## TECHNICAL APPENDICES

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# Evaluation of the Vermont All-Payer Accountable Care Organization Model: 2018–2022


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# Appendix A. Glossary of Acronyms

**Appendix Exhibit A.1.** Glossary of Acronyms

| Acronym | Definition |
|---|---|
| ACH | Accountable Communities for Health |
| ACO | Accountable Care Organization |
| AHS | Vermont Agency for Human Services |
| AIPBP | All-Inclusive Population-Based Payment |
| AWV | Annual Wellness Visit |
| BCBSVT | Blue Cross and Blue Shield of Vermont |
| BY | Baseline Year |
| CAH | Critical Access Hospital |
| CAHPS | Consumer Assessment of Healthcare Providers and Systems |
| CHT | Community Health Team |
| Innovation Center | Center for Medicare & Medicaid Innovation |
| CMS | Centers for Medicare & Medicaid Services |
| COVID-19 | 2019 Novel Coronavirus |
| DID | Difference-In-Differences |
| DVHA | Department of Vermont Health Access |
| EB | Entropy Balancing |
| ED | Emergency Department |
| EHR | Electronic Health Record |
| ERISA | Employee Retirement Income Security Act |
| ESRD | End-Stage Renal Disease |
| FFS | Fee-for-Service |
| FQHC | Federally Qualified Health Center |
| GMCB | Green Mountain Care Board |
| HRSA | Health Resources and Services Administration |
| HSA | Health Service Area |
| MA | Medicare Advantage |
| MAPCP | Multi-Payer Advanced Primary Care Program |
| NGACO | Next Generation Accountable Care Organization |
| NPPES | National Plan and Provider Enumeration System |
| NPR | Net Patient Revenue |

| Acronym | Definition |
|---|---|
| PAC | Post-Acute Care |
| PBPY | Per Beneficiary Per Year |
| PCMH | Patient-Centered Medical Homes |
| PECOS | Provider Enrollment, Chain, and Ownership System |
| PHE | Public Health Emergency |
| PMPM | Per Member Per Month |
| PMPY | Per Member Per Year |
| PSM | Propensity Score Matching |
| PY | Performance Year |
| QEM | Qualified Evaluation and Management Visit |
| QHP | Qualified Health Plan |
| RHC | Rural Health Clinic |
| RQ | Research Question |
| RUCC | Rural-Urban Continuum Code |
| SASH | Support and Services at Home |
| SIM | State Innovation Model |
| SNF | Skilled Nursing Facility |
| SSP | Shared Savings Program |
| SUD | Substance Use Disorder |
| TCOC | Total Cost of Care |
| TIN | Tax Identification Number |
| T-MSIS | Transformed Medicaid Statistical Information System |
| UVM | University of Vermont |
| VBIP | Value-Based Incentive Payment |
| VBP | Value-Based Payment |
| VEHI | Vermont Education Health Initiative |
| VHCIP | Vermont Health Care Innovation Project |
| VTAPM | Vermont All-Payer Accountable Care Organization Model |
| ZCTA | Zip Code Tabulation Area |

# Appendix B. List of Evaluation Research Questions

The evaluation uses a mixed-methods approach involving both primary and secondary (structured and unstructured) data sources to assess how stakeholders have implemented the model, as well as the extent to which and the reasons why the model achieved its intended outcomes. Appendix Exhibit B.1 crosswalks the research questions for the evaluation with the conceptual model domains and lists data sources and analytic methods we use to address them.

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

| | Data Sources | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Primary | | Secondary | | | | | | | |
| Research Questions | Provider Survey | Interviews | Commercial Claims | VHCURES | Medicare FFS | CAHPS | Community and Publicly Available Data [a] | Model-Related Documents [b] | Analytic Approach | Addressed in Report |
| **Program design features** | | | | | | | | | | |
| 1. How do ACO program design features compare across payers and to other out-of-state federal and non-federal ACO programs? | | ● | | | | | | ● | Descriptive analysis; Thematic analysis; Triangulation of qualitative and programmatic data | First Evaluation Report |
| **Model participants and implementation partners** | | | | | | | | | | |
| 2. How did characteristics of commercial, Medicaid, and Medicare beneficiaries aligned with the ACO change as the statewide ACO scale increased? | | ● | ● | ● | ● | | ● | | Descriptive trend analysis; Thematic analysis to inform interpretation of findings | Third Evaluation Report |

| Research Questions | Data Sources: Primary: Provider Survey | Data Sources: Primary: Interviews | Data Sources: Secondary: Commercial Claims | Data Sources: Secondary: VHCURES | Data Sources: Secondary: Medicare FFS | Data Sources: Secondary: CAHPS | Data Sources: Secondary: Community and Publicly Available Data [a] | Data Sources: Secondary: Model-Related Documents [b] | Analytic Approach | Addressed in Report |
|---|---|---|---|---|---|---|---|---|---|---|
| **Implementation** | | | | | | | | | | |
| 3. How did state, ACO, and payers work together to reach the statewide ACO scale targets? What barriers did they encounter? | | ● | | | | | | ● | Thematic analysis | First Evaluation Report; Second Evaluation Report |
| 4. How did hospitals, community providers, the ACO, and the state collaborate to reach population-level health goals? | | ● | | | | | | ● | Thematic analysis | Chapter 3 |
| 5. How did the GMCB use its regulatory authority to influence model implementation? | | ● | | | | | | ● | Thematic analysis; Triangulation of qualitative and programmatic data | Chapter 4 |
| 6. What challenges did participating providers encounter? How do the model's key design features influence participating providers' care delivery transformations? | | ● | | | | | | | Thematic analysis | Chapter 4 |
| 7. How did program design features impact implementation at the community level? | | ● | | | | | | ● | Thematic analysis | Chapter 4 |

| Research Questions | Data Sources: Primary: Provider Survey | Primary: Interviews | Secondary: Commercial Claims | Secondary: VHCURES | Secondary: Medicare FFS | Secondary: CAHPS | Secondary: Community and Publicly Available Data [a] | Secondary: Model-Related Documents [b] | Analytic Approach | Addressed in Report |
|---|---|---|---|---|---|---|---|---|---|---|
| **Outcomes: Implementation effectiveness** | | | | | | | | | | |
| 9. How did ACO provider network for each payer evolve as the statewide ACO scale increased? | ● | ● | | | | | ● | | Descriptive analysis; Network analysis; Thematic analysis; Triangulation of quantitative and qualitative data | Chapter 1 |
| 10. What are participating and non-participating providers' impressions of the model? | ● | ● | | | | | | | Survey analysis; Thematic analysis; Triangulation of survey and qualitative data | Chapter 3; Second Evaluation Report |
| 11. Why did providers refuse or cease to contract with the ACO? | ● | ● | | | | | | | Survey analysis; Thematic analysis; Triangulation of survey and qualitative data | Second Evaluation Report |
| 12. What impact did the model have on the model-specific health care delivery system and monitoring measures?[1] | | ● | ● | | | ● | ● | | Descriptive analysis; Pre-post analysis | Chapter 3 |
| **Outcomes: Program effectiveness—population health** | | | | | | | | | | |
| 13. How did the model impact specific population health measures? | | ● | | | | | ● | | Synthetic control methods; Thematic analysis to inform interpretation of quantitative findings | Chapter 3 |

[1] See Section 7, "Statewide Health Outcomes and Quality of Care Targets," of the Vermont All-Payer Accountable Care Organization Model Agreement for the list of population-level health goals, health-care delivery system measures and targets, and process milestones.

| Research Questions | Data Sources: Primary: Provider Survey | Primary: Interviews | Secondary: Commercial Claims | Secondary: VHCURES | Secondary: Medicare FFS | Secondary: CAHPS | Secondary: Community and Publicly Available Data [a] | Secondary: Model-Related Documents [b] | Analytic Approach | Addressed in Report |
|---|---|---|---|---|---|---|---|---|---|---|
| **Outcomes: Program effectiveness—spending, utilization, cost of care** | | | | | | | | | | |
| 14. What impact did the model have on statewide Medicare and Medicaid, all-payer, and commercial insurance spending? | | ● | ● | ● | ● | | | | Descriptive analysis; DID with group-specific trends; Thematic analysis to inform interpretation of quantitative findings | Chapter 2 |
| 15. What impact did the model have on spending, utilization, and quality-of-care outcomes for Medicaid, Medicare, and commercial insurance all-payer ACO populations? | | ● | | ● | ● | | ● | ● | Descriptive analysis; DID with group-specific trends; Synthetic control methods; Thematic analysis to inform interpretation of quantitative findings | Chapters 2 & 3 |

a) American Community Survey; Medicare Geographic Variation; CMS Public Use File; Behavioral Risk Factor Surveillance System; Area Health Resources File; County Health Ranking Data; National Vital Statistics System.

b) Documents include ACO application; Vermont annual reports; Section 1115 waiver application; hospital and budget submissions and related documents; GMCB reports.

# Appendix C. Qualitative Methods and Analysis

This report draws on two qualitative data sources: (1) model documents and (2) interviews (45 to 60-minute interviews conducted in-person during site visits in Vermont and using videoconferencing software).

**Model Documents.** We conducted a standardized review of the model documentation including the state Model Agreement, federal communication, OneCare Vermont [OneCare] and hospital budgets and related documents, contracts, GMCB reports, and new articles. These documents informed key informant outreach, interview guide development, and findings.

**Interviews.** The purpose of the interviews was to obtain firsthand information about implementation of the All-Payer Model. The document review, in addition to input from the Innovation Center, GMCB, and OneCare, contributed to the creation of a list of initial key informants.

Between May and September 2023, the team conducted 50 interviews (23 in-person, 27 virtual) with 72 interviewees (32 in-person, 40 virtual). This included 12 interviews with state leaders and implementation partners (for instance, OneCare and the Blueprint for Health) and 58 community-level interviews with hospital leaders, staff, clinicians, community providers, and Blueprint for Health program managers.

The team developed semi-structured interview guides based on each category of key informants and tailored these interview guides in advance of each interview. Topics covered included changes implemented at the health system, practice, and community levels; awareness/understanding of the model; collaboration across the continuum of care; and benefits and challenges around model design and implementation.

A two- to three-person team conducted each interview. A senior member of the team led each discussion; the second person took detailed notes during each interview. Each interview was recorded with the participants' consent. The team developed a summary of each interview.

Once primary data was collected and transcribed, the qualitative team reviewed all transcripts for quality. This review process allowed us to extract themes and develop categories and their corresponding definitions to guide coding of data from interviews. These themes were used to create a code book based on an iterative review of the data that was further informed by several rounds of pilot coding. We used NVivo software (QSR International Pty Ltd., Melbourne, Australia) to code the interviews.

Analysis of qualitative data used a thematic approach. We coded data into categories based on the key evaluation domains—model design features, implementation, and outcomes. Our coding and analysis focused on identifying existing and emergent themes. Existing themes are topics derived from the study's research questions and categories. Emergent themes arise out of discussions with interviewees.

# Appendix D. Quantitative Methods and Analysis

In this section, we present additional information on the quantitative analytic approaches for Medicare and Medicaid analyses in this report, including data sources, definitions of the treatment and comparison groups for Medicare analyses, sampling methods used to construct the Medicare comparison pool, claims-based attribution algorithms used to identify the treatment and comparison groups for the Medicare analyses, definitions and operationalization of the claims-based outcome measures, and analytic approaches.

## Appendix D.1. Data Sources

**Appendix Exhibit D.1.1.** Data Sources for Quantitative Analyses

| Data | Years | Rationale | Source(s) |
|---|---|---|---|
| Medicare beneficiary and enrollment database and claims files | 2011–2022 | Identify health, cost, utilization, and quality outcomes for Medicare beneficiaries | CMS Virtual Research Data Center (VRDC) |
| Chronic Conditions Warehouse (CCW) Master Data Management Database | 2013–2022 | Identify beneficiary enrollment in Medicare ACOs and other CMS initiatives | CMS VRDC |
| Medicare Geographic Variation Public Use File | 2017–2022 | Identify Medicare utilization, spending, and provider characteristics at the county and state levels | CMS |
| NGACO and MSSP ACO provider lists | 2013–2022 | Identify participating and preferred clinicians to attribute beneficiaries; past experience in Medicare ACO of VTAPM providers | CMS VRDC |
| National Plan and Provider Enumeration System (NPPES) | 2022 | Identify provider specialty | CMS |
| OneCare provider lists | 2018–2022 | Identify VTAPM participating and preferred clinicians | CMS |
| Vermont Health Care Uniform Reporting and Evaluation System (VHCURES) | 2017–2021 | Identify health outcomes for Vermont Medicaid enrollees | VHCURES Research File |
| Medicare shared savings reports | 2013–2022 | Identify financial and quality results by PY for the Pioneer, Next Generation ACO, and Shared Savings Program Models. | CMS |
| American Community Survey (ACS) 1- and 5-year estimates | 2015–2022 | Measure demographics, health status, health care resources, and utilization at the county and state levels | U.S. Census Bureau |

| Data | Years | Rationale | Source(s) |
|---|---|---|---|
| Rural-Urban Continuum Codes | 2013 | Measure rurality | U.S. Department of Agriculture, Economic Research Service (ERS); HRSA |
| Area Health Resources Files (AHRF) | 2015–2022 | Identify number of active doctors, Medicare FFS beneficiaries, and hospital beds | HRSA |

# Appendix D.2. Treatment and Comparison Group Construction

In this report, we construct treatment and comparison groups for the Medicare ACO initiative as well as Medicare beneficiaries statewide (the Medicare Impact Analysis), along with a treatment group of Medicaid beneficiaries (the Medicaid Descriptive Analysis).

**Medicare Impact Analysis**. This analysis examines the impact of the VTAPM on total gross and net Medicare spending (presented in Chapter 2) and healthcare utilization and quality of care outcomes (presented in Chapter 3). The structure of our Medicare impact analysis reflects the VTAPM's multiple layers of accountability, with incentives focused both on the ACO's attributed population and Vermont's statewide Medicare population. For this reason, as we did in previous evaluation reports, we estimate the model's impact at two levels:

- **VTAPM Medicare ACO (ACO-Level) Analysis**: Is the VTAPM Medicare ACO initiative achieving spending, utilization, and quality-of-care goals for its attributed Medicare beneficiaries, compared to beneficiaries attributed to similar ACO models in other comparable states?
- **Vermont Medicare (State-Level) Analysis**: Is Vermont achieving spending, utilization, and quality-of-care goals for the Medicare beneficiary population statewide, compared to Medicare beneficiaries residing in comparable states?

In this report, we include the VTAPM Medicare ACO analysis in the main report; the Vermont Medicare analysis is included in the appendix. The treatment and comparison groups for the ACO- and state-level populations, as well as their rationales, are described in **Appendix Exhibit D.2.1**. While the model identifies attributed beneficiaries prospectively based on historical qualified evaluation and management (E&M) service utilization in prior years, our evaluation used a concurrent approach and identified beneficiaries attributed to the model based on qualified E&M utilization in the PY.

**Appendix Exhibit D.2.1.** Medicare Treatment and Comparison Group Definitions and Rationales

| | Definition | Rationale |
|---|---|---|
| | **VTAPM Medicare ACO Analysis** | |
| **Treatment** | The treatment group consists of 49,174 Medicare FFS beneficiaries residing in Vermont and receiving the plurality of their primary care services from model clinicians during the baseline years and PY 5 (2022). | To define the treatment group, our evaluation uses concurrent attribution—a method that attributes beneficiaries to VTAPM's clinicians based on their care-seeking patterns during the PY. We used a concurrent attribution approach because we hypothesize that the model's ACO initiatives will impact all Medicare beneficiaries—attributed and non-attributed—who receive a meaningful level of primary care services from the model clinicians. |
| **Comparison** | The comparison group is a representative, weighted sample of Medicare FFS beneficiaries who resided in the 26 comparison states, where those beneficiaries received the plurality of their primary care services from (that is, are concurrently attributed to) clinicians participating in Medicare SSP Track 1 and Basic A/B/C/D/E ACOs during the baseline and PYs. | Because OneCare was a Medicare SSP Track 1 ACO during the baseline period, we hypothesize that the ACO would have remained in the Medicare SSP absent the VTAPM. |
| | **Vermont Medicare Analysis** | |
| **Treatment** | The treatment group consists of 76,511 eligible Vermont Medicare FFS beneficiaries who received the majority (≥50%) of their primary care services within the state during the baseline and PY 5 (2022). | We assess outcomes for all eligible Vermont Medicare beneficiaries because the model's population health initiatives and delivery system reform will impact all Vermonters, including those not attributed to model clinicians. |
| **Comparison** | The comparison group is a representative, weighted sample of Medicare FFS beneficiaries residing in the 26 comparison states, where those beneficiaries received the majority (≥50%) of their primary care services within the same comparison state during the baseline and PYs. | Because the model is expected to have statewide reach, beneficiaries in other states were used for the comparison group. |

NOTE: The State and ACO-level analyses use different attribution methodologies. The ACO-level analysis is based on the VTAPM Medicare ACO's attribution methodology. For the ACO-level analysis, we attributed Medicare beneficiaries to the treatment group if they received the plurality of primary care services from participating providers. For the state-level analysis, we developed an attribution methodology that would facilitate assessment of VTAPM's impact on Medicare beneficiaries who were Vermont residents and received most of their care within the state. Through empirical investigation, we determined that the threshold of "receiving the majority of primary care services within the state from any qualified provider" was appropriate for capturing the statewide impact of the VTAPM Model on the Medicare population. Using a lower threshold for the state-level analysis would have resulted in the inclusion of Vermont Medicare beneficiaries who received a significant amount of care from other non-neighboring states.

