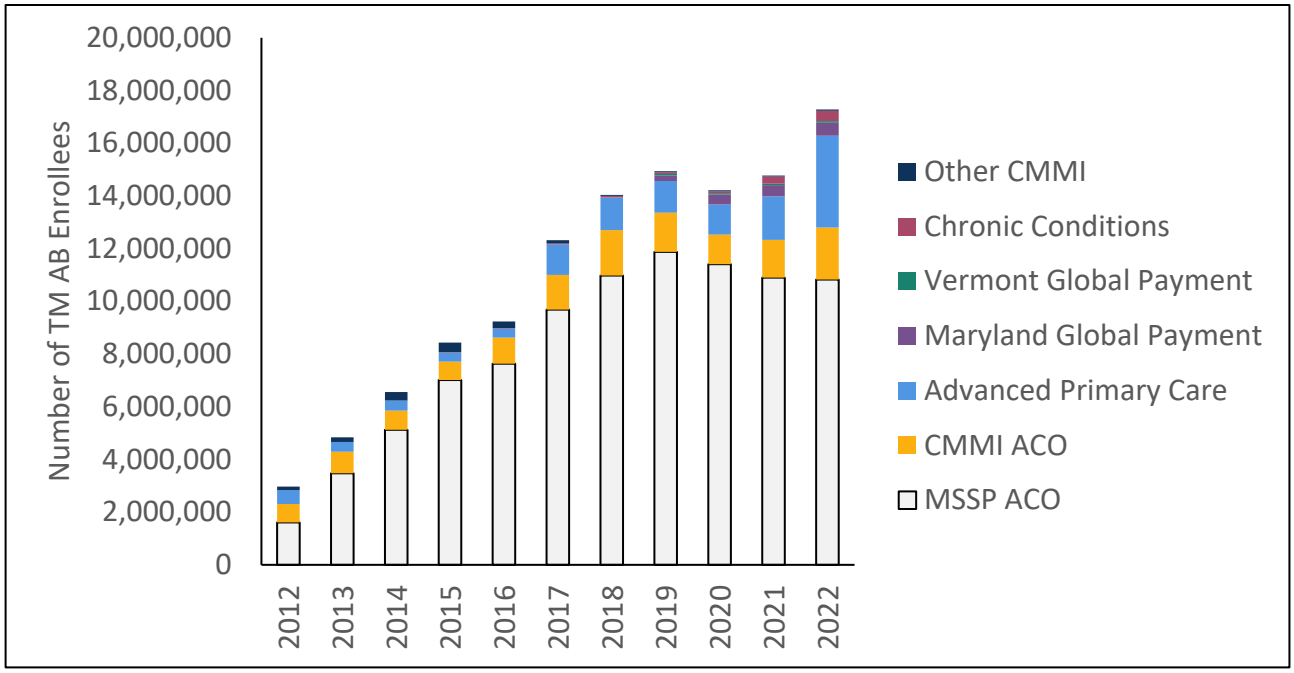
**Table 1: Data on Traditional Medicare (TM) Beneficiaries Attributed to 21 Alternative Payment Models**

| APM Categories | List of APMs Included in the Analysis |
|---|---|
| **MSSP ACO** *(2 models)* | MSSP Only, MSSP with Comprehensive Primary Care Plus (CPC+) |
| ***Innovation Center models*** | |
| **ACO** *(3 models)* | Pioneer, Next Generation Accountable Care Organization (NGACO), ACO REACH (formerly the Global and Professional Direct Contracting (GPDC)) |
| **Advanced Primary Care** *(6 models)* | Physician Group Practice Transition Demonstration, Multi-payer Advanced Primary Care Demonstrations, Medicare Health Care Quality Demonstration – 646 Demonstration for North Carolina, Comprehensive Primary Care Initiative (CPCI), Comprehensive Primary Care Plus (CPC+, non-MSSP participants), Primary Care First |
| **Maryland Global Payment** | Maryland Total Cost of Care (MDTCOC) |
| **Vermont Global Payment** | Vermont All-Payer ACO Model |
| **Chronic Conditions** *(4 models)* | Comprehensive ESRD Care, Kidney Care Choices, Value in Opioid Use Disorder Treatment Demo, ESRD Treatment Choices Model |
| **Other CMMI** *(4 models)* | Medicare-Medicaid Coordination Office Financial Alignment Demonstration (Duals), Community Based Care Transition, Medicare Health Quality Demo (646 Demonstration for Indiana), Independence at Home Practice Demonstration |

**Notes:** Table 1 provides an overview of the MSSP, and CMS Innovation Center models analyzed in this study. The models include MSSP, MSSP combined with Comprehensive Primary Care Plus (CPC+), and 19 CMS Innovation Center models. The full list of Innovation Center models is here https://www.cms.gov/priorities/innovation/models and ASPE Issue Brief [9]

Figure 1 illustrates the scope of beneficiary attribution across 21 APMs, highlighting their growth and potential impact on healthcare spending and service delivery for Traditional Medicare beneficiaries. Between 2012 and 2022, attribution to APMs increased significantly, rising from 2.9 million beneficiaries in 2012 to 17.2 million beneficiaries in 2022. In 2022, the majority of APM attributed beneficiaries (10.8 million) were attributed to the MSSP, followed by Advanced Primary Care Models with 3.4 million beneficiaries and CMS Innovation Center Accountable Care Organizations (ACOs) with 1.9 million beneficiaries. Attribution to chronic conditions (0.39 million) and other CMS Innovation Center models (50,000 beneficiaries) was relatively low. This growth reflects the expanding role of APMs in transforming care delivery and improving outcomes for Traditional Medicare beneficiaries. By 2022, nearly half of all Traditional Medicare beneficiaries enrolled in Medicare Parts A and B were attributed to an APM. Appendix Table A1 shows detailed attribution by individual model type.

**Figure 1: Participants in 21 Alternative Payment Models by model type (Traditional Medicare Parts A and B Enrollees)**



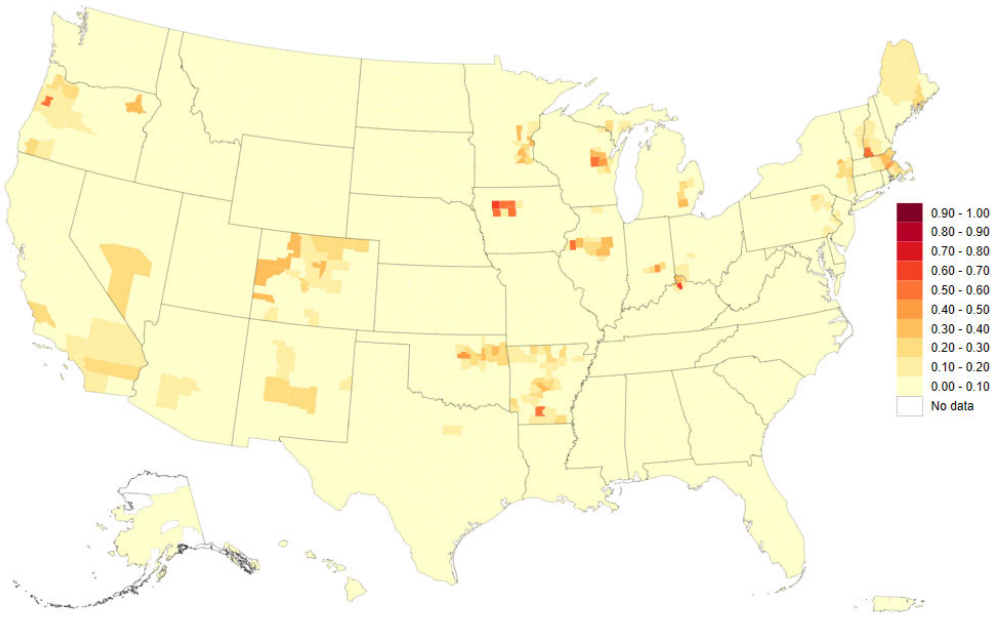

| | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| MSSP ACO | 1,608,755 | 3,468,982 | 5,125,265 | 7,008,455 | 7,627,638 | 9,681,664 | 10,972,993 | 11,871,349 | 11,409,246 | 10,899,056 | 10,821,674 |
| CMMI ACO | 697,708 | 820,660 | 728,077 | 702,160 | 992,065 | 1,320,950 | 1,728,981 | 1,491,554 | 1,118,135 | 1,429,360 | 1,976,468 |
| Advanced Primary Care | 527,547 | 372,407 | 380,342 | 341,059 | 341,606 | 1,147,849 | 1,239,377 | 1,198,925 | 1,141,113 | 1,650,045 | 3,480,996 |
| Maryland Global Payment | | | | | | | | 214,347 | 385,380 | 427,475 | 493,790 |
| Vermont Global Payment | | | | | | | | 54,512 | 49,819 | 53,631 | 62,025 |
| Chronic Conditions | | | | 13,811 | 15,079 | 36,511 | 56,048 | 61,931 | 65,494 | 272,871 | 392,102 |
| Other CMMI | 135,722 | 171,942 | 322,611 | 365,223 | 256,522 | 131,345 | 38,874 | 42,218 | 43,375 | 40,706 | 53,350 |
| **Total** | **2,969,732** | **4,833,991** | **6,556,295** | **8,430,708** | **9,232,910** | **12,318,319** | **14,036,273** | **14,934,836** | **14,212,562** | **14,773,144** | **17,280,405** |