Because of the different comparison groups used in the ACO- and state-level analyses, findings for beneficiaries attributed to the Medicare ACO should not be directly compared to the findings for Vermont Medicare beneficiaries. We used a four-step approach to construct the treatment and comparison groups for the two analyses, summarized below.

## Stage 1: Identification of Comparison States

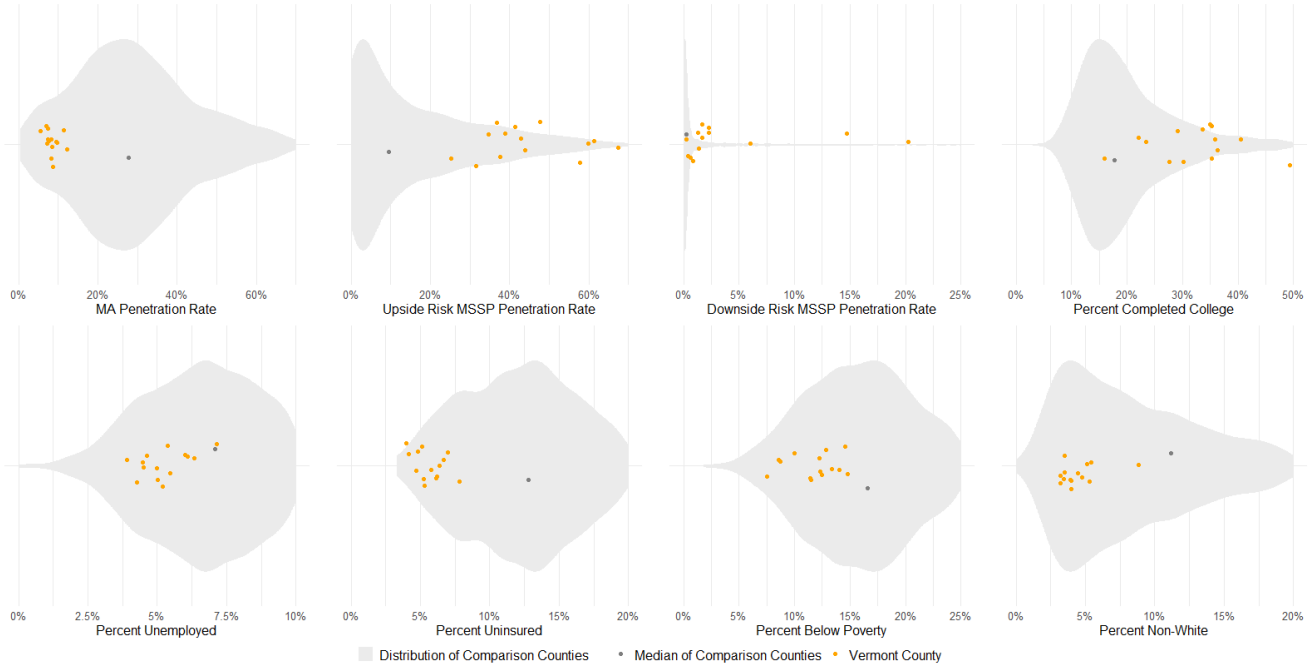
Because the VTAPM aims to improve outcomes statewide by redesigning the care delivery system through an all-payer design implemented across the entire state, a within-state comparison group was infeasible. Therefore, we drew the comparison group from 26 states with similar histories of health reform initiatives relevant to the evolution of the VTAPM, specifically primary care medical home (PCMH) initiatives formally recognized by the National Committee for Quality Assurance and multi-payer CMS reform initiatives (such as SIM, MAPCP). We included similar health care reform history as a criterion for selecting comparison group states because we hypothesized that Vermont's focus on improving population health and health care reform during the baseline period was an important factor in the model's development, as well as that states with similar reform efforts as Vermont's may be more comparable in baseline period trends. These initiatives may also have longer-term effects that extend into the VTAPM performance period; we aim to account for this by choosing comparison states that also have similar trailing effects of previous health reform efforts. To avoid contamination of model impacts, we excluded any states that share a boundary with Vermont. Additionally, we excluded Maryland because it was also currently implementing Innovation Center-funded all-payer reform initiatives. **Appendix Exhibit D.2.2** lists the 26 states selected for inclusion in the comparison group.

**Appendix Exhibit D.2.2.** Medicare Comparison Group States

| | | |
|---|---|---|
| Arkansas | Iowa | Oregon |
| California | Louisiana | Pennsylvania |
| Colorado | Maine | Rhode Island |
| Connecticut | Michigan | South Carolina |
| Delaware | Minnesota | Tennessee |
| Florida | Missouri | Texas |
| Georgia | New Mexico | Washington |
| Hawaii | North Carolina | Wyoming |
| Idaho | Ohio | |

After selecting comparison states based on similar history of health reform initiatives as described above, we observed meaningful differences in sociodemographic and market characteristics between Vermont and comparison states, using 2018 data from the American Community Survey (**Appendix Exhibit D.2.3**). Notably, Vermont's rates of Medicare Advantage and Medicare Shared Savings Program (both upside and downside risk) penetration are distinct from the rates in comparison states. This aligns with our finding that Vermont has a broader history of health care reform initiatives than most states, including those in our comparison group.

**Appendix Exhibit D.2.3.** Vermont's Sociodemographic and Market Characteristics Differ Distinctly from Comparison States'




SOURCE: 2018 5-year estimates from American Community Survey.

## Stage 2: Comparison Pool Sampling Methodology

We considered all eligible beneficiaries residing within each of the comparison states for inclusion in the comparison pool. To minimize computational burden involved in using a sizable comparison pool, we used a stratified, random sample of beneficiaries. Over 19 million eligible Medicare FFS beneficiaries (95 million beneficiary-years) resided in the comparison states during the analytic period. Conducting impact analyses on a sample exceeding 10 million beneficiaries per year is computationally challenging and would call for analytical resources exceeding those allocated for this evaluation. Therefore, as shown in **Appendix Exhibit D.2.4**, we implemented the following steps to draw a stratified, random sample of beneficiaries from the 26 comparison states to create the comparison pool.

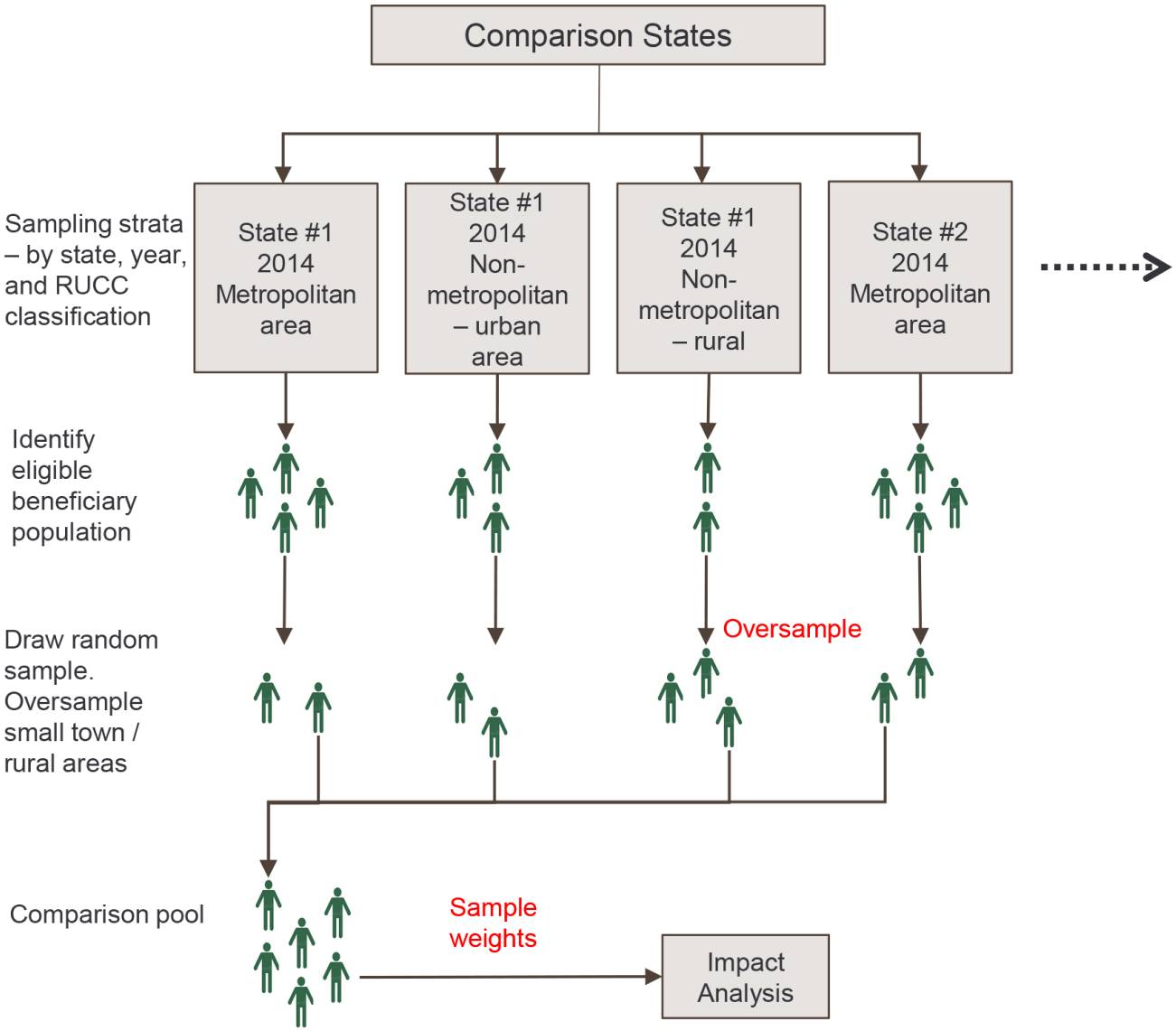
**Step 1:** Stratify all Medicare beneficiaries residing in the comparison states by state of residence, year, and rurality (based on the three Rural-Urban Continuum Code [RUCC] classifications: metropolitan; non-metropolitan – urban; and non-metropolitan – rural).

**Step 2:** Select beneficiaries who meet the insurance coverage (continuous FFS coverage and no MA coverage) attribution criteria.

**Step 3:** Oversample beneficiaries who reside in rural areas by including all beneficiaries who reside in counties with a small town/rural RUCC designation. Draw a random sample of eligible beneficiaries from counties with a metropolitan or non-metropolitan RUCC designation. The sample size allocation for each stratum is set to match Vermont's population breakdown by RUCC.

**Step 4:** Generate sample weights to ensure that the comparison pool sample is representative of the eligible population residing in the comparison states. Incorporate sampling weights in the estimation of the model's impacts.

**Appendix Exhibit D.2.4.** Medicare Comparison Pool Sampling Design




As shown in **Appendix Exhibit D.2.5**, this approach yielded a comparison pool sample that was representative of comparison states with a computationally manageable sample size of 19 million beneficiary-years.

**Appendix Exhibit D.2.5.** Medicare Beneficiaries in Comparison Pool Sample

| Year | RUCC Designation | Beneficiaries in Vermont Counties | | Beneficiaries in Comparison Pool Counties | | Stratified, Random Sample of Comparison Pool Beneficiaries | |
|---|---|---|---|---|---|---|---|
| | | N | % | N | % | N | % |
| 2014 | Metro | 25,016 | 23.62% | 18,840,032 | 78.94% | 3,248,236 | 27.40% |
| 2014 | Nonmetro - Urban | 66,750 | 63.04% | | 19.06% | | 60.94% |
| 2014 | Nonmetro - Rural | 14,124 | 13.34% | | 2.01% | | 11.65% |
| 2015 | Metro | 25,283 | 23.27% | 18,856,517 | 78.97% | 3,232,787 | 27.15% |
| 2015 | Nonmetro - Urban | 68,479 | 63.03% | | 19.03% | | 61.19% |
| 2015 | Nonmetro - Rural | 14,876 | 13.69% | | 2.00% | | 11.66% |
| 2016 | Metro | 25,808 | 23.19% | 19,170,616 | 79.08% | 3,269,451 | 27.19% |
| 2016 | Nonmetro - Urban | 69,840 | 62.75% | | 18.95% | | 61.24% |
| 2016 | Nonmetro - Rural | 15,643 | 14.06% | | 1.97% | | 11.57% |
| 2017 | Metro | 26,202 | 23.32% | 19,194,282 | 79.10% | 3,273,491 | 27.35% |
| 2017 | Nonmetro - Urban | 70,374 | 62.64% | | 18.93% | | 61.10% |
| 2017 | Nonmetro - Rural | 15,766 | 14.03% | | 1.97% | | 11.55% |
| 2018 | Metro | 27,055 | 23.77% | 18,920,027 | 79.17% | 3,237,396 | 27.78% |
| 2018 | Nonmetro - Urban | 71,042 | 62.42% | | 18.86% | | 60.71% |
| 2018 | Nonmetro - Rural | 15,717 | 13.81% | | 1.97% | | 11.50% |
| 2019 | Metro | 27,521 | 24.10% | 18,835,196 | 79.25% | 3,237,040 | 28.05% |
| 2019 | Nonmetro - Urban | 71,035 | 62.21% | | 18.77% | | 60.45% |
| 2019 | Nonmetro - Rural | 15,629 | 13.69% | | 1.98% | | 11.50% |
| 2020 | Metro | 27,836 | 24.36% | 18,409,687 | 79.46% | 3,164,557 | 28.35% |
| 2020 | Nonmetro - Urban | 70,971 | 62.11% | | 18.57% | | 60.21% |
| 2020 | Nonmetro - Rural | 15,452 | 13.52% | | 1.97% | | 11.44% |
| 2021 | Metro | 26,348 | 24.14% | 17,597,460 | 79.69% | 3,020,257 | 28.13% |
| 2021 | Nonmetro - Urban | 68,303 | 62.58% | | 18.36% | | 60.49% |
| 2021 | Nonmetro - Rural | 14,501 | 13.29% | | 1.95% | | 11.38% |
| 2022 | Metro | 24,685 | 24.59% | 16,894,980 | 80.00% | 2,898,671 | 28.67% |
| 2022 | Nonmetro - Urban | 62,533 | 62.30% | | 18.07% | | 60.05% |
| 2022 | Nonmetro - Rural | 13,153 | 13.10% | | 1.94% | | 11.28% |

NOTE: The breakdown by RUCC designation for the comparison pool sample does not exactly match Vermont's proportions in this Exhibit because we applied the stratification within each of the 26 comparison states.

- **Lack of covariate balance on area-level characteristics.** As noted above, Vermont had a significantly greater upside-risk Medicare SSP ACO penetration rate and a lower MA penetration rate than comparison states during the baseline period (**Exhibit D.2.3**). The MA penetration rate in Vermont was significantly lower than comparison states (9% versus 26%), and the ACO penetration rate was significantly higher than comparison states (48% versus 22%). Given that magnitude of difference, we were unable to achieve balance on these characteristics using the EB weights. Because providers in Vermont were more likely to have experience with upside-risk Medicare ACO contracts, certain differences in outcomes between treatment and comparison

groups could be attributed to varied experiences with these contracts, in addition to impacts attributed to the VTAPM. For the ACO-level analysis, providers' differing levels of experience with these contracts are mitigated to some extent because the comparison group was limited to Medicare beneficiaries attributed to Basic Track Level A/B/C/D/E Medicare SSP ACO providers.

- **Influence of outlier weights.** Achieving balance on most market- and beneficiary-level covariates meant that a small proportion of beneficiaries with large EB weights comprised a large proportion of the weighted comparison group. A small proportion of beneficiaries in comparison states were similar to Vermonters on observed beneficiary-level characteristics and resided in areas with market-level characteristics similar to Vermont. For example, in the ACO-level analysis in PY 5 (2022), 1% of beneficiaries of SSP providers in comparison states accounted for 35% of the weighted comparison group. Few regions outside Vermont have identical market-level demand and supply characteristics.[2]
- **Magnitude of the stated impacts was sensitive to how we defined the baseline period.** Because PY 0 (2017) is considered a "ramp-up" period during which the model design was being finalized, we defined the baseline period as 2014–2016. Using our flexible DID framework, we adjusted for incremental differences between Vermont and the comparison group's annual Medicare spending trends in the baseline period. Because our estimate of the baseline period includes only three time points (2014–2016), there may be uncertainty associated with our estimate of the group-specific baseline trends. To assess the robustness of the impact estimates to our assumptions about the group-specific baseline trends, we included PY 0 (2017) as the fourth baseline year (BY). Inclusion of PY 0 (2017) in the baseline period *lowered* Vermont's incremental annual Medicare spending trend in the baseline period relative to the comparison group's, while its exclusion *increased* Vermont's incremental annual Medicare spending trend in the baseline period over the comparison group. In our main analyses, Vermont's incremental annual spending trend in the baseline period was influenced by a spike in the state's Medicare spending in calendar year (CY) 2015. Including PY 0 (2017) in the baseline period in sensitivity checks mitigated the CY 2015 spending spike's influence on the stated impacts (see **Exhibits D.6.1** and **D.6.2**). However, given that PY 0 (2017) saw the ramp-up of the Medicare ACO initiative in the state, we excluded it from the baseline period for our main findings. Overall, across the different baseline approaches, results for PY 5 consistently showed reductions in Medicare spending, although the reductions were not significant and the magnitude of the reduction varied. In the sections below, we present findings from this sensitivity assessment alongside the main findings to convey the uncertainty associated with the magnitudes of the stated impacts.
- **Potential of delayed impacts of other Vermont health reform efforts.** The VTAPM builds on a history of health reform efforts in Vermont spanning the last two decades. Many of the initiatives overlapped, spanned multiple payers, and had goals similar to those of the VTAPM around improving the health of Vermonters through delivery system reform and financial incentives. Because of this, findings may also reflect delayed impacts from other health reform initiatives in Vermont. To partially mitigate this potential source of bias, we selected comparison states with similar histories of health reform, specifically PCMH and multi-payer reform initiatives.

[2] We observed the same issue of high outlier weights in each iteration of our comparison group, further reinforcing the fact that Vermont's market- and beneficiary-level characteristics are unique among states and that it is likely that no comparison group would be able to mitigate those differences entirely.

## Stage 3: Claims-Based Attribution to Treatment and Comparison Groups

Below, we describe the claims analysis steps for attributing Medicare beneficiaries to the state- and ACO-level treatment and comparison groups.

***State-Level Attribution.*** In this section, we describe the claims-based attribution logic employed to construct the state-level treatment and comparison groups. **Appendix Exhibit D.2.6** presents the step-down counts associated with the state-level attribution criteria.

**Step 1.** We used the 2014–2022 Medicare Beneficiary Summary File (MBSF) Base segments to identify beneficiaries with the following enrollment and geography inclusion criteria:

- Covered by Medicare Parts A and B throughout performance period or until death
- No months of MA or other Medicare-managed care plan (Part C)
- No months of coverage where Medicare is the secondary payer
- Reside in Vermont or an identified comparison county
- Have at least one paid QEM claim during the alignment period

**Step 2.** For the eligible beneficiaries identified in Step 1, we extracted 2014–2022 Outpatient header and service line final paid claims submitted by FQHCs, RHCs, or CAHs[3] with a claims processing date on or before March 31 of the following year. We retained the claims rendered by an attending physician who billed using the eligible provider specialty codes.[4]

**Step 3.** We identified Outpatient service line claims associated with the Outpatient header claims selected in Step 2 and retained the claims that had a Healthcare Common Procedure Coding System (HCPCS) code that qualified as an eligible QEM[5] and had an allowed charge greater than 0. For CAHs, the revenue center code must also be eligible.

**Step 4.** For the eligible beneficiaries identified in Step 1, we extracted 2014–2022 Carrier service line final paid claims with a claims processing date on or before March 31 of the following year and a HCPCS code that qualitied as a QEM. We retained claims that included an eligible provider specialty code.

**Step 5.** We retained the provider ID (including TIN, NPI, and CCN) and allowable charge fields in the Outpatient and Carrier claims and merged both claims files to create an analytic dataset. Next, we calculated the total allowed charges for each beneficiary in each BY (2014–2016) and PY (2017–2022). Finally, we identified claims with a provider specialty code associated with primary care practice specialty and calculated the total allowed charges for each beneficiary in each BY (2014–2016) and PY (2017–2022). If the proportion of total allowed charges billed by clinicians with a primary care specialty code exceeded 10% of total allowed charges during a given BY or PY, the beneficiary was attributed to the state-level treatment and comparison groups through their primary care clinicians in Step 6. All other beneficiaries were attributed to the state-level treatment and

[3] FQHCs, RHCs, and CAHs were identified based on the billing codes 77, 71, and 85, respectively, on outpatient claims.

[4] Primary care clinicians 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] Qualified evaluation and management (E&M) codes are 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, and G0439.

comparison groups through their specialists in the next step. Primary care specialists are given preference, and ties are broken by the date of the claim.

**Step 6.** If the proportion of total allowed charges for QEM services billed by primary care clinicians exceeded 10%, we retained QEM service claims billed by primary care clinicians and excluded QEM service claims billed by other clinicians. Next, we identified QEM service claims rendered within the state in which the beneficiary resided during the calendar year. For the treatment group, we also identified QEM service claims rendered by VTAPM participants. If the proportion of total QEM service claims rendered within the state of residence (or by VTAPM participants, in the case of the treatment group) exceeded 50%, the beneficiary was attributed to the state-level treatment or comparison group. If the total allowed charges for QEM services billed by primary care clinicians did not exceed 10%, we retained QEM service claims billed by eligible specialists and applied the same attribution logic described above to attribute beneficiaries to the state-level treatment and comparison groups.

**Appendix Exhibit D.2.6.** PY 5 Medicare State-Level Attribution Step-Down Table

| Attribution Criteria | Description | Number of Beneficiaries | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | BY 3 (2014) | BY 2 (2015) | BY 1 (2016) | PY 0 (2017) | PY 1 (2018) | PY 2 (2019) | PY 3 (2020) | PY 4 (2021) | PY 5 (2022) |
| **TREATMENT GROUP** | | | | | | | | | | |
| Geographic & Coverage Criteria | Reside in Vermont (based on MBSF) and continuously covered under both Parts A & B throughout the CY or until death and zero months of MA coverage and zero months of Medicare as a secondary payer coverage | 104,253 | 107,070 | 109,699 | 110,740 | 112,274 | 112,622 | 112,902 | 107,784 | 99,293 |
| Claims Attribution Criteria | Receive any QEM from eligible clinicians | 90,818 | 91,041 | 94,350 | 95,269 | 95,982 | 96,421 | 97,883 | 95,415 | 87,706 |
| | **Receive majority of QEMs within Vermont or from OneCare participants** | **80,094** | **79,612** | **82,701** | **83,298** | **83,691** | **83,894** | **86,442** | **84,308** | **77,214** |
| | Receive at least 10% of allowed charges for QEMs from eligible PCPs | 78,027 | 76,995 | 80,343 | 80,828 | 81,001 | 81,045 | 84,530 | 82,852 | 75,930 |
| | Receive less than 10% of allowed charges for QEMs from eligible PCPs (that is, specialist-aligned) | 2,067 | 2,617 | 2,358 | 2,470 | 2,690 | 2,789 | 1,912 | 1,456 | 1,284 |
| **COMPARISON GROUP** | | | | | | | | | | |
| Geographic & Coverage Criteria | Reside in comparison state (based on MBSF) and continuously covered under both Parts A & B throughout the CY or until death and zero months of MA coverage and zero months of Medicare as a secondary payer coverage | 3,162,032 | 3,148,360 | 3,184,526 | 3,189,196 | 3,154,307 | 3,154,048 | 3,089,278 | 2,949,309 | 2,843,544 |
| | Receive any QEM from eligible clinicians | 2,677,442 | 2,642,966 | 2,746,192 | 2,754,943 | 2,723,009 | 2,725,962 | 2,668,411 | 2,583,676 | 2,503,347 |

| Attribution Criteria | Description | Number of Beneficiaries | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | BY 3 (2014) | BY 2 (2015) | BY 1 (2016) | PY 0 (2017) | PY 1 (2018) | PY 2 (2019) | PY 3 (2020) | PY 4 (2021) | PY 5 (2022) |
| Claims Attribution Criteria | **Receive majority of QEMs within comparison state** | **2,549,976** | **2,511,988** | **2,619,549** | **2,627,992** | **2,596,902** | **2,597,217** | **2,546,893** | **2,463,420** | **2,385,866** |
| | Receive at least 10% of allowed charges for QEMs from eligible PCPs | 2,400,857 | 2,364,665 | 2,512,272 | 2,527,660 | 2,502,689 | 2,507,653 | 2,469,672 | 2,400,826 | 2,331,220 |
| | Receive less than 10% of allowed charges for QEMs from eligible PCPs (that is, specialist-aligned) | 148,990 | 147,167 | 107,110 | 100,157 | 94,021 | 89,382 | 77,095 | 62,424 | 54,460 |

***ACO-Level Attribution.*** In this section, we describe the claims-based attribution logic employed to construct the ACO and comparison groups. The model's participant list for PY 5 was used to identify practices participating in the VTAPM. **Appendix Exhibit D.2.7** summarizes the contents of the participation lists. The CY 2022 Medicare SSP Track 1 and Basic Track Levels A/B/C/D/E ACO participant list were used to identify the comparison group practices. We limited comparison group participants to those who provided services within the comparison states. The TIN and CMS Certification Number (CCN) were used to identify bills submitted by the identified practices.[6] The claims-based attribution logic used paid QEM service claims submitted by clinicians within the participating practices using the eligible specialty codes.[7] Attribution for the comparison group in each cohort mirrored the approach used for the treatment group. We used the same HCPCS and specialty codes[8] that the model used to attribute beneficiaries to the VTAPM, which included eight additional telehealth-specific codes added to the previous year's list, to align with the updated Medicare coverage for telehealth visits implemented in March 2020.[9]

**Appendix Exhibit D.2.7.** VTAPM Medicare ACO Treatment and Comparison Group Participants

| | | PY 1 | | PY 2 | | PY 3 | | PY 4 | | PY 5 | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | CCNs | TINs | CCNs | TINs | CCNs | TINs | CCNs | TINs | CCNs | TINs |
| **Treatment Group** | VTAPM Participants | 11 | 22 | 18 | 36 | 12 | 37 | 19 | 32 | 22 | 59 |
| **Comparison Group** | MSSP Basic Track Level A/B/C/D/E ACO Participants Providing Services in the Comparison States | 789 | 1,631 | 1,383 | 4,812 | 1,833 | 4,856 | 2,034 | 4,719 | 2,197 | 4,721 |

NOTE: CCN is CMS Certification Number; TIN is Taxpayer Identification Number.

Below, we describe the claims analysis steps for attributing beneficiaries to the ACO-level treatment and comparison groups. **Appendix Exhibit D.2.8** presents the step-down counts associated with the state-level attribution criteria.

**Steps 1 through 5.** The first five steps of the ACO-level claims-based attribution logic are the same as for the state-level analysis described in the previous section.

[6] FQHCs, RHCs, and CAHs were identified based on billing codes 77, 71, and 85, respectively, on outpatient claims. Clinicians billing through CAHs included those who receive payment from Medicare through the optional payment method, where the CAH bills for facility and professional outpatient services to Medicare when physicians or clinicians reassign billing rights to them.

[7] Primary care clinicians 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.

[8] These eight Healthcare Common Procedure Coding System (HCPCS) codes are: 99421-99423 (online digital E&M visit for an established patient, varying times); 99441-99443 (phone E&M visit with a physician or other qualified health professional, varying times); G2010 (remote evaluation of recorded video and/or images); and G2012 (5–10-minute communication using a technology-based service).

[9] Centers for Medicare & Medicaid Services. (2020). COVID-19 Emergency Declaration Blanket Waivers for Health Care Providers. https://www.cms.gov/files/document/summary-covid-19-emergency-declaration-waivers.pdf

**Step 6.** If the proportion of total allowed charges for QEM services billed by primary care clinicians exceeded 10%, we retained QEM service claims billed by primary care clinicians and excluded QEM service claims billed by other clinicians. Next, we identified the practice that was responsible for providing the plurality of QEM service claims rendered by eligible primary care specialists during each BY and PY. For the treatment pool beneficiaries, if the identified practice was a VTAPM participant, we attributed the beneficiary to the treatment group. For the comparison pool beneficiaries, if the practice was a Medicare SSP Track 1 participant in a PY, we attributed the beneficiary to the comparison group for that respective PY. If the total allowed charges for QEM services billed by primary care clinicians did not exceed 10%, we retained QEM service claims billed by eligible specialists and applied the same attribution logic described above to attribute beneficiaries to the ACO-level treatment and comparison groups.

**Appendix Exhibit D.2.8.** PY 5 Medicare ACO-Level Attribution Step-Down Table

| Attribution Criteria | Description | Number of Beneficiaries | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | BY 3 (2014) | BY 2 (2015) | BY 1 (2016) | PY 0 (2017) | PY 1 (2018) | PY 2 (2019) | PY 3 (2020) | PY 4 (2021) | PY 5 (2022) |
| **TREATMENT GROUP** | | | | | | | | | | |
| Geographic & Coverage Criteria | Reside in Vermont (based on MBSF) and continuously covered under both Parts A & B throughout the CY or until death and zero months of MA coverage and zero months of Medicare as a secondary payer coverage | 104,253 | 107,070 | 109,699 | 110,740 | 112,274 | 112,622 | 112,902 | 107,784 | 99,293 |
| Claims Attribution Criteria | Receive any QEM from eligible clinicians | 88,777 | 91,704 | 95,913 | 97,486 | 98,737 | 99,457 | 96,508 | 93,731 | 86,199 |
| | **Receive plurality of QEMs from OneCare participants** | **45,961** | **48,648** | **51,888** | **53,984** | **56,309** | **57,329** | **55,454** | **53,909** | **49,643** |
| | Receive at least 10% of allowed charges for QEMs from eligible PCPs | 44,808 | 47,658 | 51,000 | 53,223 | 55,551 | 56,595 | 54,402 | 53,024 | 48,864 |
| | Receive <10% of allowed charges for QEMs from eligible PCPs (that is, specialist-aligned) | 1,153 | 990 | 888 | 761 | 758 | 734 | 1,052 | 885 | 779 |
| **COMPARISON GROUP** | | | | | | | | | | |
| Geographic & Coverage Criteria | Reside in comparison state (based on MBSF) and continuously covered under both Parts A & B throughout the CY or until death and zero months of MA coverage and zero months of Medicare as a secondary payer coverage | 3,162,032 | 3,148,360 | 3,184,526 | 3,189,196 | 3,154,307 | 3,154,048 | 3,089,278 | 2,949,309 | 2,843,544 |
| | Receive any QEM from eligible providers | 2,535,908 | 2,532,726 | 2,700,098 | 2,722,823 | 2,703,048 | 2,717,181 | 2,605,261 | 2,526,011 | 2,454,575 |

| Attribution Criteria | Description | Number of Beneficiaries | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | BY 3 (2014) | BY 2 (2015) | BY 1 (2016) | PY 0 (2017) | PY 1 (2018) | PY 2 (2019) | PY 3 (2020) | PY 4 (2021) | PY 5 (2022) |
| Claims Attribution Criteria | **Receive plurality of QEMs from CY 2021 Track 1 or Basic A/B/C/D/E MSSP participants** | **596,559** | **623,380** | **686,526** | **728,436** | **760,726** | **791,649** | **777,549** | **764,262** | **733,752** |
| | Receive at least 10% of allowed charges for QEMs from eligible PCPs | 571,481 | 598,672 | 670,372 | 713,057 | 746,006 | 777,432 | 761,972 | 751,412 | 722,584 |
| | Receive <10% of allowed charges for QEMs from eligible PCPs (that is, specialist-aligned) | 25,078 | 24,708 | 16,154 | 15,379 | 14,720 | 14,217 | 15,577 | 12,850 | 11,168 |

## Stage 4: Weighting Comparison Beneficiaries Using Entropy Balancing

After selecting the treatment and comparison beneficiaries (Step 3), we used the Stata package *ebalance*[10] to weight comparison beneficiaries with entropy balancing (EB) methods. The EB approach ensured that the comparison group beneficiaries, on average, resided in regions similar to Vermont and were similar to those Vermonters on observed characteristics.[11] Beneficiaries were balanced using individual-level (sociodemographic and health) and area-level (sociodemographic and health care market) characteristics. The EB approach balanced the means and distributions of observed characteristics across treatment and comparison groups; see **Appendix Exhibits D.2.9-D.2.13** and **Appendix Exhibits D.2.14-D.2.18** for balancing statistics before and after EB weights were applied for the ACO- and state-level analyses, respectively.