**Notes:** The models include MSSP, MSSP combined with Comprehensive Primary Care Plus (CPC+), and 19 CMS Innovation Center models. The full list of CMS Innovation Center models is here https://www.cms.gov/priorities/innovation/models

Figure 2 and Figure 3 highlight the growth and geographic variation in CMS Innovation Center and MSSP penetration rates across counties between 2013 and 2022. In 2013, the average CMS Innovation Center penetration rate was 3.9%, with significant variation across counties (10th percentile = 0.1%, 50th percentile = 0.5%, 90th percentile = 14.8%). By 2022, the average CMS Innovation Center penetration rate had increased to 20%, with variation remaining substantial (10th percentile = 1.6%, 50th percentile = 11.8%, 90th percentile = 56.6%). Similarly, the average MSSP penetration rate in 2013 was 10.8%, again showing considerable variation across counties (10th percentile = 0.2%, 50th percentile = 5.7%, 90th percentile = 26.7%). By 2022, the average MSSP penetration rate had grown to 36.2%, with wide variation across counties (10th percentile = 7.6%, 50th percentile = 34.4%, 90th percentile = 63.2%). These findings underscore the increasing adoption of CMS Innovation Center models and MSSP over time while also reflecting substantial regional differences in their penetration across the United States. See Appendix Table A2 for more on how the penetration rates are calculated.

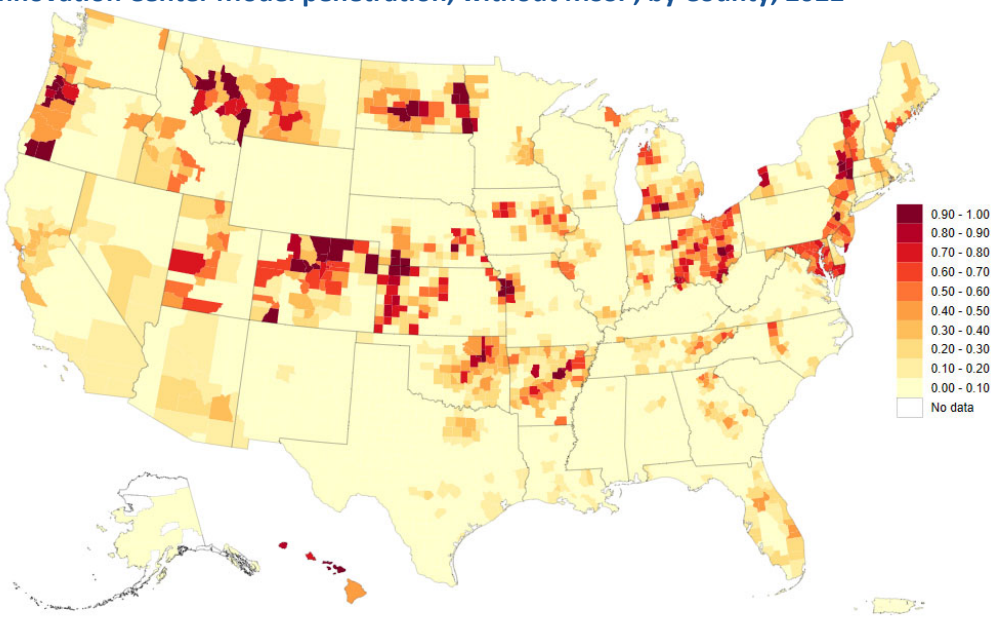
## Figure 2: Geographic variation in 19 Selected Innovation Center model penetration rates among Traditional Medicare (Parts A and B enrollees) across the United States

### Innovation Center Model penetration, without MSSP, by County, 2013



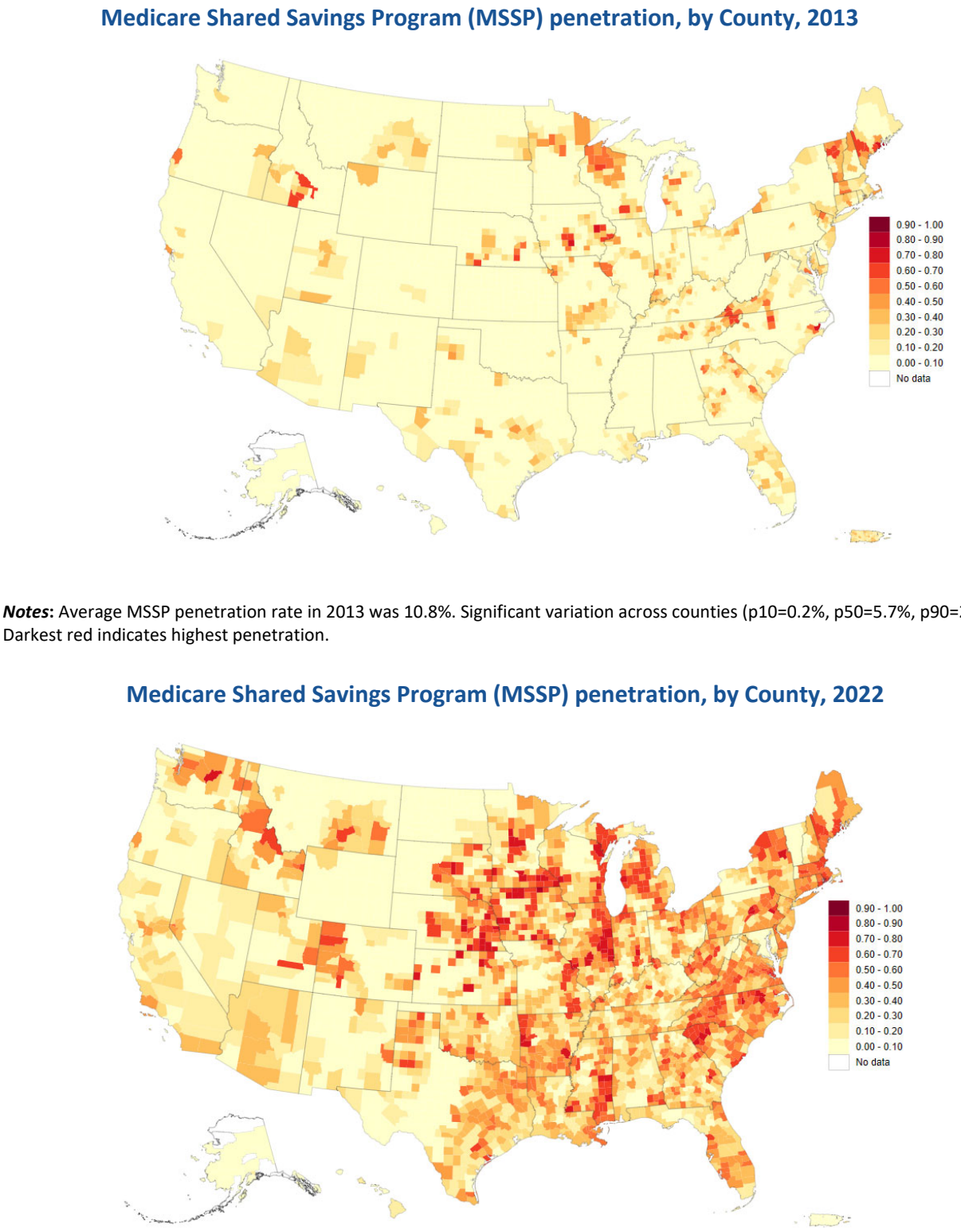

**Notes:** Average Innovation Center Model (CMMI) penetration rate in 2013 was 3.9%. Significant variation across counties (p10=0.1%, p50=0.5%, p90=14.8%). Darkest red indicates highest penetration.

### Innovation Center Model penetration, without MSSP, by County, 2022




**Notes:** Average Innovation Center Model (CMMI) penetration rate in 2022 was 20%. Significant variation across counties (p10=1.6%, p50=11.8%, p90=56.6%). Darkest red indicates highest penetration.

**Figure 3: Geographic variation in MSSP model penetration rates among Traditional Medicare (Parts A and B enrollees) across the United States**




***Notes*:** Average MSSP penetration rate in 2013 was 10.8%. Significant variation across counties (p10=0.2%, p50=5.7%, p90=26.7%). Darkest red indicates highest penetration.

***Notes*:** Average MSSP penetration rate in 2022 was 36.2%. Significant variation across counties (p10=7.6%, p50=34.4%, p90=63.2%). Darkest red indicates highest penetration.

# METHODS

In this section, we describe the methodology we employed for estimating the impact of the MSSP and CMS Innovation Center models on both Medicare spending and quality measures for TM beneficiaries. A more detailed explanation of the methods is provided in Appendix B. The basic approach takes advantage of the fact that model participation varies across counties and over time. Using this variation, we estimated the impact of model penetration on Medicare spending and a variety of claims-based quality outcomes. Our analyses are designed to examine changes in these outcomes over a 16-year period – 2007-2022.[‡] The goal was to identify the relationship between county-level penetration of CMS Innovation Center and MSSP models and these outcomes. It is important to note that the outcomes are calculated for all FFS beneficiaries, based on whether they were attributed to a model or not. Thus, the estimated impacts include the effects the models had on attributed beneficiaries as well as on non-attributed beneficiaries in the geographic area (spillover effects).