[10] Hainmueller J, Xu Y. Ebalance: A Stata Package for Entropy Balancing. J Stat Software. 2013;54(7). Available at SSRN: https://ssrn.com/abstract=1943090 or http://dx.doi.org/10.2139/ssrn.1943090

[11] Hainmueller J. Entropy Balancing for Causal Effects: A Multivariate Reweighting Method to Produce Balanced Samples in Observational Studies. Political Analysis. 2012;20(1):25-46. doi:10.1093/pan/mpr025

**Appendix Exhibit D.2.9.** Medicare ACO-Level Covariate Balance: Area-Level Sociodemographic and Market Characteristics

| | BY 3 (2014) | | BY 2 (2015) | | BY 1 (2016) | | PY 5 (2022) | |
|---|---|---|---|---|---|---|---|---|
| | Unweighted | Weighted | Unweighted | Weighted | Unweighted | Weighted | Unweighted | Weighted |
| Downside-Risk MSSP Rate | 0.3670 | -0.1749 | 0.3941 | -0.2308 | 0.0903 | -0.1807 | 0.0766 | -0.1462 |
| Upside-Risk MSSP Rate | 3.7826 | 3.4525 | 3.1262 | 2.9911 | 2.3320 | 2.1472 | 2.3889 | 2.3731 |
| # of Active MDs per 100K | 0.8869 | -0.0001 | 0.8926 | 0.0000 | 0.9103 | 0.0000 | 0.9092 | 0.0000 |
| # Health Centers per 100K | -0.3274 | 0.0000 | -0.2955 | 0.0000 | -0.3510 | 0.0000 | -0.2902 | 0.0000 |
| High School Completion Rate | 1.4770 | 0.0001 | 1.4674 | 0.0001 | 1.4433 | 0.0001 | 1.3506 | 0.0001 |
| # Hospital Beds per 100K | -0.1991 | -0.0001 | -0.1869 | 0.0000 | -0.0866 | 0.0000 | -0.0811 | 0.0000 |
| Medicare Advantage Rate | -17.5972 | -18.4201 | -14.8617 | -15.0402 | -13.9098 | -14.1674 | -14.0263 | -14.1498 |
| Median Household Income | 1.2912 | 0.0000 | 1.2722 | 0.0000 | 1.2901 | 0.0001 | 1.2017 | 0.0000 |
| # Non-Physician PCPs per 100K | 1.0927 | 0.0000 | 1.1300 | 0.0000 | 1.2004 | 0.0000 | 1.1970 | 0.0000 |
| # PCPs per 100K | 1.2750 | 0.0000 | 1.2621 | 0.0001 | 1.2745 | 0.0000 | 1.2282 | 0.0000 |
| Rurality | 0.0012 | 0.0001 | 0.0220 | 0.0001 | -0.0348 | 0.0001 | -0.1121 | 0.0001 |
| College Completion Rate | 1.1904 | 0.2281 | 1.1863 | 0.2271 | 1.1904 | 0.2420 | 1.0979 | 0.1257 |
| % Below Poverty Line | -0.9158 | 0.0151 | -0.9062 | 0.0206 | -0.8992 | 0.0155 | -0.8585 | -0.0525 |
| Unemployment Rate | -1.3544 | -0.4905 | -1.3559 | -0.5100 | -1.3614 | -0.5126 | -1.2968 | -0.5582 |
| % Uninsured | -3.7398 | -2.1295 | -3.7075 | -2.0854 | -3.7127 | -2.1270 | -3.5094 | -2.1933 |

**Appendix Exhibit D.2.10.** Medicare ACO-Level Covariate Balance: Beneficiary-Level Sociodemographic and Eligibility Characteristics

| | BY 3 (2014) | | BY 2 (2015) | | BY 1 (2016) | | PY 5 (2022) | |
|---|---|---|---|---|---|---|---|---|
| | Unweighted | Weighted | Unweighted | Weighted | Unweighted | Weighted | Unweighted | Weighted |
| Age 65 to 69 | 0.0100 | 0.0000 | 0.0057 | 0.0000 | 0.0065 | 0.0000 | -0.0384 | 0.0000 |
| Age 70 to 74 | -0.0183 | 0.0000 | -0.0130 | 0.0000 | -0.0137 | 0.0000 | -0.0213 | 0.0000 |
| Age 75 to 79 | -0.0436 | 0.0000 | -0.0479 | 0.0000 | -0.0404 | 0.0000 | -0.0326 | 0.0000 |
| Age 80 to 84 | -0.0106 | 0.0000 | -0.0134 | 0.0000 | -0.0231 | 0.0000 | -0.0295 | 0.0000 |
| Age 85+ | 0.0022 | 0.0000 | 0.0091 | 0.0000 | 0.0121 | 0.0000 | 0.0136 | 0.0000 |
| Death During Year | -0.0046 | 0.0000 | 0.0058 | 0.0000 | -0.0005 | 0.0000 | -0.0014 | 0.0000 |
| Disabled | 0.0558 | -0.0001 | 0.0553 | 0.0000 | 0.0561 | -0.0001 | 0.1256 | 0.0000 |
| ESRD | -0.0874 | 0.0000 | -0.0970 | 0.0000 | -0.0922 | -0.0001 | -0.0610 | 0.0000 |
| Long-Term Care in Prior Year | -0.0457 | 0.0000 | -0.0270 | 0.0000 | -0.0275 | 0.0000 | -0.0175 | 0.0000 |
| Male | 0.0023 | 0.0000 | 0.0033 | 0.0000 | 0.0046 | 0.0000 | 0.0057 | 0.0000 |
| Months of Alignment | -0.0006 | 0.0000 | -0.0135 | 0.0000 | -0.0028 | 0.0000 | 0.0022 | 0.0000 |
| Months of Part D Coverage | 0.2000 | 0.0000 | 0.2000 | 0.0000 | 0.2000 | 0.0000 | 0.2000 | 0.0000 |
| Dual-Eligible | 0.1667 | 0.0000 | 0.3333 | 0.0000 | 0.4000 | 0.0000 | 0.2000 | 0.0000 |
| Race: Black | -1.0185 | -0.0015 | -0.9794 | -0.0014 | -0.9485 | -0.0017 | -0.6842 | -0.0008 |
| Race: Hispanic | -0.3348 | 0.0000 | -0.3355 | -0.0001 | -0.3331 | -0.0001 | -0.2778 | -0.0001 |
| Race: Asian/Pacific Islander | -0.0359 | 0.0000 | -0.0375 | 0.0000 | -0.0344 | 0.0000 | -0.0236 | 0.0000 |
| Race: Other | 0.0515 | 0.0000 | 0.0614 | 0.0000 | 0.0741 | 0.0000 | 0.0985 | 0.0000 |

**Appendix Exhibit D.2.11.** Medicare ACO-Level Covariate Balance: Beneficiary-Level Chronic Conditions

| | BY 3 (2014) | | BY 2 (2015) | | BY 1 (2016) | | PY 5 (2022) | |
|---|---|---|---|---|---|---|---|---|
| | Unweighted | Weighted | Unweighted | Weighted | Unweighted | Weighted | Unweighted | Weighted |
| Alzheimer's Disease | -0.0338 | 0.0000 | -0.0157 | 0.0000 | -0.0167 | 0.0000 | -0.0080 | 0.0000 |
| Dementia | -0.0677 | 0.0000 | -0.0583 | 0.0000 | -0.0645 | 0.0000 | -0.0497 | 0.0000 |
| Acute Myocardial Infarction | 0.0005 | 0.0000 | -0.0018 | 0.0000 | 0.0174 | 0.0000 | 0.0117 | 0.0000 |
| Anemia | -0.0827 | 0.0000 | -0.1023 | 0.0000 | -0.1343 | 0.0000 | -0.0874 | 0.0000 |
| Asthma | 0.0244 | 0.0000 | 0.0143 | 0.0000 | 0.0287 | 0.0000 | 0.0157 | 0.0000 |
| Atrial Fibrillation | 0.0046 | 0.0000 | 0.0018 | 0.0000 | 0.0009 | 0.0000 | -0.0311 | 0.0000 |
| Cataracts | -0.0599 | 0.0000 | -0.0494 | 0.0000 | -0.0328 | 0.0000 | -0.0090 | 0.0000 |
| Congestive Heart Failure | -0.1690 | 0.0000 | -0.1702 | 0.0000 | -0.1551 | 0.0000 | -0.1304 | 0.0000 |
| Chronic Kidney Disease | -0.1246 | 0.0000 | -0.1289 | 0.0000 | -0.1278 | 0.0000 | -0.1754 | 0.0000 |
| Breast Cancer | 0.0009 | 0.0000 | -0.0008 | 0.0000 | 0.0027 | 0.0000 | -0.0409 | 0.0000 |
| Colorectal Cancer | -0.0345 | 0.0000 | -0.0420 | 0.0000 | -0.0395 | 0.0000 | -0.0419 | 0.0000 |
| Endometrial Cancer | 0.0137 | 0.0000 | 0.0107 | 0.0000 | 0.0147 | 0.0000 | 0.0048 | 0.0000 |
| Lung Cancer | 0.0087 | 0.0000 | 0.0043 | 0.0000 | 0.0000 | 0.0000 | 0.0092 | 0.0000 |
| Prostate Cancer | -0.0168 | 0.0000 | -0.0157 | 0.0000 | -0.0130 | 0.0000 | -0.0393 | 0.0000 |
| COPD | -0.0823 | 0.0000 | -0.0766 | 0.0000 | -0.0762 | 0.0000 | -0.0576 | 0.0000 |
| Depression | 0.0847 | 0.0000 | 0.0722 | 0.0000 | 0.0712 | 0.0000 | 0.0354 | 0.0000 |
| Diabetes | -0.1471 | 0.0000 | -0.1576 | 0.0000 | -0.1651 | 0.0000 | -0.1471 | 0.0000 |
| Glaucoma | 0.0683 | 0.0000 | 0.0709 | 0.0000 | 0.0750 | 0.0000 | 0.0461 | 0.0000 |
| Hip/Pelvic Fracture | 0.0022 | 0.0000 | -0.0076 | 0.0000 | -0.0053 | 0.0000 | -0.0004 | 0.0000 |
| Hyperlipidemia | -0.2220 | 0.0000 | -0.2837 | 0.0000 | -0.3052 | 0.0000 | -0.4091 | 0.0000 |

| | BY 3 (2014) | | BY 2 (2015) | | BY 1 (2016) | | PY 5 (2022) | |
|---|---|---|---|---|---|---|---|---|
| | Unweighted | Weighted | Unweighted | Weighted | Unweighted | Weighted | Unweighted | Weighted |
| Benign Prostatic Hyperplasia | -0.0152 | 0.0000 | -0.0437 | 0.0000 | -0.0419 | 0.0000 | -0.1073 | 0.0000 |
| Hypertension | -0.2478 | 0.0000 | -0.2626 | 0.0000 | -0.2588 | 0.0000 | -0.2738 | 0.0000 |
| Acquired Hypothyroidism | -0.1387 | 0.0000 | -0.1609 | 0.0000 | -0.1674 | 0.0000 | -0.1732 | 0.0000 |
| Ischemic Heart Disease | -0.1692 | 0.0000 | -0.1593 | 0.0000 | -0.1328 | 0.0000 | -0.1238 | 0.0000 |
| Osteoporosis | -0.0894 | 0.0000 | -0.0883 | 0.0000 | -0.0824 | 0.0000 | -0.0529 | 0.0000 |
| Rheumatoid Arthritis/Osteoarthritis | -0.1267 | 0.0000 | -0.1160 | 0.0000 | -0.1008 | 0.0000 | -0.1415 | 0.0000 |
| Stroke/TIA | -0.0619 | 0.0000 | -0.0715 | 0.0000 | -0.0642 | 0.0000 | -0.0631 | 0.0000 |

**Appendix Exhibit D.2.12.** Medicare ACO-Level Covariate Balance: Beneficiary-Level Other Chronic and Potentially Disabling Conditions

| | BY 3 (2014) | | BY 2 (2015) | | BY 1 (2016) | | PY 5 (2022) | |
|---|---|---|---|---|---|---|---|---|
| | Unweighted | Weighted | Unweighted | Weighted | Unweighted | Weighted | Unweighted | Weighted |
| ADHD and Other Conduct Disorders | 0.0606 | 0.0000 | 0.0564 | 0.0000 | 0.0633 | 0.0000 | 0.0643 | 0.0000 |
| Alcohol Use Disorders | 0.0284 | 0.0000 | 0.0268 | 0.0000 | 0.0301 | 0.0000 | 0.0343 | 0.0000 |
| Anxiety Disorders | 0.0844 | 0.0000 | 0.0817 | 0.0000 | 0.0804 | 0.0000 | 0.0545 | 0.0000 |
| Autism Spectrum Disorders | 0.0456 | 0.0000 | 0.0300 | 0.0000 | 0.0278 | 0.0000 | 0.0018 | 0.0000 |
| Bipolar Disorder | 0.0293 | 0.0000 | 0.0232 | 0.0000 | 0.0230 | 0.0000 | 0.0196 | 0.0000 |
| Traumatic Brain Injury | 0.0052 | 0.0000 | -0.0053 | 0.0000 | 0.0091 | 0.0000 | 0.0186 | 0.0000 |
| Cerebral Palsy | 0.0082 | 0.0000 | 0.0058 | 0.0000 | 0.0143 | 0.0000 | 0.0155 | 0.0000 |
| Cystic Fibrosis | -0.0039 | 0.0000 | -0.0189 | 0.0000 | -0.0389 | 0.0000 | -0.0730 | 0.0000 |
| Major Depressive Affective Disorder | 0.0918 | 0.0000 | 0.0788 | 0.0000 | 0.0734 | 0.0000 | 0.0153 | 0.0000 |
| Drug Use Disorders | 0.0567 | 0.0000 | 0.0535 | 0.0000 | 0.0657 | 0.0000 | 0.0417 | 0.0000 |
| Epilepsy | -0.0065 | 0.0000 | -0.0054 | 0.0000 | -0.0090 | 0.0000 | 0.0010 | 0.0000 |

| | BY 3 (2014) | | BY 2 (2015) | | BY 1 (2016) | | PY 5 (2022) | |
|---|---|---|---|---|---|---|---|---|
| | Unweighted | Weighted | Unweighted | Weighted | Unweighted | Weighted | Unweighted | Weighted |
| Fibromyalgia, Chronic Pain, and Fatigue | -0.0722 | 0.0000 | -0.0725 | 0.0000 | -0.0649 | 0.0000 | -0.0396 | 0.0000 |
| Deafness and Hearing Impairment | 0.0701 | 0.0000 | 0.0723 | 0.0000 | 0.0731 | 0.0000 | 0.0468 | 0.0000 |
| Viral Hepatitis | 0.0017 | 0.0000 | -0.0009 | 0.0000 | 0.0104 | 0.0000 | 0.0193 | 0.0000 |
| HIV/AIDS | -0.0042 | 0.0000 | 0.0021 | 0.0000 | 0.0064 | 0.0000 | 0.0078 | 0.0000 |
| Intellectual Disabilities | 0.0043 | 0.0000 | -0.0014 | 0.0000 | 0.0014 | 0.0000 | -0.0034 | 0.0000 |
| Learning Disabilities | 0.0270 | 0.0000 | 0.0318 | 0.0000 | 0.0247 | 0.0000 | 0.0044 | 0.0000 |
| Leukemias and Lymphomas | 0.0077 | 0.0000 | 0.0040 | 0.0000 | 0.0085 | 0.0000 | 0.0035 | 0.0000 |
| Liver Disease | -0.0193 | 0.0000 | -0.0156 | 0.0000 | -0.0133 | 0.0000 | -0.0250 | 0.0000 |
| Migraine | 0.0188 | 0.0000 | 0.0148 | 0.0000 | 0.0102 | 0.0000 | 0.0073 | 0.0000 |
| Mobility Impairments | -0.0308 | 0.0000 | -0.0303 | 0.0000 | -0.0281 | 0.0000 | -0.0224 | 0.0000 |
| Multiple Sclerosis and Transverse Myelitis | 0.0149 | 0.0000 | 0.0097 | 0.0000 | 0.0165 | 0.0000 | 0.0154 | 0.0000 |
| Muscular Dystrophy | 0.0090 | 0.0000 | 0.0018 | 0.0000 | 0.0004 | 0.0000 | 0.0087 | 0.0000 |
| Obesity | -0.0389 | 0.0000 | -0.0732 | 0.0000 | -0.1100 | 0.0000 | -0.3490 | 0.0000 |
| Other Developmental Delays | 0.0387 | 0.0000 | 0.0314 | 0.0000 | 0.0380 | 0.0000 | 0.0220 | 0.0000 |
| Personality Disorders | 0.0633 | 0.0000 | 0.0627 | 0.0000 | 0.0758 | 0.0000 | 0.0538 | 0.0000 |
| Post-Traumatic Stress Disorder | 0.1135 | 0.0000 | 0.1081 | 0.0000 | 0.1145 | 0.0000 | 0.1070 | 0.0000 |
| Peripheral Vascular Disease | -0.2118 | 0.0000 | -0.2215 | 0.0000 | -0.2122 | 0.0000 | -0.1889 | 0.0000 |
| Schizophrenia | 0.0345 | 0.0000 | 0.0339 | 0.0000 | 0.0302 | 0.0000 | 0.0465 | 0.0000 |
| Other Psychotic Disorders | 0.0081 | 0.0000 | 0.0060 | 0.0000 | 0.0082 | 0.0000 | 0.0440 | 0.0000 |
| Spina Bifida | 0.0001 | 0.0000 | 0.0087 | 0.0000 | 0.0094 | 0.0000 | 0.0109 | 0.0000 |
| Spinal Cord Injury | 0.0019 | 0.0000 | 0.0180 | 0.0000 | 0.0092 | 0.0000 | -0.0104 | 0.0000 |

| | BY 3 (2014) | | BY 2 (2015) | | BY 1 (2016) | | PY 5 (2022) | |
|---|---|---|---|---|---|---|---|---|
| | Unweighted | Weighted | Unweighted | Weighted | Unweighted | Weighted | Unweighted | Weighted |
| Tobacco Use Disorders | 0.0261 | 0.0000 | 0.0203 | 0.0000 | 0.0150 | 0.0000 | -0.0174 | 0.0000 |
| Pressure Ulcers and Chronic Ulcers | -0.0352 | 0.0000 | -0.0393 | 0.0000 | -0.0285 | 0.0000 | -0.0233 | 0.0000 |
| Blindness and Visual Impairment | -0.0408 | 0.0000 | -0.0268 | 0.0000 | -0.0351 | 0.0000 | 0.0107 | 0.0000 |

**Appendix Exhibit D.2.13.** Medicare ACO-Level Covariate Balance: County-Level COVID-19 PHE Characteristics

| | PY 5 (2022) | |
|---|---|---|
| | **Unweighted** | **Weighted** |
| COVID-19 Vaccination Rate | 0.4730 | -0.4682 |
| # COVID-19 Cases per 100K | 1.3049 | 1.3398 |
| # COVID-19 Deaths per 100K | -1.7662 | 0.0000 |
| COVID-19 Case Fatality Rate | -5.4232 | -1.3975 |

**Appendix Exhibit D.2.14.** Medicare State-Level Covariate Balance: Area-Level Sociodemographic and Market Characteristics

| | BY 3 (2014) | | BY 2 (2015) | | BY 1 (2016) | | PY 5 (2022) | |
|---|---|---|---|---|---|---|---|---|
| | Unweighted | Weighted | Unweighted | Weighted | Unweighted | Weighted | Unweighted | Weighted |
| Downside-Risk MSSP Rate | 0.3827 | -0.2903 | 0.4062 | -0.3765 | 0.1432 | -0.1299 | 0.1415 | -0.0101 |
| Upside-Risk MSSP Rate | 3.3872 | 3.2164 | 2.9556 | 2.8682 | 2.3501 | 2.1021 | 2.3480 | 2.3156 |
| # of Active MDs per 100K | 0.7986 | 0.0000 | 0.8085 | 0.0000 | 0.8100 | 0.0000 | 0.8008 | 0.0000 |
| # Health Centers per 100K | 0.0297 | 0.0000 | -0.0071 | 0.0000 | 0.0215 | 0.0000 | 0.0251 | 0.0000 |
| High School Completion Rate | 1.2121 | 0.0000 | 1.2294 | 0.0000 | 1.2288 | 0.0000 | 1.1143 | 0.0000 |
| # Hospital Beds per 100K | -0.4132 | 0.0000 | -0.3930 | 0.0000 | -0.2954 | 0.0000 | -0.2694 | 0.0000 |
| Medicare Advantage Rate | -17.8347 | -16.6850 | -15.2021 | -13.9395 | -14.7968 | -13.4840 | -14.5172 | -12.9170 |
| Median Household Income | 0.9474 | 0.0000 | 0.9621 | 0.0000 | 0.9440 | 0.0000 | 0.8295 | 0.0000 |
| # Non-Physician PCPs per 100K | 1.0141 | 0.0000 | 1.0597 | 0.0000 | 1.1032 | 0.0000 | 1.1119 | 0.0000 |
| # PCPs per 100K | 1.2101 | 0.0000 | 1.1827 | 0.0000 | 1.2053 | 0.0000 | 1.1769 | 0.0000 |
| Rurality | 0.3121 | 0.0000 | 0.3107 | 0.0000 | 0.3142 | 0.0000 | 0.3141 | 0.0000 |
| College Completion Rate | 1.0250 | 0.2013 | 1.0347 | 0.1833 | 1.0333 | 0.2083 | 0.9368 | 0.0920 |
| % Below Poverty Line | -0.8907 | -0.0291 | -0.8903 | -0.0246 | -0.8886 | -0.0458 | -0.8068 | -0.1103 |
| Unemployment Rate | -1.3329 | -0.5766 | -1.3393 | -0.5679 | -1.3125 | -0.5416 | -1.1984 | -0.5399 |
| % Uninsured | -3.1920 | -1.9443 | -3.2396 | -1.9683 | -3.2341 | -2.0140 | -3.0015 | -2.0888 |

**Appendix Exhibit D.2.15.** Medicare State-Level Covariate Balance: Beneficiary-Level Sociodemographic and Eligibility Characteristics

| | BY 3 (2014) | | BY 2 (2015) | | BY 1 (2016) | | PY 5 (2022) | |
|---|---|---|---|---|---|---|---|---|
| | Unweighted | Weighted | Unweighted | Weighted | Unweighted | Weighted | Unweighted | Weighted |
| Age 65 to 69 | 0.0090 | 0.0000 | 0.0070 | 0.0000 | 0.0086 | 0.0000 | -0.0357 | 0.0000 |
| Age 70 to 74 | -0.0030 | 0.0000 | 0.0013 | 0.0000 | 0.0041 | 0.0000 | -0.0157 | 0.0000 |
| Age 75 to 79 | -0.0333 | 0.0000 | -0.0346 | 0.0000 | -0.0255 | 0.0000 | -0.0191 | 0.0000 |
| Age 80 to 84 | -0.0064 | 0.0000 | -0.0095 | 0.0000 | -0.0186 | 0.0000 | -0.0201 | 0.0000 |
| Age 85+ | 0.0117 | 0.0000 | 0.0118 | 0.0000 | 0.0095 | 0.0000 | 0.0037 | 0.0000 |
| Death During Year | -0.0210 | 0.0000 | -0.0130 | 0.0000 | -0.0166 | 0.0000 | -0.0268 | 0.0000 |
| Disabled | 0.0207 | 0.0000 | 0.0221 | 0.0000 | 0.0202 | 0.0000 | 0.1022 | 0.0000 |
| ESRD | -0.0999 | 0.0000 | -0.1023 | 0.0000 | -0.1044 | 0.0000 | -0.0792 | 0.0000 |
| Long-Term Care in Prior Year | -0.0729 | 0.0000 | -0.0723 | 0.0000 | -0.0778 | 0.0000 | -0.0606 | 0.0000 |
| Male | -0.0059 | 0.0000 | 0.0033 | 0.0000 | 0.0048 | 0.0000 | 0.0003 | 0.0000 |
| Months of Alignment | 0.0156 | 0.0000 | 0.0062 | 0.0000 | 0.0107 | 0.0000 | 0.0270 | 0.0000 |
| Months of Part D Coverage | 0.2000 | 0.0000 | 0.2000 | 0.0000 | 0.2000 | 0.0000 | 0.2000 | 0.0000 |
| Dual-Eligible | 0.1667 | 0.0000 | 0.2000 | 0.0000 | 0.2000 | 0.0000 | 0.2000 | 0.0000 |
| Race: Black | -1.1179 | -0.0005 | -1.0884 | -0.0004 | -1.0845 | -0.0005 | -0.7553 | -0.0001 |
| Race: Hispanic | -0.4756 | 0.0000 | -0.4610 | 0.0000 | -0.4716 | 0.0000 | -0.4146 | 0.0000 |
| Race: Asian/Pacific Islander | -0.1144 | 0.0000 | -0.1098 | 0.0000 | -0.1144 | 0.0000 | -0.1122 | 0.0000 |
| Race: Other | 0.0278 | 0.0000 | 0.0427 | 0.0000 | 0.0557 | 0.0000 | 0.0812 | 0.0000 |

**Appendix Exhibit D.2.16.** Medicare State-Level Covariate Balance: Beneficiary-Level Chronic Conditions

| | BY 3 (2014) | | BY 2 (2015) | | BY 1 (2016) | | PY 5(2022) | |
|---|---|---|---|---|---|---|---|---|
| | Unweighted | Weighted | Unweighted | Weighted | Unweighted | Weighted | Unweighted | Weighted |
| Alzheimer's Disease | -0.0573 | 0.0000 | -0.0506 | 0.0000 | -0.0523 | 0.0000 | -0.0323 | 0.0000 |
| Dementia | -0.0883 | 0.0000 | -0.0900 | 0.0000 | -0.0949 | 0.0000 | -0.0810 | 0.0000 |
| Acute Myocardial Infarction | 0.0037 | 0.0000 | 0.0004 | 0.0000 | 0.0129 | 0.0000 | 0.0140 | 0.0000 |
| Anemia | -0.1265 | 0.0000 | -0.1346 | 0.0000 | -0.1731 | 0.0000 | -0.1404 | 0.0000 |
| Asthma | 0.0000 | 0.0000 | -0.0025 | 0.0000 | 0.0031 | 0.0000 | 0.0024 | 0.0000 |
| Atrial Fibrillation | 0.0037 | 0.0000 | 0.0022 | 0.0000 | 0.0067 | 0.0000 | -0.0332 | 0.0000 |
| Cataracts | -0.0392 | 0.0000 | -0.0287 | 0.0000 | -0.0048 | 0.0000 | 0.0031 | 0.0000 |
| Congestive Heart Failure | -0.1949 | 0.0000 | -0.1923 | 0.0000 | -0.1803 | 0.0000 | -0.1533 | 0.0000 |
| Chronic Kidney Disease | -0.1493 | 0.0000 | -0.1493 | 0.0000 | -0.1580 | 0.0000 | -0.2047 | 0.0000 |
| Breast Cancer | -0.0046 | 0.0000 | -0.0029 | 0.0000 | -0.0037 | 0.0000 | -0.0459 | 0.0000 |
| Colorectal Cancer | -0.0317 | 0.0000 | -0.0401 | 0.0000 | -0.0398 | 0.0000 | -0.0395 | 0.0000 |
| Endometrial Cancer | 0.0141 | 0.0000 | 0.0116 | 0.0000 | 0.0128 | 0.0000 | 0.0058 | 0.0000 |
| Lung Cancer | -0.0001 | 0.0000 | -0.0054 | 0.0000 | -0.0031 | 0.0000 | 0.0016 | 0.0000 |
| Prostate Cancer | -0.0178 | 0.0000 | -0.0130 | 0.0000 | -0.0121 | 0.0000 | -0.0315 | 0.0000 |
| COPD | -0.0982 | 0.0000 | -0.1002 | 0.0000 | -0.0932 | 0.0000 | -0.0718 | 0.0000 |
| Depression | 0.0585 | 0.0000 | 0.0460 | 0.0000 | 0.0492 | 0.0000 | 0.0277 | 0.0000 |
| Diabetes | -0.1497 | 0.0000 | -0.1552 | 0.0000 | -0.1635 | 0.0000 | -0.1523 | 0.0000 |
| Glaucoma | 0.0608 | 0.0000 | 0.0676 | 0.0000 | 0.0732 | 0.0000 | 0.0348 | 0.0000 |
| Hip/Pelvic Fracture | -0.0014 | 0.0000 | -0.0106 | 0.0000 | -0.0082 | 0.0000 | -0.0050 | 0.0000 |
| Hyperlipidemia | -0.2243 | 0.0000 | -0.2811 | 0.0000 | -0.3068 | 0.0000 | -0.4098 | 0.0000 |

| | BY 3 (2014) | | BY 2 (2015) | | BY 1 (2016) | | PY 5(2022) | |
|---|---|---|---|---|---|---|---|---|
| | Unweighted | Weighted | Unweighted | Weighted | Unweighted | Weighted | Unweighted | Weighted |
| Benign Prostatic Hyperplasia | -0.0298 | 0.0000 | -0.0518 | 0.0000 | -0.0474 | 0.0000 | -0.1078 | 0.0000 |
| Hypertension | -0.2495 | 0.0000 | -0.2643 | 0.0000 | -0.2648 | 0.0000 | -0.2763 | 0.0000 |
| Acquired Hypothyroidism | -0.1409 | 0.0000 | -0.1602 | 0.0000 | -0.1642 | 0.0000 | -0.1797 | 0.0000 |
| Ischemic Heart Disease | -0.2015 | 0.0000 | -0.1871 | 0.0000 | -0.1647 | 0.0000 | -0.1489 | 0.0000 |
| Osteoporosis | -0.0994 | 0.0000 | -0.0954 | 0.0000 | -0.0919 | 0.0000 | -0.0644 | 0.0000 |
| Rheumatoid Arthritis/Osteoarthritis | -0.1417 | 0.0000 | -0.1284 | 0.0000 | -0.1118 | 0.0000 | -0.1472 | 0.0000 |
| Stroke/TIA | -0.0778 | 0.0000 | -0.0899 | 0.0000 | -0.0791 | 0.0000 | -0.0751 | 0.0000 |

**Appendix Exhibit D.2.17.** Medicare State-Level Covariate Balance: Beneficiary-Level Other Chronic and Potentially Disabling Conditions

| | BY 3 (2014) | | BY 2 (2015) | | BY 1 (2016) | | PY 5 (2022) | |
|---|---|---|---|---|---|---|---|---|
| | Unweighted | Weighted | Unweighted | Weighted | Unweighted | Weighted | Unweighted | Weighted |
| ADHD and Other Conduct Disorders | 0.0484 | 0.0000 | 0.0498 | 0.0000 | 0.0597 | 0.0000 | 0.0602 | 0.0000 |
| Alcohol Use Disorders | 0.0175 | 0.0000 | 0.0182 | 0.0000 | 0.0196 | 0.0000 | 0.0226 | 0.0000 |
| Anxiety Disorders | 0.0653 | 0.0000 | 0.0652 | 0.0000 | 0.0619 | 0.0000 | 0.0526 | 0.0000 |
| Autism Spectrum Disorders | 0.0140 | 0.0000 | 0.0011 | 0.0000 | -0.0002 | 0.0000 | -0.0069 | 0.0000 |
| Bipolar Disorder | 0.0054 | 0.0000 | 0.0037 | 0.0000 | -0.0019 | 0.0000 | 0.0038 | 0.0000 |
| Traumatic Brain Injury | 0.0021 | 0.0000 | -0.0040 | 0.0000 | 0.0030 | 0.0000 | 0.0134 | 0.0000 |
| Cerebral Palsy | 0.0020 | 0.0000 | 0.0005 | 0.0000 | 0.0035 | 0.0000 | 0.0073 | 0.0000 |
| Cystic Fibrosis | -0.0332 | 0.0000 | -0.0482 | 0.0000 | -0.0707 | 0.0000 | -0.1075 | 0.0000 |
| Major Depressive Affective Disorder | 0.0642 | 0.0000 | 0.0513 | 0.0000 | 0.0427 | 0.0000 | 0.0055 | 0.0000 |
| Drug Use Disorders | 0.0228 | 0.0000 | 0.0227 | 0.0000 | 0.0225 | 0.0000 | 0.0151 | 0.0000 |
| Epilepsy | -0.0246 | 0.0000 | -0.0262 | 0.0000 | -0.0292 | 0.0000 | -0.0194 | 0.0000 |

| | BY 3 (2014) | | BY 2 (2015) | | BY 1 (2016) | | PY 5 (2022) | |
|---|---|---|---|---|---|---|---|---|
| | Unweighted | Weighted | Unweighted | Weighted | Unweighted | Weighted | Unweighted | Weighted |
| Fibromyalgia, Chronic Pain, and Fatigue | -0.0822 | 0.0000 | -0.0894 | 0.0000 | -0.0943 | 0.0000 | -0.0785 | 0.0000 |
| Deafness and Hearing Impairment | 0.0586 | 0.0000 | 0.0642 | 0.0000 | 0.0614 | 0.0000 | 0.0421 | 0.0000 |
| Viral Hepatitis | -0.0182 | 0.0000 | -0.0179 | 0.0000 | -0.0133 | 0.0000 | -0.0005 | 0.0000 |
| HIV/AIDS | -0.0292 | 0.0000 | -0.0247 | 0.0000 | -0.0164 | 0.0000 | -0.0074 | 0.0000 |
| Intellectual Disabilities | -0.0127 | 0.0000 | -0.0155 | 0.0000 | -0.0195 | 0.0000 | -0.0154 | 0.0000 |
| Learning Disabilities | 0.0197 | 0.0000 | 0.0260 | 0.0000 | 0.0163 | 0.0000 | 0.0005 | 0.0000 |
| Leukemias and Lymphomas | 0.0062 | 0.0000 | 0.0086 | 0.0000 | 0.0060 | 0.0000 | -0.0020 | 0.0000 |
| Liver Disease | -0.0302 | 0.0000 | -0.0292 | 0.0000 | -0.0275 | 0.0000 | -0.0298 | 0.0000 |
| Migraine | 0.0146 | 0.0000 | 0.0103 | 0.0000 | 0.0042 | 0.0000 | 0.0085 | 0.0000 |
| Mobility Impairments | -0.0415 | 0.0000 | -0.0504 | 0.0000 | -0.0495 | 0.0000 | -0.0416 | 0.0000 |
| Multiple Sclerosis and Transverse Myelitis | 0.0129 | 0.0000 | 0.0092 | 0.0000 | 0.0162 | 0.0000 | 0.0127 | 0.0000 |
| Muscular Dystrophy | 0.0109 | 0.0000 | 0.0079 | 0.0000 | 0.0037 | 0.0000 | 0.0097 | 0.0000 |
| Obesity | -0.0375 | 0.0000 | -0.0709 | 0.0000 | -0.1069 | 0.0000 | -0.2927 | 0.0000 |
| Other Developmental Delays | 0.0346 | 0.0000 | 0.0314 | 0.0000 | 0.0296 | 0.0000 | 0.0170 | 0.0000 |
| Personality Disorders | 0.0495 | 0.0000 | 0.0496 | 0.0000 | 0.0667 | 0.0000 | 0.0535 | 0.0000 |
| Post-Traumatic Stress Disorder | 0.1067 | 0.0000 | 0.1038 | 0.0000 | 0.1081 | 0.0000 | 0.1059 | 0.0000 |
| Peripheral Vascular Disease | -0.2317 | 0.0000 | -0.2512 | 0.0000 | -0.2571 | 0.0000 | -0.2337 | 0.0000 |
| Schizophrenia | -0.0026 | 0.0000 | -0.0011 | 0.0000 | -0.0024 | 0.0000 | 0.0095 | 0.0000 |
| Other Psychotic Disorders | -0.0286 | 0.0000 | -0.0322 | 0.0000 | -0.0326 | 0.0000 | -0.0009 | 0.0000 |
| Spina Bifida | -0.0003 | 0.0000 | 0.0059 | 0.0000 | 0.0029 | 0.0000 | 0.0071 | 0.0000 |
| Spinal Cord Injury | 0.0033 | 0.0000 | 0.0156 | 0.0000 | 0.0015 | 0.0000 | -0.0190 | 0.0000 |

| | BY 3 (2014) | | BY 2 (2015) | | BY 1 (2016) | | PY 5 (2022) | |
|---|---|---|---|---|---|---|---|---|
| | Unweighted | Weighted | Unweighted | Weighted | Unweighted | Weighted | Unweighted | Weighted |
| Tobacco Use Disorders | -0.0031 | 0.0000 | -0.0032 | 0.0000 | -0.0108 | 0.0000 | -0.0225 | 0.0000 |
| Pressure Ulcers and Chronic Ulcers | -0.0511 | 0.0000 | -0.0465 | 0.0000 | -0.0427 | 0.0000 | -0.0415 | 0.0000 |
| Blindness and Visual Impairment | -0.0618 | 0.0000 | -0.0511 | 0.0000 | -0.0526 | 0.0000 | 0.0003 | 0.0000 |