The data used in this analysis consists of 100% claims, enrollment, and APM model attribution information on TM beneficiaries with Part A and Part B enrollment. The Innovation Center model attribution data used to calculate the county level penetration rates was limited to the 19 models as displayed on Table 1. These models include many of the ACO and primary care models that represent accountable care as envisioned by the Innovation Center's current objectives. At the time this study was conducted, we did not have access to attribution data for models such as Bundled Payments for Care Improvement (BPCI), Comprehensive Care for Joint Replacement (CJR) and the Oncology Care Model. We will add these data along with 2023 claims as the next phase of the study begins.

We aggregated the beneficiary-level data to the county level, which provides several key analytical advantages. For example, models at the county level are more flexible for comparing with various counterfactuals and in analyzing and comparing outcomes across counties with different APM growth rates. Penetration rates at the county level for both Innovation Center models and MSSP were calculated as the number of beneficiary months in model divided by total beneficiary months.

The analyses are conducted in two stages. In the first stage, we estimate the impact of county- level penetration rates for Innovation Center models and MSSP on the outcomes of interest. In the second stage, we use these results to calculate gross Medicare savings generated by CMS Innovation Center models and MSSP using counterfactual scenarios, such as estimating potential savings if penetration rates were set at the zero versus 90th percentile penetration rates across all U.S. counties. In additional analyses we further assess spending growth and savings in regions with high CMS Innovation Center penetration growth, comparing these regions to those with differing levels of CMS Innovation Center model expansion. Finally, it analyzes the impact of CMS Innovation Center and MSSP attribution on other selected outcomes.

[‡] The years 2007 – 2011 are included to represent trends in pre-model years.

We recognize several challenges with this approach. First, several factors other than model penetration may affect the outcomes over time. We use a variety of approaches to control for these potentially confounding factors.[§] We also recognize that both the Innovation Center and MSSP programs are voluntary. Model participants may "select" themselves into and out of models based on both their expectation for success and their actual performance once they are participating. Thus, our estimates may reflect these selection effects, meaning the results represent the outcomes realized under the program by select providers but are not necessarily generalizable to other providers that may participate in the future. We also conduct sensitivity analyses with methods that attempt to partially correct for some of the selection dynamics.[**]

# FINDINGS

### Estimated Impact on Medicare Spending Per Beneficiary

Using the methods described above, we developed estimates of the impact of model penetration on Medicare spending per beneficiary and claims-based utilization and quality outcomes. In this section, we present results for both from our base set of estimating models – detailed results from alternative models are presented in Appendix Figures A1 and A2. Annual Medicare spending (Parts A and B) per beneficiary averaged $10,151 over the study period, ranging from $8,423 in 2007 to $12,009 in 2022.

Figure 4 illustrates the difference between predicted spending under actual CMS Innovation Center penetration rates (blue line) and counterfactual spending with zero CMS Innovation Center penetration (yellow line), while holding all other variables unchanged. The gap between the blue and yellow lines represents the estimated gross savings per Traditional Medicare beneficiary (AB enrolled) attributable to CMS Innovation Center models, encompassing both direct and indirect effects. While the two lines follow closely, the gap between them still represents appreciable savings, especially in later years.

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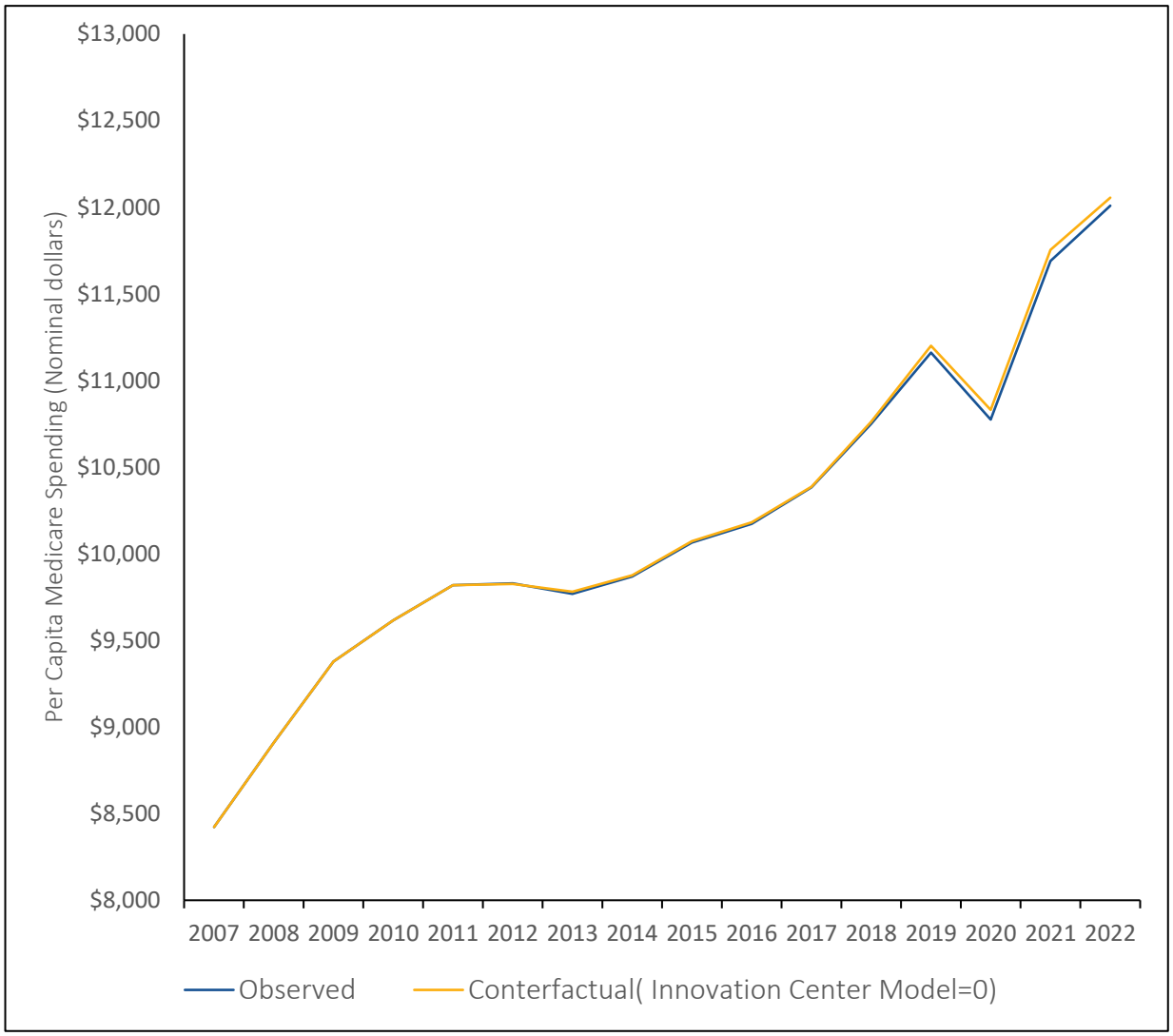
[§] The models include the Innovation Center models penetration rate, MSSP penetration rate, and the MA penetration rate at the county level. We include two- way fixed effects (county and year) as well as a variety of potentially confounding factors including race/ethnicity, dually eligible, 27 CCW chronic conditions.

[**] To the extent these selection issues cannot by fully accounted for, our estimated effects might be biased relative to estimates using penetration rates that did not reflect systematic selection of providers. While our estimates reflect the impact on spending the participating providers had, the estimates might not be accurate for projecting the impacts of new model participants in the future.

**Figure 4. Observed Innovation Center Model Penetration vs Counterfactual of No Innovation Center Model (Setting Innovation Center penetration rates to zero) for TM Parts A and B Enrollees**

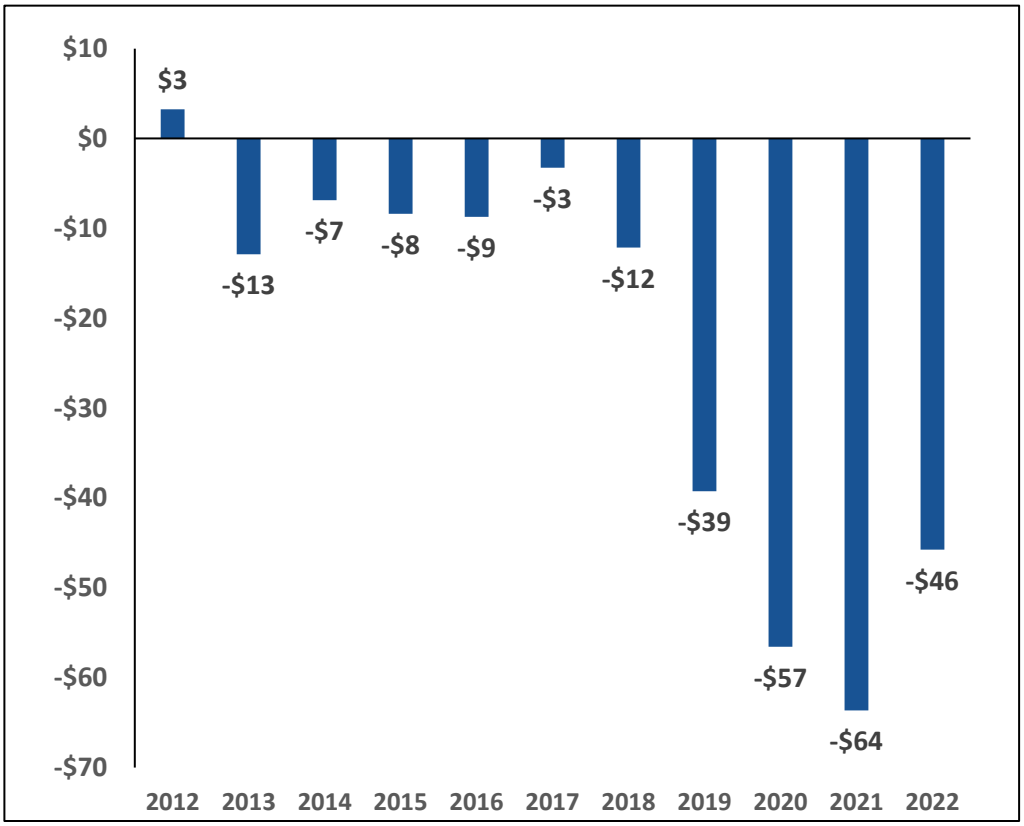



**Notes:** Per capita Medicare spending include spending on Part A and B services for patients enrolled in Part A and B throughout the calendar year or until death.