**Appendix Exhibit D.2.18.** Medicare State-Level Covariate Balance: County-Level COVID-19 PHE Characteristics

| | PY 5 (2022) | |
|---|---|---|
| | **Unweighted** | **Weighted** |
| COVID-19 Vaccination Rate | 0.3597 | -0.4688 |
| # COVID-19 Cases per 100K | 0.9675 | 1.1590 |
| # COVID-19 Deaths per 100K | -1.8361 | 0.0000 |
| COVID-19 Case Fatality Rate | -5.2404 | -1.5169 |

# Appendix D.3. Specifications for the Claims-Based Evaluation Measures

**Appendix Exhibit D.3.1** details definitions for the claims-based outcome measures for the Medicare and Medicaid analyses. The outcome measures are total Medicare spending, 12 Medicare utilization measures, 3 Medicare quality-of-care measures, total Medicaid spending, 2 Medicaid utilization outcomes, and 3 SUD diagnosis and treatment outcomes.

**Appendix Exhibit D.3.1.** Definitions for Claims-Based Outcome Measures

| Measure | Definition |
|---|---|
| **Medicare Spending** | |
| *Total Medicare Parts A & B spending* PBPY | Total Medicare Parts A & B spending (2022 USD) PBPY aligned with the VTAPM or comparison group. Spending includes Medicare paid amount on Parts A & B claims from the start of the year until the end of the year or until the end date for when the beneficiary remained aligned (that is, until s/he was excluded due to alignment exclusion criteria), for the treatment or comparison group. |
| **Medicare Utilization** | |
| *Acute care hospital stays* per 1,000 beneficiaries per year (BPY) | Number of acute care hospital stays per 1,000 BPY aligned with the VTAPM or comparison group. Stays that included transfers between facilities were counted as one stay. Stays that commenced after 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, are counted toward the measure. |
| *Acute care hospital days* per 1,000 BPY | Number of acute care hospital days per 1,000 BPY aligned with the VTAPM or comparison group. Inpatient days after 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, are counted toward the measure. |
| *Emergency department (ED) visits* (including observation stays) per 1,000 BPY | Number of ED visits including observational stay per 1,000 BPY aligned with the VTAPM or comparison group. Visits that included transfers between ED facilities were counted as one visit. Visits 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, are counted toward the measure. |
| *Total E&M visits* per 1,000 BPY | Total number of evaluation and management (E&M) visits with primary care clinicians or specialist providers (excluding hospital and ED visits) per 1,000 BPY aligned with the VTAPM or comparison group. Primary care clinicians and specialist providers are defined below. |
| *Primary care E&M visits* per 1,000 BPY | Number of E&M visits with primary care clinicians per 1,000 BPY aligned with the VTAPM or comparison group. Primary care clinicians include 01 (general practice); 08 (family practice); 11 (internal medicine); 12 (osteopaths); 16 (obstetrics/gynecology); 35 (chiropractors); 38 (geriatric medicine); 48 (podiatrists); 50 (nurse practitioner); 80 (licensed clinical social worker); 84 (preventive medicine); and 97 (physician assistant). AWVs are excluded from this measure. |
| *Specialty care E&M visits* per 1,000 BPY | Number of E&M visits with specialist providers (excluding hospital and ED visits) per 1,000 BPY aligned with the VTAPM or comparison group. Specialist providers are defined as all those who are not primary care clinicians, noted above. |
| *SNF stays* per 1,000 BPY | Number of SNF stays per 1,000 BPY aligned with the VTAPM or comparison group. SNF stays that commenced after 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, are counted toward the measure. |

| Measure | Definition |
|---|---|
| *SNF days* per 1,000 BPY | Number of SNF days per 1,000 BPY aligned with the VTAPM or comparison group. SNF days after 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, are counted toward the measure. |
| *Home health visits* per 1,000 BPY | Number of home health (HH) visits per 1,000 BPY aligned with the VTAPM or comparison group. The numbers of HH visits were identified based on lines with revenue center codes 420-449 and 550-599. Visits 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, are counted toward the measure. |
| *Home health episodes* per 1,000 BPY | Number of episodes of HH for 1,000 BPY during the period aligned with the VTAPM or comparison group. Episodes include sum of 60-day HH episodes, as well as HH episodes with low-utilization payment adjustments (LUPAs) and partial episode payment (PEP) adjustments. |
| *Hospice days* per 1,000 BPY | Number of days of hospice service use per 1,000 BPY aligned with the VTAPM or comparison group. Days of hospice use counted using the claim from and through dates on hospice claims. Hospice days after 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, are counted toward the measure. |
| *Imaging, procedures, and tests* per 1,000 BPY | Counts of imaging, procedures, and tests per 1,000 BPY aligned with the VTAPM or comparison group. These were computed using the Berenson-Eggers Type of Service (BETOS) codes on the carrier claims and were specified as the number of claims for a beneficiary with codes "PXX," "TXX," and "IXX" incurred between the beneficiary's alignment start and end dates in each year. |
| **Medicare Access to and Quality of Care** | |
| Beneficiaries with *Annual Wellness Visit (AWV)* per 1,000 per year | Number of beneficiaries with an AWV in the year, per 1,000 beneficiaries aligned to the VTAPM or comparison group. This measure reflects the likelihood of beneficiaries receiving an AWV visit in the year. AWV codes on Medicare claims include G0438 (for the initial visit) and G0439 (for subsequent visits). |
| Beneficiaries with acute care hospitalizations for *ambulatory care-sensitive conditions (ACSCs)* per 1,000 per year | Number of beneficiaries with one or more ACSC acute care hospitalizations in the year, per 1,000 beneficiaries aligned with the VTAPM or comparison group. This measure reflects the likelihood of beneficiaries being hospitalized for ACSCs during the year. ACSC hospitalizations include diabetes short-term complications, diabetes long-term complications, chronic obstructive pulmonary disease or asthma in older adults, hypertension, heart failure, dehydration, bacterial pneumonia, urinary tract infection, uncontrolled diabetes, asthma in younger adults, and lower-extremity amputation among patients with diabetes.[12,13] |
| Beneficiaries with *unplanned readmissions within 30 days after hospital discharge* per 1,000 per year | Number of beneficiaries with one or more occurrences of unplanned hospital readmissions within 30 days of discharge in the year, per 1,000 beneficiaries aligned with the VTAPM or comparison group. This measure reflects the likelihood of beneficiaries having unplanned readmissions in the year. We used CMS's risk-standardized all-condition readmission measure for ACOs (ACO #8) to identify eligible hospitalizations and unplanned readmissions.[14] |

[12] Agency for Healthcare Research and Quality. Prevention Quality Overall Composite Technical Specifications, Prevention Quality Indicator 90, Version 6.0. 2016; http://www.qualityindicators.ahrq.gov/Downloads/Modules/PQI/V60-ICD09/TechSpecs/PQI_90_Prevention_Quality_Overall_Composite.pdf.

[13] For claims prior to October 1, 2015, with ICD-9 codes, we used Version 5.0 of PQI 90. For claims after October 1, 2015, with ICD-10 codes, we used Version 6.0 of PQI 90.

**14** Centers for Medicare & Medicaid Services. A Blueprint for the CMS Measures Management System, ACO #8 Risk Standardized All Condition Readmission, Version 1.0. 2012; https://www.cms.gov/Medicare/Medicare-Fee-for-Service-Payment/sharedsavingsprogram/Downloads/Measure-ACO-8-Readmission.pdf.

| Measure | Definition |
|---|---|
| **Medicaid Spending** | |
| *Medicaid total spending (VHCURES)* | Total Medicaid spending (2021 USD) per member per year. |
| **Medicaid Utilization** | |
| *Acute care stays per 1,000 per year (T-MSIS)* | Number of acute care hospital stays per 1,000 enrollees per year. Stays that included transfers between facilities were counted as one stay. Stays that commenced after 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, are counted toward the measure. |
| *ED visits per 1,000 per year (T-MSIS)* | Number of ED visits including observational stays per 1,000 enrollees per year. Visits that included transfers between ED facilities were counted as one visit. Visits 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, are counted toward the measure. |
| **Medicaid SUD Diagnosis and Treatment** | |
| *SUD diagnosis per 1,000 per year (T-MSIS)* | Number of members with an SUD diagnosis per 1,000 enrollees per year during the performance year. |
| *SUD treatment per 1,000 per year (T-MSIS)* | Number of members receiving medication-assisted treatment or any SUD treatment services, facility claim, or pharmacy claim with an associated SUD diagnosis during the performance year, per 1,000 enrollees per year. |
| *ED visits involving SUD services per 1,000 per year (T-MSIS)* | Number of ED or observation visits that involved alcohol, opioid, or other drug abuse and dependence treatment during the year, regardless of the initial reason for the visit, per 1,000 enrollees per year. This measure is a subset of the Medicaid members receiving any SUD treatment. |

NOTE: For providers in ACOs who opted for population-based payments (PBP) or all-inclusive-population-based-payments (AIPBPs), we used the actual amount Medicare would have paid for services absent the population-based payments.

# Appendix D.4. Analytic Approach to Estimating Medicare Impact

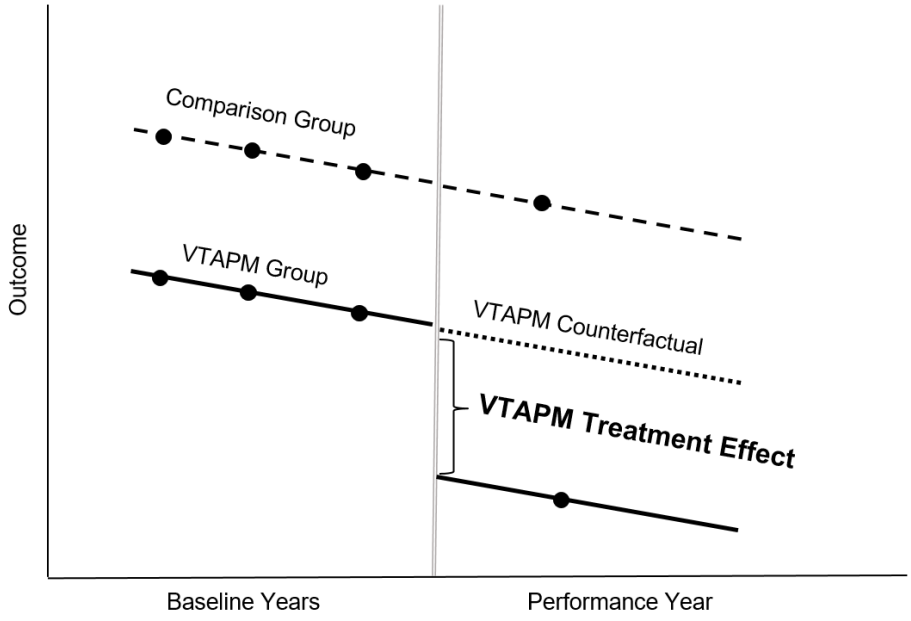
In this section, we describe the specification of our difference-in-differences (DID) regression models to assess the impact of the VTAPM on Medicare claims-based outcomes and provide the rationale and tests we used to guide various analytic decisions.

## Difference-in-Differences Estimation

Using the DID design, we assessed the impact of VTAPM in PY 5 and cumulatively over the first five PYs (total Medicare spending only) for both the ACO-level and state-level analyses. The design compares differences in outcomes for the VTAPM and EB-weighted comparison beneficiaries in PY 5 against differences in outcomes for the treatment and comparison groups in three BYs (BY 3, BY 2, and BY 1). The comparison group is used to obtain an appropriate counterfactual of what would have happened to the VTAPM beneficiaries in PY 5 in the absence of the model. The DID models net out time-invariant unobservable factors that influence the VTAPM and comparison groups. Together with EB weights, this approach mitigates biases from unobserved differences between the VTAPM and comparison group.

As shown in **Appendix Exhibit D.4.1**, the DID compares differences in outcomes for the VTAPM and propensity score-weighted comparison beneficiaries in a given PY to differences in outcomes for the treatment and comparison groups in BY 3, BY 2, and BY 1.

**Appendix Exhibit D.4.1.** Difference-in-Differences Estimation of the VTAPM Treatment Effect



**Estimating impacts in PY 5.** We estimated impacts using DID regression models for each of the state- and ACO-level analyses separately. We report impact estimates in PY 5 as relative increases or relative decreases, in relation to the VTAPM counterfactual absent the model. Impacts for PY 5 are estimated in separate models due to the differences in model clinicians for the ACO-level analysis; for both the ACO- and state-level analyses, a single cumulative estimate is produced as a weighted average of the five PY-specific impact estimates. While all impact estimates are at the beneficiary level, we describe impacts as relative increases or decreases PBPY for spending outcomes and per 1,000 BPY for utilization and quality-of-care outcomes. Estimates are reported at the p<0.1, p<0.05, and p<0.01 levels of statistical significance.

A key assumption of the DID design is that the VTAPM and the comparison group has similar (i.e., parallel) trends in outcomes during the BYs before the start of VTAPM. This assumption of common trends allows the comparison group to establish a reliable representation of the VTAPM group in a given PY in the absence of the VTAPM model. However, we employed a flexible DID specification that allowed trends in outcomes during the baseline period to differ between the treatment and comparison groups. To do so, we included an interaction term between the linear year and treatment (***VTAPM ∗ YEAR***) in our DID models. Our flexible DID specification allowed trends between the treatment and comparison group to either increase or decrease linearly over time, such that the DID estimate represented the impact of the model on the outcome measure after accounting for baseline secular trends.

**Equations D.1** and **D.2** show the general specification of the DID model that we used to estimate ACO- and state-level impacts of the VTAPM in a given PY, respectively.

**Equation D.1:** DID model for estimating ACO-level impact in a given PY, with fixed effects for years, controlling for beneficiary, community, and practice characteristics

$$E(Y_{ijkt}) = \alpha_0 + \beta_1 VTAPM + \gamma_1 BY2 + \gamma_2 BY1 + \gamma_3 PY + \delta_1 VTAPM * PY + \sigma_1 VTAPM * YEAR + \theta_1 BENE_{ijkt} + \varphi_2 CNTY_j + \rho_2 ZCTA_j + \omega_2 PRAC_k + \varepsilon_{ijkt}$$

- ***E(Y$_{ijkt}$)*** is the outcome for the ***i$^{th}$*** beneficiary in the treatment or comparison group (that is, residing in Vermont or a comparison state and receiving the plurality of their care from a provider participating in the VTAPM Medicare ACO or a Shared Savings Program comparison ACO) in year ***t.***
- $\boldsymbol{\alpha_0}$ is the intercept, the mean outcome for the beneficiaries in the comparison group during the baseline period.
- ***VTAPM*** is the binary indicator for belonging to the treatment group. The coefficient $\boldsymbol{\beta_1}$ captures the difference between the treatment and comparison group in the baseline period.
- ***BY2***, ***BY1***, and ***PY*** represent fixed effects for each BY and PY. The coefficients $\boldsymbol{\gamma_1}$, $\boldsymbol{\gamma_2}$, and $\boldsymbol{\gamma_3}$ capture change in outcome relative to the reference period ***BY3.***
- The interaction term ***VTAPM ∗ PY*** is the binary indicator for treatment group beneficiaries in ***PY***. The coefficient $\boldsymbol{\delta_1}$ is the DID estimate and represents the impact of VTAPM's initiatives in ***PY.***
- ***$\sigma_1$ VTAPM ∗ YEAR*** is the linear group-specific interaction term (treatment effect interacted with linear year), included to address the common trends assumption.
- ***BENE, CNTY,*** *and* ***ZCTA*** are vectors of beneficiary-level characteristics and the characteristics of their county and ZCTA of residence. The vectors $\boldsymbol{\theta_1}$, $\boldsymbol{\varphi_2}$, and $\boldsymbol{\rho_2}$ are the coefficients associated with these characteristics.
- ***PRAC$_k$*** is a fixed effect for each VTAPM and MSSP practice. The coefficient $\boldsymbol{\omega_2}$ captures the practice-specific time-invariant differences.
- $\boldsymbol{\varepsilon_{ijkt}}$ is the random error term.