Figure 5 displays the gross per capita savings by year. The savings per beneficiary/year grew over time, starting at $13 in 2013 and reaching $46 in 2022, with an average savings of $23 per beneficiary between 2012 and 2022. Notably, between 2018 and 2022, the average savings increased to $43 per person, corresponding to annual savings of $1.3 billion for TM. Alternative specifications of the estimating models produced larger effects - an average savings of $31 per beneficiary/year between 2012 and 2022, with total annual savings estimated at $1 billion (Appendix Figure A1). Overall, these estimates indicate that CMS Innovation Center models generated a total gross savings ranging from $7.7 - $11 billion from 2012 to 2022.

- **Annual gross savings of $23 per beneficiary per year between 2012 and 2022**
- **Annual gross savings per beneficiary increased over time**
- **Between 2018 and 2022, CMS Innovation Center models generated an average annual savings of $43 per beneficiary, amounting to $1.3 billion each year**

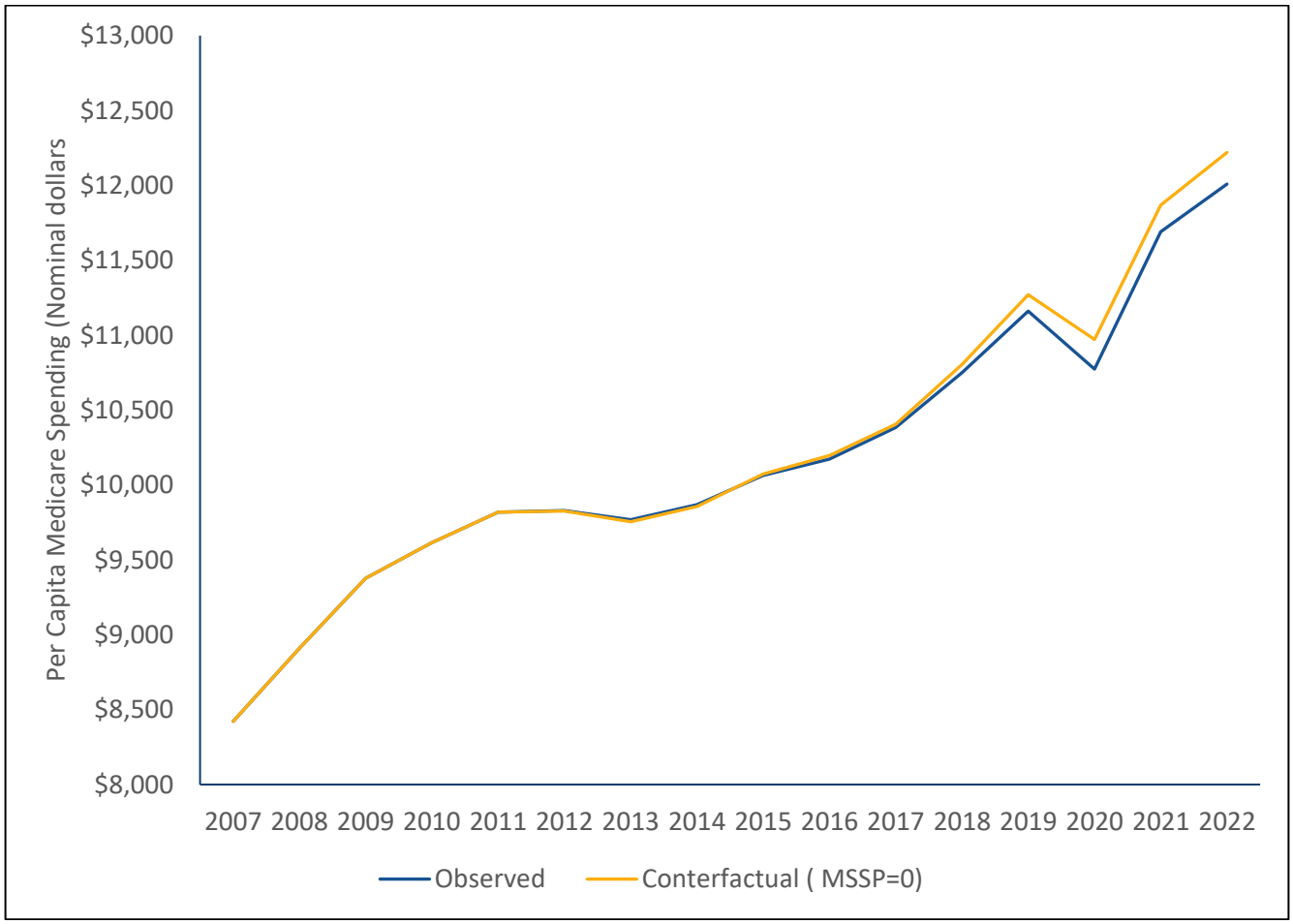
**Figure 5: Gross per capita change in Medicare spending generated by CMS Innovation Center Models**




**Notes:** Gross per capita change includes spending on Part A and B services for patients enrolled in Part A and B throughout the calendar year or until death.

Figure 6 illustrates the difference between the predicted spending with actual MSSP penetration rates (blue line) and counterfactual spending (yellow line) with zero MSSP penetration while holding all other variables unchanged. The gap between the blue and the yellow lines is the estimated gross savings per Traditional Medicare beneficiary (Parts A and B enrolled) attributed to MSSP, including both direct and indirect effects. Compared to the CMS Innovation Center models, MSSP demonstrates higher savings with more separation between the blue and yellow lines. The higher level of savings is likely due to both the longer duration of MSSP and higher penetration rates relative to the Innovation Center models.

**Figure 6. Observed MSSP Model Penetration vs Counterfactual of No MSSP (Setting MSSP penetration rates to zero)**



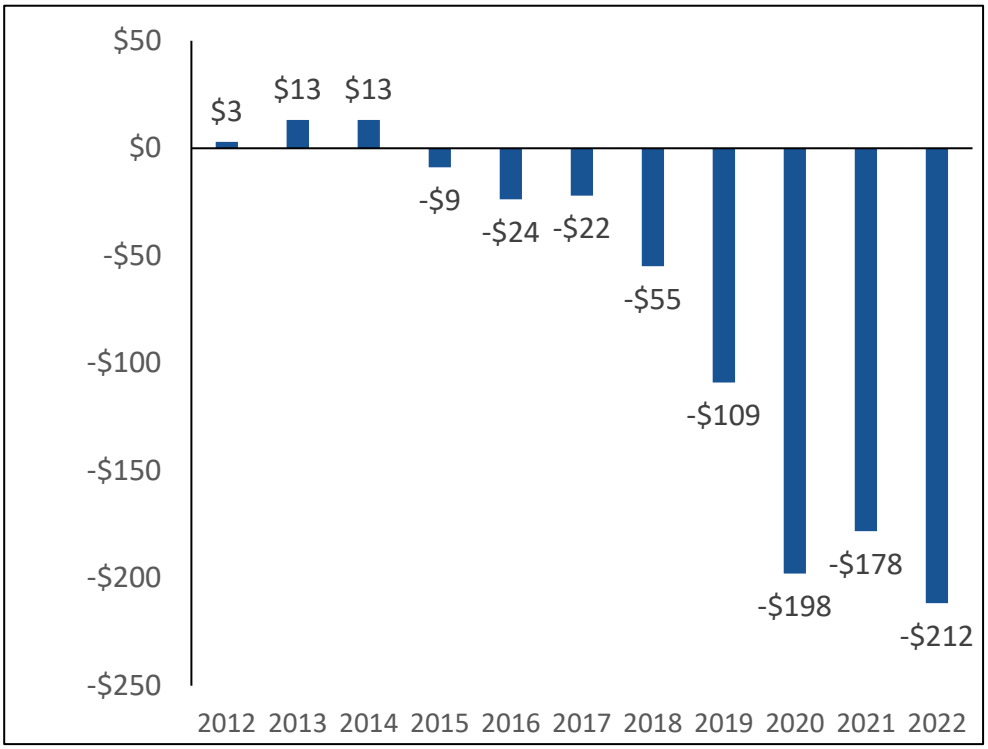

**Notes:** Per capita Medicare spending include spending on Part A and B services for patients enrolled in Part A and B throughout the calendar year or until death.

As displayed on Figure 7, the annual savings per beneficiary attributed to MSSP grew over time, starting at $9 per beneficiary in 2015 and reaching $212 in 2022, with an average savings of $68 per beneficiary between 2012 and 2022. Notably, between 2018 and 2022, the average savings increased to $148 per beneficiary, corresponding to aggregate annual savings of $4.5 billion for TM. An alternative specification of the estimating models produced larger effects - an average savings of $94 per beneficiary/year between 2012 and 2022, with total annual savings estimated at $2.9 billion (Appendix Figure A2). Overall, these estimates indicate that MSSP models generated a total gross savings ranging from $23 - $31 billion from 2012 to 2022.

We also estimated savings attributable to beneficiaries not aligned with MSSP – the value of spillovers from the program in 2022. To do so, we combined external estimates of gross savings from the MSSP program with our estimated 2022 savings of $212 per beneficiary to decompose into direct model savings and spillover. Studies on the impact of the MSSP have estimated gross savings of about $4.8 billion in 2022 for 10.4 million beneficiaries, or about $461 per attributed beneficiary, which we use as our estimate of direct model savings. If we assume an MSSP penetration rate of 36%, we estimate that MSSP generated a spillover of $72 per non-attributed beneficiary in 2022. [14]

**Figure 7: Gross per capita change in Medicare spending generated by Medicare Shared Savings Program (MSSP)**

- **Annual gross savings of $68 per beneficiary per year between 2012 and 2022**
- **Annual gross savings per beneficiary increased over time.**
- **Between 2018 and 2022, MSSP generated an average annual savings of $148 per beneficiary, amounting to $4.5 billion each year.**
- **MSSP has generated an estimated spillover of $72 per nonaligned beneficiary in 2022.**



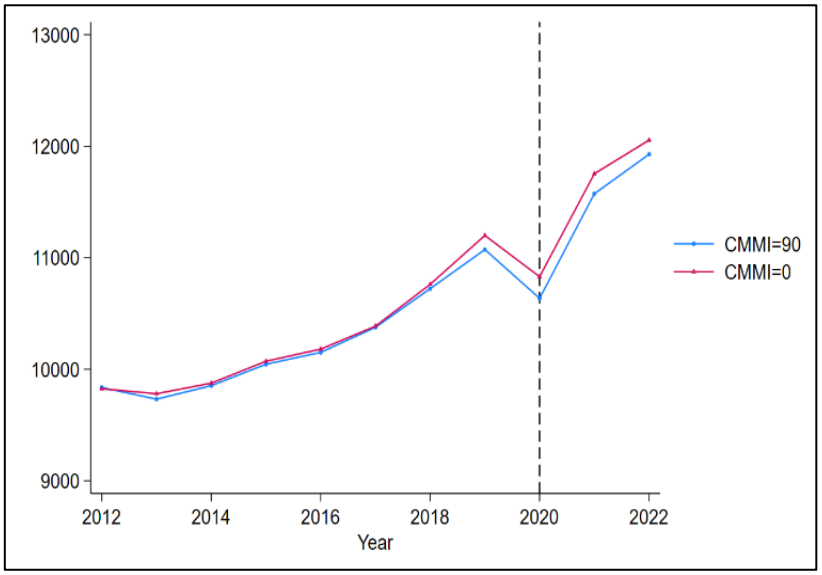

**Notes:** Gross per capita change includes spending on Part A and B services for patients enrolled in Part A and B throughout the calendar year or until death.

We also estimated what savings might have been in a counterfactual scenario of high innovation center penetration across the country. Increasing all counties from zero to the 90th percentile of CMS Innovation Center penetration could generate an annual gross savings of $2.2 billion between 2012 and 2022. Increasing all counties from zero to the 90th percentile of CMS Innovation Center & MSSP penetration could generate an annual gross savings of $6 billion between 2012 and 2022.

**Figure 8. Significant savings potential from increasing counties from zero to 90th percentile of APM models**

Figure 8a shows the difference between the predicted spending at 90th percentile CMS Innovation Center penetration rates (blue line) and counterfactual spending (red line) with zero CMS Innovation Center penetration, keeping all other variables unchanged. The difference between the blue and the red line is the estimated savings per Traditional Medicare beneficiary (Parts A and B enrolled) by increasing counties from zero to the 90th percentile of CMS Innovation Center penetration. Increasing CMS Innovation Center penetration from 0 to the 90th percentile generates an average per capita savings (direct and indirect) of $70 between 2012 and 2022, with an annual gross savings of $2.2 billion.

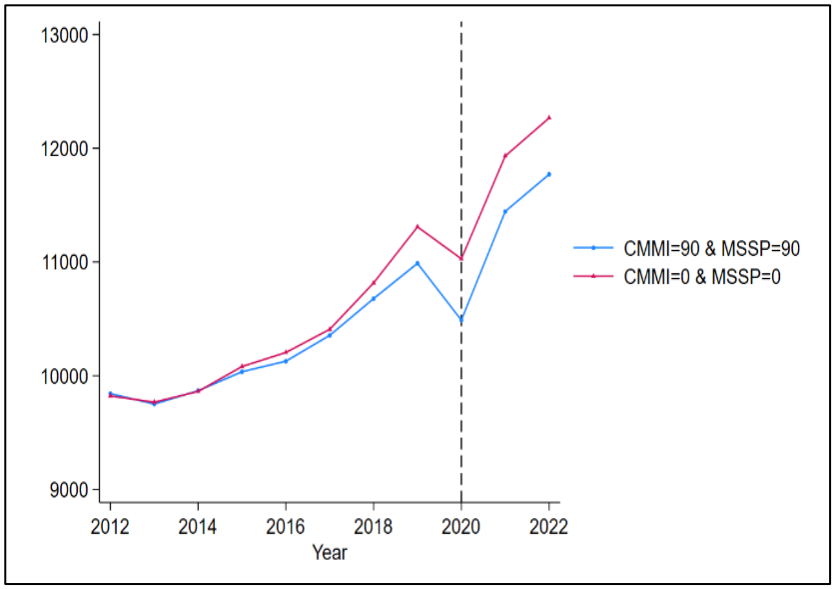
Figure 8a




**Notes:** See Appendix Table A4 for 90th percentile Innovation Center model penetration rates

For CMS Innovation Center and MSSP programs jointly (Figure 8b), increasing all counties from 0 to the 90th percentile of both CMS Innovation Center & MSSP penetration is predicted to generate per capita gross savings of $189, with an annual gross savings of $6 billion. The annual savings grows over time as the 90th percentile of penetration increases. Between 2018 -2022, if all counties were at the 90th percentile of CMS Innovation Center and MSSP penetration, the estimated annual savings would be $12 billion. These results show potential for significant savings in the future if counties reach high APM penetration.

Figure 8b




**Notes:** See Appendix Tables T4 and A5 for the 90th percentile Medicare Innovation Center model and Medicare Shared Savings program (MSSP) penetration rates

Next, we assess spending growth and savings in regions with high CMS Innovation Center penetration growth, comparing these regions to those with differing levels of CMS Innovation Center model expansion.

- **The impact on Medicare spending varies significantly across areas with different levels of CMS Innovation Center growth**
- **Counties that attained or maintained relatively high CMS Innovation Center model penetration had lowest Medicare Spending growth**
- **These counties accounted for most of the estimated reductions in Medicare spending**

Results presented in Table 2 are estimates of Medicare Spending growth separately for groups of counties based on their growth and/or levels of CMS Innovation Center model penetration. Average per beneficiary spending in the years prior to the establishment of CMS Innovation Center models (2007-2011) was higher for counties that maintained or attained relatively high levels of CMS Innovation Center model penetration relative to other counties (the first Panel of the Table) - $9914 vs. $8835 (the second panel of the Table). This difference suggests that providers in higher cost areas were more likely to choose to participate in models, potentially because they expected to benefit from the shared savings.

Annual spending growth rates for the pre-model years were comparable across all the counties. However, while spending growth slowed considerably from 2012 – 2022, growth rates were not consistent across counties. In counties that maintained relatively high levels of CMS Innovation Center model penetration or those that attained relatively high levels over time, the reduction in annual spending growth was somewhat larger than for other counties. These reductions translated to annual savings of approximately $35 per beneficiary compared to no CMS Innovation Center models, generating an annual gross savings of $1.08 billion for TM. Conversely, counties with low or stagnant CMS Innovation Center growth exhibited smaller or negligible spending changes. Roughly 62% of Traditional Medicare beneficiaries lived in counties that either (a) moved from a low to a high CMS Innovation Center penetration between 2012 and 2022 or (b) remained high. Another 22% of beneficiaries lived in counties that experienced little to no CMS Innovation Center growth, and the remaining 16% resided in counties with moderate CMS Innovation Center growth.