**Equation D.2:** DID model for estimating state-level impact in a given PY, with fixed effects for years, controlling for beneficiary and community characteristics

$$E(Y_{ijkt}) = \alpha_0 + \beta_1 VT + \gamma_1 BY2 + \gamma_2 BY1 + \gamma_3 PY + \delta_1 VT * PY + \sigma_1 VT * YEAR + \theta_1 BENE_{ijkt} + \varphi_2 CNTY_j + \rho_2 ZCTA_j + \varepsilon_{ijkt}$$

- $E(Y_{ijkt})$ is the outcome for the $i^{th}$ beneficiary in the treatment or comparison group (that is, residing in Vermont or a comparison state and receiving the majority of their care from within their state of residence) in year ***t.***
- $\alpha_0$ is the intercept, the mean outcome for the beneficiaries in the comparison group during the baseline period.
- ***VT*** is the binary indicator for belonging to the treatment group. The coefficient $\theta_1$ captures the difference between the treatment and comparison group in the baseline period.
- ***BY2***, ***BY1***, and ***PY*** represent fixed effects for each BY and PY. The coefficients $\gamma_1$, $\gamma_2$, and $\gamma_3$ capture change in outcome relative to the reference period ***BY3.***
- The interaction term ***VT * PY*** is the binary indicator for treatment group beneficiaries in $PY$. The coefficient $\delta_1$ is the DID estimate and represents the impact of Vermont's statewide initiatives in $PY$.
- $\sigma_1$ ***VTAPM * YEAR*** is the linear group-specific interaction term (treatment group interacted with linear year), included to address the common trends assumption.
- ***BENE, CNTY***, and ***ZCTA*** are vectors of beneficiary-level characteristics and the characteristics of their county and ZCTA of residence. The vectors $\vartheta_1$, $\varphi_2$, and $\rho_2$ are the coefficients associated with these characteristics.
- $\varepsilon_{ijkt}$ is the random error term.

We include the following covariates in both the ACO- and state-level regression model:

- **Beneficiary-level covariates** include age; gender; race/ethnicity; disability; ESRD 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); flag for utilization of long-term care; and an indicator for whether a beneficiary was aligned using primary or specialty care visits.
- **ZCTA-level covariates** include number of alignment-eligible providers within 10 miles per 1,000 population, percent of population with a high school degree, percent with a bachelor's degree, percent below the federal poverty level, rurality, rural-urban continuum code, percent of population unemployed, percent of population uninsured, percent of population receiving Supplemental Security Income, and median household income.
- **County-level covariates** include total population; number of hospital beds per 1,000 population; number of active MDs per 1,000 population; number of RHCs per 1,000 population; number of FQHCs per 1,000 population; number of physician assistants per 1,000 population; number of nurse practitioners per 1,000 population; number of certified nursing specialists per 1,000 population; number of hospital-based primary care clinicians per 1,000 population; number of office-based primary care clinicians per 1,000 population; U.S. Department of Agriculture Economic Research Service economic typology code; HRSA health professional shortage area (HPSA) code; mental health HPSA code; and rate of participation of ACOs with downside risk.
- **Year-level covariates** include binary indicators for year.

The ACO-level model also included a fixed effect for practice, grouping all practices who saw fewer than 500 attributed BPY. Both ACO- and state-level models include the previously described EB weights for the

comparison group; all VTAPM group beneficiaries receive a weight of one (1). We provide details of the estimation of the models based on Equations D.1 and D.2. All models were estimated using Stata 17.0.[15]

## Assessment of Common Baseline Trends

Despite using the flexible DID approach, we wanted to assess if common baseline trends were achieved in our analyses. We tested this assumption using two methods (see **Appendix Exhibits F.40** and **F.41** for results from these two methods):

- We assessed whether the coefficient $\boldsymbol{\sigma_1}$ for the interaction term (in **Equations D.1** and **D.2**) was significantly different from zero (p<0.05). If it was significantly different, the assumption of common trends did not hold.
- We specified a model to estimate the average marginal effect for VTAPM in BY 1 relative to BY 3 (**Equation D.3**). We assessed whether the coefficient $\theta_{-2}$ for the leading interaction term in BY 1 was significantly different from zero (p<0.05). If this was significantly different, the assumption of common trends did not hold.

**Equation D.3:** Test of common trends via estimation of VTAPM's average marginal effect in BY 1 over BY 3

$$E(Y_{ijkt}) = \alpha_0 + \beta_1 VTAPM + \gamma_1 BY2 + \gamma_1 BY1 + \gamma_1 PY + \theta_{-2} VTAPM_j * BY1_t + \delta_1 VTAPM_j * PY_t + \theta_1 BENE_{ijkt} + \varphi_2 CNTY_j + \rho_2 ZCTA_j + \omega_2 PRAC_k + \varepsilon_{ijkt}$$

## Modelling Outcomes of Medicare Spending, Utilization, and Quality of Care

**Appendix Exhibit D.4.2** summarizes the models used for the 16 claims-based outcome measures for the Medicare state- and ACO-level analyses for PY 5. Outcome measures for spending and utilization were modelled as continuous variables, using generalized linear models (GLM). For outcomes where more than 15% of the sample had zero values, we used two-part models (TPMs), with a probit model to assess the likelihood of a non-zero outcome and GLM to assess levels of the outcome for those with non-zero outcomes. We determined the appropriate distributional form using a modified Park test.[16] The modified Park test examines the heteroscedasticity of the error term to ascertain the appropriate distribution; we ran the test using all observations for outcomes with GLMs and using only non-zero observations for outcomes with TPMs. The two quality-of-care measures were modelled as binary measures.[17] All models used standard errors clustered at the state-level and included a log link.

[15] StataCorp. *Stata Statistical Software: Release 17*. 2021; College Station, TX: StataCorp LP.

[16] Manning W, Mullahy J. Estimating Log Models: To Transform or Not to Transform? J Health Econ. 2001;20:461-494.

[17] A Medicare beneficiary is eligible for a single wellness visit annually. For ACS hospitalizations and unplanned 30-day readmissions, few beneficiaries had events (for the ACO-level analysis, 2.9% of Medicare ACO-attributed beneficiaries had ACS hospitalizations and 11.6% of those with an initial hospitalization had a 30-day readmission), and fewer had more than one event. We chose to model these as binary measures, whether or not the beneficiary had the event during the year. We tested that our conclusions were robust to modelling the latter three measures as counts.

**Appendix Exhibit D.4.2.** Model Specifications for Medicare Outcome Measures, PY 5 (2022)

| Outcome | ACO | State |
|---|---|---|
| Total Medicare spending | Gamma | Gamma |
| Acute care stays | TPM Inverse Gaussian | TPM Inverse Gaussian |
| Acute care days | TPM Inverse Gaussian | TPM Inverse Gaussian |
| ED visits | TPM Inverse Gaussian | TPM Inverse Gaussian |
| Total E&M visits | Gamma | Gamma |
| Primary E&M visits | Poisson | Poisson |
| Specialist E&M visits | Gamma | Poisson |
| SNF stays | TPM Inverse Gaussian | TPM Inverse Gaussian |
| SNF days | TPM Gamma | TPM Gamma |
| HH visits | TPM Inverse Gaussian | TPM Inverse Gaussian |
| HH episodes | TPM Inverse Gaussian | TPM Inverse Gaussian |
| Hospice days | TPM Gamma | TPM Gamma |
| Imaging, procedures, tests | Poisson | Poisson |
| AWVs | Logit | Logit |
| ACS hospitalizations | Logit | Logit |
| Unplanned 30-day readmissions | Logit | Logit |

NOTE: TPM = Two-part model.

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

- Because we used nonlinear models for the outcome variables, we employed the approach suggested by Puhani (2012) to express the DID $\boldsymbol{\delta_1}$ coefficient in Equation D.1 and D.2 as the estimated outcome for the treated VTAPM group relative to its expected outcome absent the treatment.[18] 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.[19] We computed confidence intervals using the delta method.[20]
- We expressed the estimated impact as a percent of the expected outcome for the VTAPM group in a given PY absent the model. We computed the percentage change from the DID coefficient for outcomes estimated with log-linear models.[21] For outcomes estimated with two-part models, we computed the predicted level of outcomes for VTAPM beneficiaries in the PY absent VTAPM incentives by summing the adjusted mean for the comparison group in the PY and the adjusted difference between the VTAPM and the comparison group in

[18] Puhani P. The Treatment Effect, the Cross Difference, and the Interaction Term in Nonlinear 'Difference-in-Differences' Models. Econ Lett. 2012;115()1:85-87.

[19] Karaca-Mandic P, Norton EC, Dowd B. Interaction Terms in Nonlinear Models. Health Serv Res. 2012;47(1pt1):255-274.

[20] Dowd BE, Greene WH, Norton EC Computation of Standard Errors. Health Serv Res. 2014;49(2):731-750.

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

the BYs.[22] We obtained the latter from the average predicted and adjusted outcomes for the VTAPM and comparison group in the BYs, which we calculated post-estimation.

- We used post-estimation marginal effects to predict the average adjusted outcomes (such as the conditional means) for the VTAPM and comparison group in the baseline period (all BYs) and PY. We report these for the VTAPM and comparison group in **Appendix F**, alongside the impact estimates to understand if the latter were driven by improved performance for the VTAPM group or deteriorating performance for the comparison group or both.
- Finally, we expressed impact estimates for measures of spending and utilization from our annual models as per beneficiary per year (PBPY) and per 1,000 BPY, respectively.

## Estimating Impacts on Total Medicare Gross Spending for Subgroups of Beneficiaries

We applied the flexible DID framework to estimate the model's impact for total gross Medicare spending among subgroups of beneficiaries in PY 5. Selected beneficiary subgroups included:

- Subgroups based on dual eligibility. Two categories included beneficiaries dually eligible for Medicare and Medicaid, and those in Medicare only (non-duals).
- Subgroups based on rural residence. Two categories included beneficiaries who lived in a rural zip code and those who lived in an urban zip code. Urban zip code was defined as a 2013 Rural Urban Continuum Code of 1 (counties in metro areas of 1 million population or more), 2 (counties in metro areas of 250,000 to 1 million population), or 3 (counties in metro areas of fewer than 250,000 population).
- Subgroups of beneficiaries with multiple chronic conditions. Three categories included beneficiaries with 0–2 conditions, those with 3–6 conditions, and those with 7 or more conditions.

We used **Equation D.4** to assess treatment effects for beneficiary categories in a subgroup set. The original treatment effect ***VTAPM * PY*** specified in Equation D.1 was split into ***VTAPM * PY * Subgroup$_m$*** for *m* beneficiary categories in a subgroup. We also included two-way interaction terms between subgroup and the VTAPM group indicator (to control for baseline differences between VTAPM and comparators for the beneficiary categories) and between subgroup and the PY indicator (to control for differences between the PYs and BYs for the beneficiary categories). We used the approach developed by Puhani (2012) to estimate the marginal VTAPM treatment effect for the beneficiary categories in a subgroup, relative to the treated counterfactual.[23] The percentage of impact (impact relative to the counterfactual) for beneficiary categories in a subgroup were estimated as well. The same method was used to assess treatment effects for the state-level analysis, decomposing the ***VT * PY*** treatment effect into ***VT * PY * Subgroup$_m$*** for *m* beneficiary categories.

[22] McWilliams J, Michael LA, Hatfield ME, Chernew ME, Landon BE, Schwartz AL. Early Performance of Accountable Care Organizations in Medicare. NEJM. 2016;374(24):2357-2366.

[23] 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. doi.org/10.1016/j.econlet.2011.11.025

**Equation D.4:** ACO-level DID model for 3-beneficiary categories subgroup, with fixed effects for years, controlling for beneficiary, community, and practice characteristics

$$E(Y_{ijkt}) = \alpha_0 + \beta_1 VTAPM + \gamma_1 BY2 + \gamma_2 BY1 + \gamma_3 PY + \tau_1 Subgroup_1 + \tau_2 Subgroup_2 + \mu_1 VTAPM * Subgroup_1 + \mu_2 VTAPM * Subgroup_2 + \pi_1 PY * Subgroup_1 + \pi_2 PY * Subgroup_2 + \delta_1 VTAPM * PY * Subgroup_1 + \delta_2 VTAPM * PY * Subgroup_2 + \delta_3 VTAPM * PY * Subgroup_3 + \sigma_1 VTAPM * YEAR + \theta_1 BENE_{ijkt} + \varphi_2 CNTY_j + \rho_2 ZCTA_j + \omega_2 PRAC_k + \varepsilon_{ijkt}$$

where:

- $VTAPM * PY * Subgroup_m$ represent the interactions of beneficiary attribution to the VTAPM, the PY, and each subgroup. $\delta_m$ are the treatment effects of interest for the $m^{th}$ beneficiary subgroup.

## Estimating Impacts of Providers Selecting AIPBP on Total Medicare Gross Spending

We estimated the impacts of the VTAPM model on total gross spending disaggregated by two categories of payment election by providers (that is, providers who selected AIPBP versus providers who did not). We applied the provider's AIPBP status in the PY to the respective BYs so that provider AIPBP status was the same in the BYs and PYs in our analysis. We determined whether a provider elected AIPBP from the 2022 Medicare provider list. Beneficiaries attributed to clinicians with incomplete OneCare provider network or Medicare provider list data were excluded.

The analysis was at the beneficiary-year level. To apply provider AIPBP status categories to beneficiary-years, within each PY and BY, we attributed VTAPM and comparison group beneficiaries to the provider from whom they received the plurality of Medicare Parts A & B spending during the year. We then estimated a DID model in which the treatment effect was allowed to vary for beneficiaries attributed to VTAPM providers with different AIPBP status. This analysis was also only conducted among beneficiaries attributed to the Medicare ACO, as we did not have data related to the payment mechanisms for non-VTAPM providers (i.e., the comparison group). The specification for this model was similar to that used in our main analyses, as indicated in **Equation D.5**.

**Equation D.5:** ACO-level DID model with provider-type fixed effects and interaction terms to estimate treatment effect associated with each subgroup of providers

$$E(Y_{ijkt}) = \alpha_0 + \beta_1 VTAPM + \gamma_1 BY2 + \gamma_2 BY1 + \gamma_3 PY + \delta_1 VTAPM * PY * Provider\_AIPBP_1 + \delta_2 VTAPM * PY * Provider\_AIPBP_2 + \sigma_1 VTAPM * YEAR + \theta_1 BENE_{ijkt} + \varphi_2 CNTY_j + \rho_2 ZCTA_j + \omega_2 PRAC_k + \varepsilon_{ijkt}$$

where:

- $VTAPM * PY * Provider\_AIPBP_m$ represent the interactions of beneficiary attribution to the VTAPM, the PY, and each type of provider AIPBP status. $\delta_m$ are the treatment effects of interest for the $m^{th}$ subgroup.

## Estimating Impacts on Total Medicare Gross Spending for Subgroups Defined by the Number of Years of Participation

The methodology for estimating impacts on subgroups defined by the number of years of participation was similar to that for estimating impacts of provider AIPBP status. We looked at the number of years beneficiaries were attributed to the model, as well as the number of years providers participated in the model. For beneficiaries, we examined two subgroups of beneficiaries who participated in the model for all five PYs versus those who participated in the model for less than 5 years. For providers, we examined two subgroups of beneficiaries who were attributed to providers participating in the model for all five PYs versus beneficiaries attributed to providers participating in the model for less than five years. The specification for this analysis was similar to **Equation D.5**, with the $Provider\_AIPBP_m$ terms replaced by terms denoting five years of participation or less than five years of participation. We also excluded from this analysis beneficiaries who switched between treatment and control groups throughout the entire performance period.

## Methodological Limitations and Mitigation Strategies

Vermont has unique market characteristics and a state context that continue to present several methodological challenges to our evaluation. These challenges include:

- **Differential effects of the COVID-19 PHE.** In 2020, 2021, and 2022, the COVID-19 PHE had meaningfully different effects in Vermont and the comparison states. Rates of COVID-19 cases and deaths in Vermont were lower than rates in comparison states, likely due in part to Vermont's robust pandemic response and broad vaccination campaign.
- **Vermont's unique context**. Few areas outside Vermont have similar sociodemographic and health insurance market characteristics and experiences of extensive health care reform. As a result, unaccounted-for differences in area-level characteristics between the treatment and comparison groups may bias the stated impacts.
- **Scale and intensity of Vermont's health reform efforts in the baseline period.** Vermont's PCMH and multi-payer ACO initiatives during the baseline period were likely more advanced than similar initiatives in the comparison states. This may have contributed to differing trends in spending and utilization for the treatment and comparison groups in the baseline period and may also have additional spillover effects during the VTAPM's performance period.