## Table 2: Impact of Medicare Spending in areas with varying levels of CMS Innovation Center growth

| CMS Innovation Center Model Penetration Growth, 2012 to 2022 | % Population | Average MSSP penetration | Average MA penetration | Spending per capita | Annual Medicare Spending growth* | Annual Medicare Spending growth* | Gross Savings per capita | Gross Savings per capita |
|---|---|---|---|---|---|---|---|---|
| | (2012 - 2022) | (2012 - 2022) | (2012 - 2022) | (2007-2011) | (2007 - 2011) | (2012 - 2022) | (2012 - 2022) | (2018 - 2022) |
| **High Innovation Center model penetration growth counties** | | | | | | | | |
| CMMI(Q1) - CMMI (Q4) | 3% | 26% | 27% | $8,905 | 3.84% | 2.00% | **-$35** | **-$65** |
| CMMI(Q2) - CMMI (Q4) | 7% | 29% | 32% | $8,833 | 3.77% | 1.86% | | |
| CMMI(Q3) - CMMI (Q3) | 11% | 26% | 36% | $9,848 | 3.94% | 1.77% | | |
| CMMI(Q3) - CMMI (Q4) | 8% | 27% | 36% | $9,240 | 3.91% | 1.91% | | |
| CMMI(Q4) - CMMI (Q4) | 21% | 29% | 39% | $9,525 | 3.72% | 1.90% | | |
| CMMI(Q4) - CMMI (Q3) | 12% | 25% | 39% | $9,367 | 3.85% | 2.17% | | |
| **Low Innovation Center model penetration growth counties** | | | | | | | | |
| CMMI(Q4) - CMMI(Q1) | 1% | 26% | 32% | $8,495 | 3.7% | 2.0% | | |
| CMMI(Q4) - CMMI(Q2) | 4% | 26% | 33% | $9,125 | 3.4% | 2.1% | | |
| CMMI(Q3) - CMMI(Q1) | 2% | 23% | 31% | $8,177 | 4.0% | 2.2% | | |
| CMMI(Q3) - CMMI(Q2) | 6% | 25% | 30% | $8,800 | 3.9% | 2.1% | **-$4** | **-$6** |
| CMMI(Q1) - CMMI(Q1) | 3% | 21% | 29% | $9,105 | 3.6% | 2.3% | | |
| CMMI(Q2) - CMMI(Q2) | 6% | 28% | 27% | $8,838 | 3.8% | 2.1% | | |
| **Other Innovation Center model penetration counties** | | | | | | | | |
| Other CMMI penetration counties | 16% | 24% | 32% | $9,093 | 3.9% | 2.2% | **-$5** | **-$11** |

**Notes: CMMI(Q1) - CMMI(Q4) - Counties that moved from lowest to highest CMMI penetration rates between 2012 & 2022. *Growth estimates from predicted spending using Linear Regression Model. Gross savings calculated using zero CMMI counterfactual. Average pre-APM (2007-2011) Medicare Spending in High Innovation Center model penetration growth counties were $9414. Average pre-APM (2007-2011) Medicare Spending in Low Innovation Center model penetration growth counties were $8835, and for Other Innovation Center model penetration counties it was $9093.**

## Estimated Impact on Other Outcomes

We also assessed a variety of claims-based measures of utilization and quality. These outcomes include inpatient stays, healthy days at home, emergency room visits, mortality during the year, transitional care management (TCM), and advanced care planning (ACP). Table 3 compares observed averages for these measures with predictions of what they would have been with no Innovation Center models or MSSP or 90th percentile penetration.

### Table 3: Impact of MSSP and CMS Innovation Center models on other selected outcomes

| | CMS Innovation Center Models | | | Medicare Shared Savings Program (MSSP) | | |
|---|---|---|---|---|---|---|
| | Penetration rates | | | Penetration rates | | |
| OUTCOMES | Zero | Actual | 90th percentile | Zero | Actual | 90th percentile |
| TCM | 33.7 | 34.5 | 36.2 | 31.5 | 34.5 | 37.0 |
| % Change | | ***2.4%*** | ***5.0%*** | | ***9.4%*** | ***7.4%*** |
| ACP | 58.7 | 59.1 | 59.9 | 56.1 | 59.1 | 61.5 |
| % Change | | ***0.7%*** | ***1.3%*** | | ***5.4%*** | ***4.0%*** |
| Inpatient Stays | 0.302 | 0.300 | 0.298 | 0.303 | 0.300 | 0.298 |
| % Change | | ***-0.4%*** | ***-0.8%*** | | ***-0.9%*** | ***-0.7%*** |
| Healthy days at home | 342.7 | 342.8 | 343.0 | 342.6 | 342.8 | 342.9 |
| % Change | | ***0.02%*** | ***0.06%*** | | ***0.05%*** | ***0.04%*** |
| ER visits | 1.37 | 1.36 | 1.36 | 1.37 | 1.36 | 1.36 |
| % Change | | ***-0.2%*** | ***-0.4%*** | | ***-0.7%*** | ***-0.6%*** |
| Mortality | 4.43% | 4.42% | 4.41% | 4.43% | 4.42% | 4.42% |
| % Change | | ***-0.2%*** | ***-0.2%*** | | ***-0.2%*** | ***0.0%*** |

**Notes**: **Zero** = Predicted value with zero penetration rate, **Actual** = Predicted value with actual penetration rate. **90th percentile** = Predicted Value with penetration rates set at 90th percentile. All average rates presented are predicted rates adjusted for covariates. % Change to actual is change from zero; % change to 90th percentile is change from actual.
Inpatient stays=Total number of unique inpatient claims for the beneficiary in the year; HDAH (healthy days at home )=number of days alive-number of days in inpatient (acute hospital, SNF, LTCH, hospice, or home health); TCM (transitional care management)= TCM claim lines per 1,000 beneficiaries; ACP (advance care planning)=ACP claim lines per 1,000 beneficiaries; Mortality=indication of whether the beneficiary died in the calendar year. See Appendix Table A3 for details on variables.

The largest observed effects are for the use of TCM and ACP services – indicators of care coordination efforts. For example, during 2012-2022, TCM use increased by 2.4% relative to the counterfactual of zero model penetration. Increasing CMS Innovation Center penetration from actual (current levels) to the 90th percentile is predicted to result in an additional 5% increase in TCM claims. Similarly, current MSSP participation increased TCM use by 9.4%, and raising penetration from actual to the 90th percentile is expected to boost TCM claims by an additional 7.4%. In terms of ACP visit claims, the current CMS Innovation Center penetration resulted in a 0.7% increase and increasing penetration to the 90th percentile is predicted to lead to an additional 1.3% rise. Comparable changes for MSSP are 5.4% and 4% respectively. Increasing MSSP penetration from actual to the 90th percentile is predicted to decrease inpatient stays and ER visits by roughly 0.3% and 0.4% respectively.

# DISCUSSION AND CONCLUSION

This brief is the third in a series of papers that examine an appropriate framework for evaluating the efforts of the CMS Innovation Center and APMs in general. For several reasons described in this series, it is important to develop more comprehensive methods that go beyond simply relying on estimated net savings from models as their primary success indicator.[††] Therefore, we must advance beyond only using model specific evaluations and their results for assessing full impact. To be sure, the model specific evaluations to date have represented high quality, state of the art methodology and have been exceptionally valuable for both expanding and modifying models as well as identifying the most successful elements within a model. But alone, they do not capture potentially important spillover effects. In addition, they do not fully capture the contribution of individual models and particularly the aggregate effect of all models on producing evidence, learning, and care transformations that will potentially improve health care value in the future. Of equal importance, as model participation expands and spillover effects become more likely, the ability to construct valid comparison groups for traditional evaluations will be increasingly limited.

When considering new methods for evaluating the full impacts of APMs, researchers face many challenges. One of these challenges is to understand how provider decisions and other trends that affect program participation can affect outcomes of interest, develop methods to address these issues and provide appropriate interpretation of the estimated effects. Because participation in MSSP and CMS Innovation Center models is largely voluntary, a variety of "selection" effects that affect area- level penetration rates may be in play. Providers are more likely to participate when they anticipate success in terms of improving value and receiving shared savings. Over time, providers not realizing such success in the models may withdraw reducing penetration rates in some areas. In contrast, the success of providers in models may encourage other providers to enter new models as they become available, increasing penetration rates in some counties. In addition, participation responses to changes to how benchmarks were established in both programs may have changed the "selection" from higher cost to lower cost providers over time. In effect, while penetration rates may impact outcomes of interest, those outcomes can also affect penetration rates over time. Thus, great care must be taken in disentangling these influences, interpreting estimated impacts, and using them to make projections.

The results presented in this Brief reflect changes in the selected outcomes that resulted from these program dynamics. It is reasonable to assume that providers that anticipated success from participation indeed responded to the models' incentives and achieved the observed savings. It is also reasonable that changes in practice patterns that resulted in those savings could "spillover" to nonaligned beneficiaries. While it is always useful to consider whether the observed effects would

[††] For example, a recent Congressional Budget Office (CBO) report estimated that Innovation Center operations increased net federal spending by 5.4 billion dollars between 2011 and 2020.

have been realized for reasons other than model participation, we are not aware of plausible scenarios under which this might have occurred.

We believe that the results presented above provide reasonable estimates of the impacts CMS Innovation Center models and MSSP had during the 2012 – 2022 period. It appears the positive results for CMS Innovation Center models were largely attributable to counties with high levels of model penetration at the end of the study period, either by maintaining relatively high levels of model penetration during this period or growing to high penetration by 2022. Because the results are likely due to favorable selection – that is, participants are providers more likely to achieve savings participating in the models – more work needs to be done before the results can be generalized. That is, it can be applied to make future projections of the effects of increased model penetration across all geographies. We will continue to explore methods to address these selection issues so that future results might better be generalized to wider program participation. For example, models that provide what the impacts on spending might have been if less successful providers had not withdrawn from participation might be estimated. These models would potentially use measures of penetration that include all aligned beneficiaries remaining in the model for its full duration even if their providers have withdrawn.

In general, we believe the range of spending impacts presented in this Brief is conservative. As described, we were able to use a subset of all CMS Innovation Center models tested. The models included in the analysis capture a large share of aligned beneficiaries and the important primary care and ACO models. Nonetheless, some models that have been associated with savings were not included, likely reducing the estimated effects. Moreover, not including beneficiaries attributed to the Bundled Payments for Care Improvement (BPCI) and Comprehensive Care for Joint Replacement (CJR) models may also miss synergistic impacts they may have had in conjunction with ACO models. It is also true that the estimates cannot adequately account for the impact Innovation Center models have had on the evolution of MSSP over time and on the Physician Fee Schedule.[‡‡] Finally, while we have not estimated spillover effects to MA plans, any reduction in TM spending growth would have a downward effect on MA benchmark calculations. We have not included these potential reductions in our savings estimates.

It is also important to address the difference between gross savings, as calculated in this Brief, and net savings as used in other assessments of APM impact. Gross savings are the difference between program payments made to providers and estimates of what would have been paid if there were no APMs.[§§] Net savings are the gross savings after accounting for any upfront payments made and shared savings to participants. Net savings are important because they reflect the past and current impact on the federal budget. On the other hand, gross savings better reflect changes in care patterns and utilization that may be incentivized by APMs and, therefore, are better indicators of how the delivery system is responding to these new payment methods. Over time, the challenge for

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[‡‡] For example, the Pioneer ACO model was expanded as a new MSSP Track 3 in the 2016 performance year. In the PFS, CMS is permanently adding features from advanced primary care models as the APCM codes, and also the Million hearts model as a cardiac risk assessment code.

[§§] In most evaluations, gross savings for individual models have been calculated relative to the experience of a comparison group or relative to the benchmarks set for the models.

policy will be to establish payment parameters such as benchmarks and shared savings rates in a way that allows for a sustainable rate of spending growth while also allowing sufficient gains to providers for investing in value-based care.

Given all these considerations, our results suggest sizable savings and modest quality improvement to the Traditional Medicare program associated with both CMS Innovation Center and MSSP models. Together, these estimates imply gross savings of $30- $43 billion over the 2012-2022 period. While the estimated quality improvements were relatively small, we believe county- level models may result in underestimation.

As these programs continue to evolve and enter their second decade, further research will be able to determine if these savings and quality improvements are sustained or increase as investments made in value-based care have greater impacts and as the models continue to expand to new providers. It will be especially important to determine if the program is able to expand into and achieve comparable improvements in those geographic areas that have experienced low model penetration to date. Assuming we continue to pursue the goal of full participation in APMs, another important policy issue arises. Can the balance between a sustainable trajectory of spending and sufficient incentives to achieve full participation for providers be found in the current voluntary system? Or will some form of mandatory participation be required?

In this brief, we have described important evaluation challenges for assessing APMs and taken a first step in exploring methods that might be used to address some of these challenges. Because the issues involved are critical to the future of APMs and value-based purchasing, we intend to continue exploring and developing these methods. We hope many evaluators and health services researchers will also undertake this challenge.

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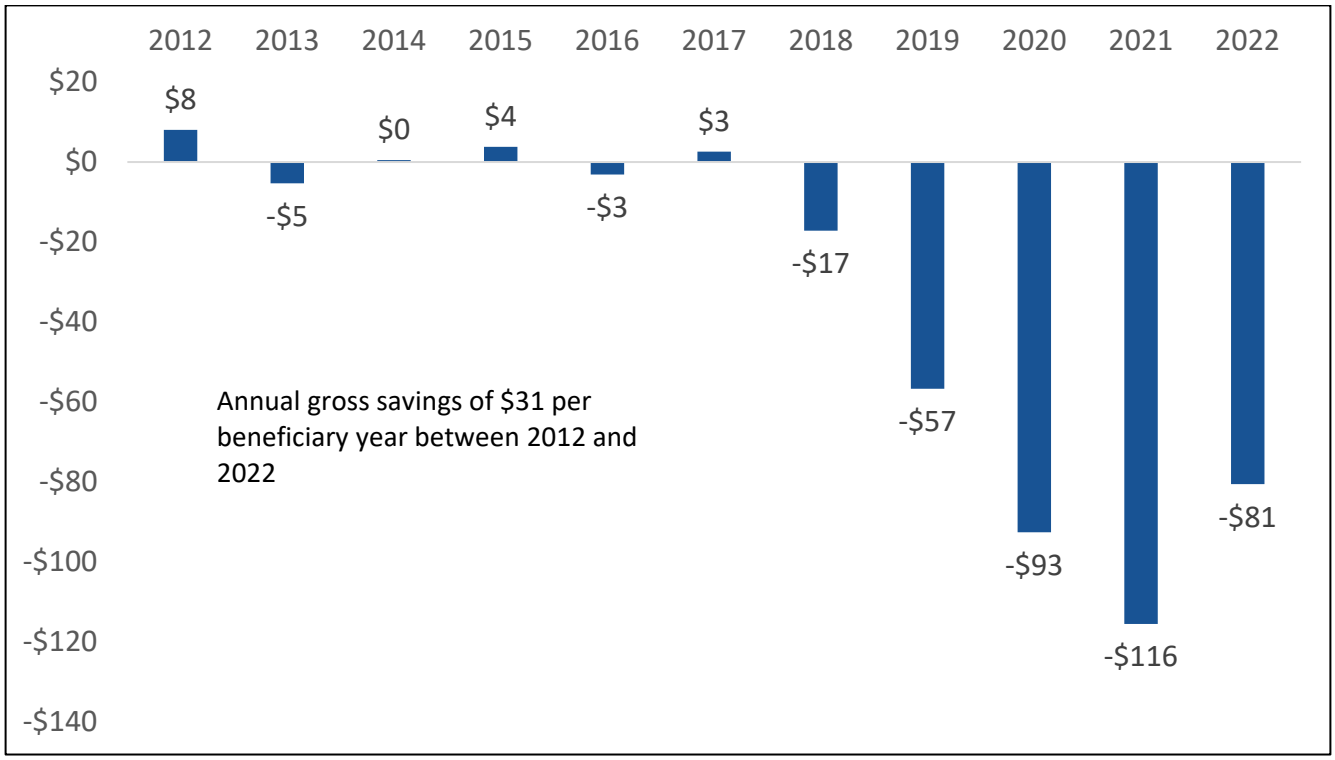
# APPENDIX

## Table A1. CMS Innovation Center model participation by Model Type

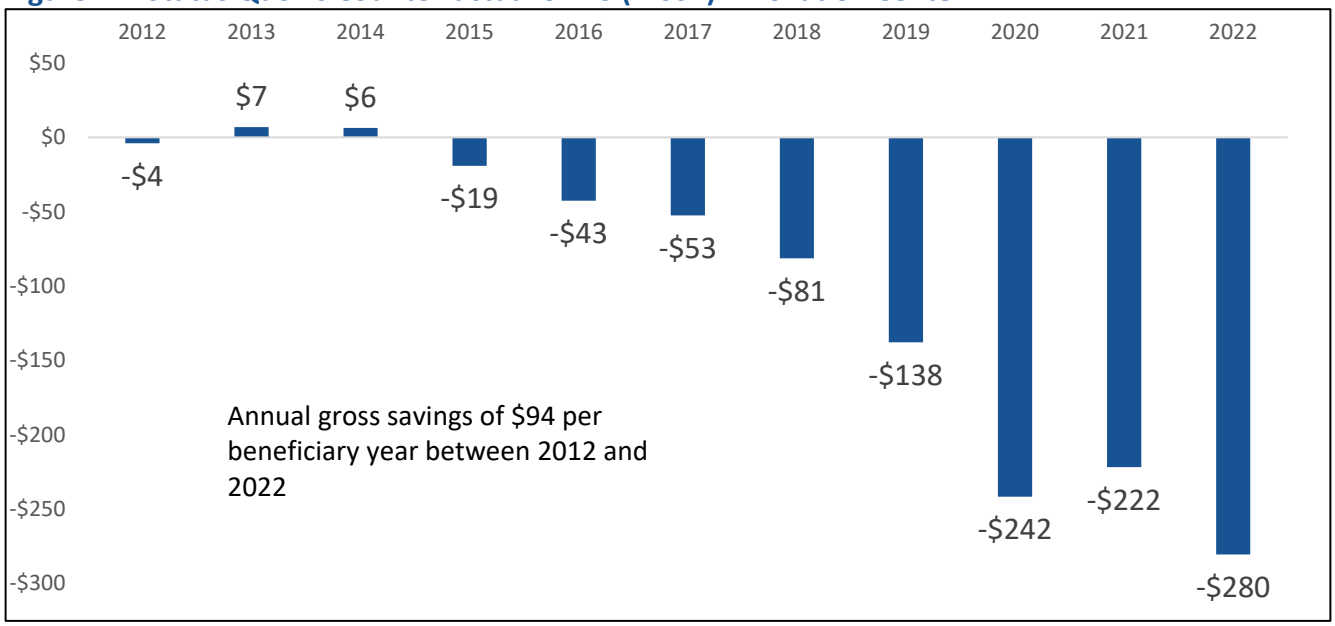
| | | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| FFS Beneficaires (AB) | | | | | | | | | | | | |
| MSSP ACO | | 1,608,755 | 3,468,982 | 5,125,265 | 7,008,455 | 7,627,638 | 9,681,664 | 10,972,993 | 11,871,349 | 11,409,246 | 10,899,056 | 10,821,674 |
| | Medicare Shared Savings Program (MSSP) | 1,608,755 | 3,468,982 | 5,125,265 | 7,008,455 | 7,627,638 | 8,777,131 | 9,966,393 | 10,854,109 | 10,405,691 | 9,922,776 | 9,809,695 |
| | MSSP and CPC+ | | | | | | 904,533 | 1,006,600 | 1,017,240 | 1,003,555 | 976,280 | 1,011,979 |
| CMMI ACO | | 697,708 | 820,660 | 728,077 | 702,160 | 992,065 | 1,320,950 | 1,728,981 | 1,491,554 | 1,118,135 | 1,429,360 | 1,976,468 |
| | Pioneer | 697,708 | 820,660 | 728,077 | 702,160 | 377,113 | | | | | | |
| | Next Generation | | | | | 614,952 | 1,320,950 | 1,728,981 | 1,491,554 | 1,118,135 | 1,055,558 | |
| | GPDC/ACO Realizing Equity, Access, and Community Health Model | | | | | | | | | | 373,802 | 1,976,468 |
| Advanced Primary Care | | 527,547 | 372,407 | 380,342 | 341,059 | 341,606 | 1,147,849 | 1,239,377 | 1,198,925 | 1,141,113 | 1,650,045 | 3,480,996 |
| | Physician Group Practice Transition Demonstration | 164,099 | | | | | | | | | | |
| | Multi-payer Advanced Primary Care Demonstrations | 29,824 | 32,155 | 32,799 | | | | | | | | |
| | Medicare Health Care Quality Demonstration – 646 Demo for North Carolina | 41,193 | | | | | | | | | | |
| | Comprehensive Primary Care Initiative (CPCI) | 292,431 | 340,252 | 347,543 | 341,059 | 341,606 | | | | | | |
| | Comprehensive Primary Care Plus (CPC+), non-SSP Participants | | | | | | 1,147,849 | 1,239,377 | 1,198,925 | 1,141,113 | 1,069,471 | 1,054,928 |
| | Primary Care First | | | | | | | | | | 580,574 | 2,426,068 |
| Maryland Global Payment | Maryland Total Cost of Care (MDTCOC): Primary Care Program (CMMI) | | | | | | | | 214,347 | 385,380 | 427,475 | 493,790 |
| Vermont Global Payment | Vermont All-Payer Model (CMMI) | | | | | | | | 54,512 | 49,819 | 53,631 | 62,025 |
| Chronic Conditions | | | | | 13,811 | 15,079 | 36,511 | 56,048 | 61,931 | 65,494 | 272,871 | 392,102 |
| | Comprehensive ESRD Care (CEC) | | | | 13,811 | 15,079 | 36,511 | 56,048 | 61,931 | 65,494 | 48,196 | 51,449 |
| | Kidney Care Choices | | | | | | | | | | 112,633 | 199,170 |
| | Value in Opioid Use Disorder Treatment Dem | | | | | | | | | | 3,346 | 4,007 |
| | ESRD Treatment Choices Model | | | | | | | | | | 108,696 | 137,476 |
| Other CMMI | | 135,722 | 171,942 | 322,611 | 365,223 | 256,522 | 131,345 | 38,874 | 42,218 | 43,375 | 40,706 | 53,350 |
| | Independence at Home Practice Demonstration | 6,142 | 10,077 | 11,856 | 11,806 | 12,102 | 11,287 | | 6,318 | 10,054 | 8,029 | 8,746 |
| | Medicare Medicaid Coordination Office (MMCO) Financial Alignment Demonstration (Duals) | | 24,743 | 44,291 | 54,188 | 60,111 | 74,533 | 38,874 | 35,900 | 33,321 | 32,677 | 44,604 |
| | Community Based Care Transition | 26,265 | 137,122 | 266,464 | 299,229 | 184,309 | 45,525 | | | | | |
| | Medicare Health Care Quality Demonstration – 646 Demo for Indiana | 103,315 | | | | | | | | | | |

## Figure A1. Status Quo vs Counterfactual of No CMS Innovation Center




**Notes:** Models with all covariates, year, and county fixed effects and CMS Innovation Center, MSSP and MA penetration interacted with year. Models exclude year interacted with Chronic Conditions.

## Figure A2. Status Quo vs Counterfactual of No (MSSP) Innovation Center




**Notes:** Models with all covariates, year, and county fixed effects and CMS Innovation Center, MSSP and MA penetration interacted with year

**Appendix Table A2: Penetration rate measures**

## County-level penetration measures

**(Only for FFS beneficiaries(Part AB)**

- CMMI penetration
- MSSP penetration

**Penetration Rate** = (Total # of bene-months in models)/(Total # of bene-months in FFS)

- Medicare Advantage penetration

**Penetration Rate** = (Total # of bene-months in MA)/(Total # of bene-months in MA+FFS)

## Appendix Table A3: Description of variables listed in Table 3

| Variable | Variable description |
|---|---|
| Inpatient stays | The total number of unique IP claims for a beneficiary |
| ER visits | The sum of observation and nonobservation visits for a beneficiary |
| Mortality | Indicator for whether a beneficiary died in the calendar year |
| Healthy days at home (HDAH) | Number of Days Alive - (Number of Days in IP+IRF+SNF+LTCH+ Hospice + Home Health) |
| TCM | The total number of claims lines with transitional care management (TCM) per 1000 Traditional Medicare beneficiaries. TCM claim lines identified using HCPCS code "99495" and "99496" |
| ACP | The total number of claim lines with advance care planning (ACP) per 1000 Traditional Medicare beneficiaries. ACP claim lines identified using HCPCS code "99497" and "99498" |

### Appendix Table A4: 19 Selected Innovation Center Models penetration rates

| | Average | p10 | p90 |
|---|---|---|---|
| 2012 | 3% | 0% | 12% |
| 2013 | 4% | 0% | 15% |
| 2014 | 4% | 0% | 12% |
| 2015 | 4% | 0% | 12% |
| 2016 | 5% | 0% | 15% |
| 2017 | 8% | 0% | 24% |
| 2018 | 9% | 0% | 28% |
| 2019 | 9% | 0% | 29% |
| 2020 | 9% | 0% | 29% |
| 2021 | 12% | 1% | 35% |
| 2022 | 20% | 2% | 57% |

**Notes:** Average= Mean penetration rate across all counties, p10 = Penetration rate at 10th percentile, Penetration rate at 90th percentile.

### Appendix Table A5: Medicare Shared Savings Program (MSSP)

| | Average | p10 | p90 |
|---|---|---|---|
| 2012 | 3% | 0% | 9% |
| 2013 | 11% | 0% | 27% |
| 2014 | 17% | 1% | 36% |
| 2015 | 23% | 1% | 47% |
| 2016 | 24% | 2% | 49% |
| 2017 | 30% | 4% | 59% |
| 2018 | 35% | 7% | 63% |
| 2019 | 36% | 7% | 65% |
| 2020 | 38% | 6% | 66% |
| 2021 | 38% | 6% | 65% |
| 2022 | 36% | 8% | 63% |

**Notes:** Average= Mean penetration rate across all counties, p10 = Penetration rate at 10th percentile, Penetration rate at 90th percentile

# APPENDIX B – Additional Explanation of Methods

Using a weighted (number of beneficiaries in the county) regression framework, for a given outcome, $Y$, for county $i$ in year $t$, we will relate the outcome to a vector of county characteristics. The county-level characteristics include race/ethnicity, gender, CCW chronic conditions, dual eligibility, number of primary care providers (PCP), number of non-PCP providers, CMS Innovation Center penetration rate, MSSP penetration rates and MA penetration rates. County-level CMS Innovation Center and MSSP penetration rates are calculated as (Total # of bene-months in models)/ (Total # of bene-months in Traditional Medicare) and MA penetration rates are calculated as Total # of bene-months in MA)/ (Total # of bene-months in Traditional Medicare & MA). All covariates are interacted with year, except for demographic variables, dual eligibility and urbanicity. The models also include county fixed effects to account for unobserved county characteristics. An important contribution of this modeling framework is including interactions of all time-varying variables with year indicators. This allows the relationship between time-varying variables in the model and a given outcome to vary over time. We also estimated models only with time varying covariates, year and county-fixed effects and interacting only year with CMS Innovation Center, MSSP and Medicare Advantage penetration rates.

The analysis will allow us to capture both direct effects of models – on the Medicare beneficiaries attributed to these models – as well as spillover effects on those not directly affected by the models. Because the proposed analytic framework will estimate many relationships, interpreting these coefficients directly would be challenging. Instead of doing so, we will construct a counterfactual assuming that penetration of Innovation Center models is set to zero for all years after 2012. Differences in predicted values of a given outcome will provide an estimated effect of Innovation Center or MSSP models that varies over time and that can be aggregated over the full time.

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