To address these methodological challenges, we employed several mitigation strategies, described in detail in **Appendix Exhibit D.4.3**.

**Appendix Exhibit D.4.3.** Methodological Challenges and Mitigation Strategies

| Challenge | Mitigation Strategy |
|---|---|
| **Differential Effects of the COVID-19 PHE in 2022** | |
| Ongoing changes in utilization and imbalance between treatment and control groups due to the COVID-19 PHE | • Included cumulative COVID-19 deaths per 100,000 population as a county-level covariate in entropy balancing models for the main analysis[24]<br>• Conducted a sensitivity check using an alternate version of the analytic weights from an entropy balancing model that included county-level COVID-19 vaccination coverage in 2022<br>• Generated a descriptive assessment of beneficiary- and area-level COVID-19 characteristics<br>• Conducted sensitivity checks with beneficiary- and area-level COVID-19 characteristics included as covariates in the impact models |
| Potential for outlier weights and imbalance on other covariates when the COVID-19 covariate is included in entropy balancing models | • Examined distributions of comparison group weights and assessed covariate balance tables to ensure treatment and comparison groups were appropriately balanced.<br>• Conducted a sensitivity check using alternate analytic weights from an entropy balancing model that did not include COVID-19 covariates |
| **Vermont's Unique Context** | |
| Inability to balance the treatment and comparison groups on MA penetration and upside-risk Medicare SSP penetration rates | • Limited the ACO-level comparison group to Medicare beneficiaries attributed to Track 1 or Basic A/B/C/D/E Medicare SSP ACO providers, who are likely to have similar experience in upside-risk contracts<br>• Conducted sensitivity analyses with the inclusion of MA penetration and ACO upside-risk penetration as covariates |
| Influence of outlier weights | • Tested multiple iterations of the entropy balancing algorithm to optimize balance on beneficiary- and market-level characteristics while minimizing the percent of comparison beneficiaries in the top percentile by weight |
| **Scale and Intensity of Vermont's Health Reform Efforts in the Baseline Period** | |
| VTAPM's trends in the baseline period (2014–2016) may not reflect long-term secular trends | • Conducted a sensitivity analysis that includes the model "ramp-up" period of PY 0 (2017) as a baseline year |
| Potential of longer-term impacts of other Vermont health reform efforts | • Selected comparison states with similar histories of health reform, specifically multi-payer reform initiatives and PCMH initiatives |

**Relatively Large Standard Errors in 2022.** In addition, we continue to see large standard errors in our impact estimates, as we also did in PY 3 (2020) and PY 4 (2021). There are several reasons for these large standard errors, the first of which is large variability in certain outcomes in the treatment and comparison groups, particularly during the COVID-19 PHE. For many outcomes, while the treatment and comparison groups showed similar trends at baseline, outcomes diverged after COVID-19 began in 2020, with one group eventually reverting to baseline levels while the other group remained at pandemic levels. The COVID-19 pandemic may play a role in exacerbating the variability in spending and utilization outcomes if it contributed to greater

[24] We assessed the effect of adding various combinations of county-level COVID-19 variables (COVID-19 cases, COVID-19 deaths, case fatality rate, and the Pandemic Vulnerability Index score) in our entropy balancing model to mitigate the difference in community COVID-19 burden between Vermont and the comparison states. After assessing these options, we included only COVID-19 deaths (per 100,000 population) in our entropy balancing model because it was less susceptible to local variation in health care availability and it achieved adequate balance while minimizing outlier weights.

variability in these outcomes during PY 5 (for example, if the pandemic led to very high total spending for some individuals who contracted COVID-19 on top of other chronic, high-cost conditions, or if it led to very low total spending for other individuals who postponed necessary and routine care). In addition to COVID-19, there could also be other unknown exogenous factors affecting variability in the outcomes. We adjust for many individual and area-level covariates in our models, but if some of these factors are not appropriately controlled for, they can increase the imprecision and standard errors of our impact estimates. Finally, the models for many utilization outcomes are using relatively small sample sizes or effective sample sizes. For example, to estimate impacts on unplanned 30-day readmissions, the analytic sample only includes beneficiaries with an initial hospitalization. For the PAC utilization outcomes, only a very small subset of beneficiaries experienced any utilization, which increases the standard errors of the impact estimates obtained from these models.

# Appendix D.5. Net Impact Estimation

In addition to estimating the gross impact of the VTAPM model on total Medicare Parts A and B spending, we also calculate the net spending impact of the VTAPM by accounting for incentive payments from CMS for shared savings or losses for VTAPM and comparison clinicians in the BYs and PYs. Incentive payments estimated for the treatment and comparison group populations include the following:

- **Treatment providers, PY**: MAPCP incentives received during the PY + shared savings/losses for treatment clinicians in the PY.
- **Treatment providers, BYs**: MAPCP incentives received during the BYs + shared savings/losses for treatment clinicians who participated in the SSP, Pioneer, or NGACO models in the BYs.
- **Comparison providers, PY**: Shared savings/losses paid to comparison clinicians who participated in the SSP, Pioneer, or NGACO in the PY.
- **Comparison providers, BYs**: Shared savings/losses paid to comparison clinicians who participated in the SSP, Pioneer, or NGACO models in the BYs.

The $9.5 million in Medicare start-up funding provided by CMS in the 2017 cooperative payment agreement is not included in the net spending estimation. **Appendix Exhibit D.5.1** shows the total PBPY dollar amount of CMS incentive payment amounts that are included in the net impact estimation for the ACO- and state-level analyses in PY 5.

**Appendix Exhibit D.5.1.** CMS Incentive Payments for VTAPM and Comparison Clinicians

| | | PY 1 | | PY 2 | | PY 3 | | PY 4 | | PY 5 | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | BYs | PY | BYs | PY | BYs | PY | BYs | PY | BYs | PY |
| ACO | VTAPM | $119.68 | $279.80 | $116.84 | $183.86 | $122.14 | $300.00 | $117.86 | $139.76 | $115.52 | $130.95 |
| | Comparison | $36.01 | $46.21 | $30.52 | $98.79 | $28.39 | $114.62 | $39.34 | $116.51 | $49.85 | $121.26 |
| State | Vermont | $119.44 | $196.49 | $116.77 | $159.58 | $122.04 | $221.36 | $118.26 | $130.66 | $115.93 | $127.99 |
| | Comparison | $19.40 | $35.02 | $19.08 | $50.50 | $19.38 | $50.82 | $18.31 | $44.00 | $19.87 | $19.91 |

**NOTE:** All estimates are presented per beneficiary per year in 2022 USD. Total net incentive payments for VTAPM in each PY are the treatment group's net incentive payments (PY payments minus BY payments), minus the comparison group's net incentive payments (PY payments minus BY payments).

To estimate PBPY incentives for VTAPM providers in the baseline and comparison providers in the baseline and PYs, we used the following methods:

- For the ACO-level analysis, we identified beneficiaries attributed by the ACO-level concurrent alignment receiving a meaningful level of care during a year from providers participating in SSP, Pioneer, or NGACO models based on the CMS MDM, then applied the PBPY incentive costs associated for those ACOs using publicly available data on annual shared savings/losses incurred by providers in CMS models.
- For the state-level analysis, we identified beneficiaries attributed by the state-level concurrent alignment who were also attributed to SSP, Pioneer, or NGACO models based on the CMS MDM file, then linked the data to publicly available data on annual shared savings/losses for those ACOs at the beneficiary level.

We weighted PBPY estimates for both the ACO- and state-level analyses using the analytic EB weights. To calculate the net incentive amount, we subtracted the PY-BY difference in the comparison group from the PY-BY

difference in the treatment group. The net incentive amount is subtracted from the gross Medicare spending estimate to calculate the net Medicare spending estimate presented in the report.

## Appendix D.6. Sensitivity Analyses

We conducted the following sensitivity tests to assess the robustness of our estimates to different assumptions in PY 5:

- **Include CY 2017 as baseline** – The scale and intensity of Vermont's delivery system reform initiatives in the baseline period may have contributed to a permanent structural change in the long-term Medicare spending trajectory. The impact of these initiatives may have persisted into the model's "ramp-up" year (2017) and performance periods. Inclusion of 2017 as a BY allows us to account for some of the delayed impacts of the baseline period initiatives. Additionally, the Medicare ACO initiative was not implemented until 2018, so, although 2017 was a model PY, no Medicare ACO initiative activities were in place. For this sensitivity analysis, we include CY 2017 and consider it in the model as a fourth year in the baseline period.
- **No COVID-19 PHE variable in EB weight** – In estimation of the EB weights, we excluded the COVID-19 PHE covariate (number of cumulative deaths per 100,000 population in PY 4) from the balancing model.
- **Cumulative COVID-19 deaths and COVID-19 vaccination rate included in weight** – In estimation of the EB weights, we included the COVID-19 PHE covariate (number of cumulative deaths per 100,000 population in PY 4) and county-level COVID-19 vaccination rate in PY 4 in the balancing model.
- **Cap spending at 99th percentile** – We capped the Medicare spending outcome at the 99th percentile to assess the robustness of the impact estimates to the possibility of random variation in the highest spenders between the VTAPM and comparison group.
- **Alternative model distribution** – Instead of using the distribution recommended by the Park test, we used the second-best distribution, which was Poisson for both the ACO- and state-level analyses. This tests the robustness of our results to different distributional assumptions.
- **No linear interaction term** – We removed the linear interaction term from the DID model statement, which accounts for differences in the linear trend in the baseline period between the treatment and comparison groups.
- **Include upside ACO rate covariate** – We added a covariate to the DID model statement representing the percent of beneficiaries in a county who participated in an ACO with upside risk.
- **Include MA rate covariate** – We added a covariate to the DID model statement representing the percent of beneficiaries in a county who had one or more months of MA coverage.

**Appendix Exhibits D.6.1 and D.6.2** present the findings from each of these analyses for PY 5. While we observe a moderate amount of variation from the results of the main DID model presented in this report, findings were overall similar to the main findings and showed no significant impact of VTAPM on total Medicare spending.

**Appendix Exhibit D.6.1.** Medicare ACO-Level PY 5: Sensitivity Analyses for Total Medicare Spending

| | Baseline (2014–2016) | | PY 5 (2022) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Difference-in-Differences | | | | | |
| | VTAPM | Comp. | VTAPM | Comp. | DID Estimate | VTAPM Change | Comp. Change | 90% CI | % Impact | p |
| **Main spending model** | $11,743 | $14,753 | $10,075 | $14,107 | -$1,021.99 | -$1,668 | -$636 | -$2,236.83, $192.86 | -8.29 | 0.166 |
| **Include CY 2017 as a baseline** | $11,762 | $14,732 | $10,251 | $14,084 | -$862.44 | -$1,511 | -$648 | -$1,862.32, $137.43 | -7.09 | 0.156 |
| **No COVID-19 PHE variable in EB weight** | $11,732 | $14,707 | $10,038 | $13,985 | -$972.89 | -$1,694 | -$722 | -$2,166.71, $220.92 | -7.95 | 0.180 |
| **Cumulative COVID-19 deaths and COVID-19 vaccination rate included in weight** | $11,816 | $14,636 | $9,973 | $13,918 | -$1,123.65 | -$1,843 | -$718 | -$2,338.82, $91.53 | -9.00 | 0.128 |
| **Cap spending at 99th percentile** | $11,417 | $13,683 | $9,665 | $12,852 | -$921.98 | -$1,752 | -$831 | -$1,997.44, $153.48 | -7.91 | 0.158 |
| **Alternative model distribution** | $10,272 | $13,922 | $8,329 | $13,362 | -$1,383.29** | -$1,943 | -$560 | -$2,305.16, -$461.43 | -12.0 | 0.014 |
| **No linear interaction term** | $11,911 | $14,501 | $11,503 | $13,867 | $225.85 | -$408 | -$634 | -$138.51, $590.21 | 2.04 | 0.308 |
| **Include upside ACO rate covariate** | $11,642 | $14,911 | $9,690 | $14,259 | -$1,299.00 | -$1,952 | -$652 | -$2,708.25, $110.25 | -10.3 | 0.129 |
| **Include MA rate covariate** | $11,618 | $14,958 | $10,039 | $14,298 | -$918.50 | -$1,579 | -$660 | -$2,110.90, $273.90 | -7.60 | 0.205 |

NOTE: Impacts are PBPY, in 2022 USD. Asterisks denote significance at *p<0.10, **p<0.05, ***p<0.01. VTAPM Change and Comp. Change columns indicate the change in average adjusted outcome for the VTAPM or comparison group, respectively, between PY 5 and the baseline; cells highlighted in blue indicate a decrease between PY 5 (2022) and the baseline for the VTAPM or comparison group.

**Appendix Exhibit D.6.2.** Medicare State-Level PY 5: Sensitivity Analyses for Total Medicare Spending

| | Baseline (2014–2016) | | PY 5 (2022) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Difference-in-Differences | | | | | |
| | Vermont | Comp. | Vermont | Comp. | DID Estimate | VTAPM Change | Comp. Change | 90% CI | % Impact | p |
| **Main spending model** | $12,662 | $13,259 | $11,099 | $12,810 | -$1,114.08 | -$1,563 | -$449 | -$2,575.92, $347.76 | -8.43 | 0.210 |
| **Include CY 2017 as baseline** | $12,725 | $13,242 | $11,493 | $12,770 | -$759.69 | -$1,232 | -$472 | -$1,730.55, $211.16 | -5.91 | 0.198 |
| **No COVID-19 PHE variable in EB weight** | $12,637 | $13,283 | $11,193 | $12,721 | -$880.83 | -$1,444 | -$562 | -$2,292.36, $530.70 | -6.81 | 0.305 |
| **Cumulative COVID-19 deaths and COVID-19 vaccination rate included in weight** | $12,646 | $13,260 | $11,073 | $12,776 | -$1,089.58 | -$1,573 | -$484 | -$2,532.48, $353.32 | -8.27 | 0.214 |
| **Cap spending at 99th percentile** | $12,190 | $12,690 | $10,385 | $12,087 | -$1,201.34 | -$1,805 | -$603 | -$2,528.94, $126.27 | -9.48 | 0.137 |
| **Alternative model distribution** | $11,727 | $12,177 | $10,344 | $11,709 | -$915.87 | -$1,383 | -$468 | -$2,248.72, $416.98 | -7.52 | 0.258 |
| **No linear interaction term** | $12,795 | $13,120 | $12,164 | $12,677 | -$187.43 | -$631 | -$443 | -$559.54, $184.68 | -1.53 | 0.407 |
| **Include upside ACO rate covariate** | $13,071 | $12,848 | $12,515 | $12,417 | -$125.27 | -$556 | -$431 | -$1,619.03, $1,368.49 | -1.01 | 0.890 |
| **Include MA rate covariate** | $12,636 | $13,287 | $11,081 | $12,837 | -$1,104.71 | -$1,555 | -$450 | -$2,562.37, $352.05 | -8.38 | 0.213 |

NOTE: Impacts are PBPY, in 2022 USD. Asterisks denote significance at *p<0.10, **p<0.05, ***p<0.01. VTAPM Change and Comp. Change columns indicate the change in average adjusted outcome for the VTAPM or comparison group between PY 5 and the baseline; cells highlighted in blue indicate a decrease between PY 5 (2022) and the baseline for the VTAPM or comparison group.

We also conducted sensitivity analyses to test the impact of the inclusion of COVID-19 PHE-specific variables in PY 5 (2022) as covariates in our main DID model. We tested four variations as part of our sensitivity testing, including individual-level covariates, area-level covariates, and a combination of both. All variables were coded as non-zero values in the PY 5 (2022) data and zeroes for all prior years. We tested the inclusion of the following covariates in the DID model:

- **Flag for COVID-19 diagnosis** – An individual-level flag indicating that a beneficiary had a diagnosis of COVID-19 in their Medicare claims.
- **Percent vaccinated against COVID-19 covariate** – This is the estimated percentage of the population vaccinated against COVID-19 in the county.
- **Cumulative number of deaths per 100,000 population** – A county-level flag that indicates the cumulative number of deaths per 100,000 population in a beneficiary's county in PY 5 (2022).
- **Flag for COVID-19 diagnosis** *and* **number of cumulative deaths per 100,000 population** *and* **percent vaccinated against COVID-19 covariate** – The final sensitivity test includes the covariate for individual-level flag for COVID-19 diagnosis, the covariate for county-level cumulative number of deaths per 1,000 in the same DID model, and the covariate for the percent of a beneficiary's county that was vaccinated against COVID-19 in PY 5 (2022).

**Appendix Exhibits D.6.3 and D.6.4** present the findings from each of these COVID-19 PHE-related sensitivity analyses for PY 5 for the ACO- and state-level impact analyses. While we observe a moderate amount of variation from the results of the main DID model presented in this report, sensitivity findings were overall similar to the main findings (that is, in the same direction and of a relatively similar magnitude) and do not change our overall interpretation of the main findings.

**Appendix Exhibit D.6.3.** Medicare ACO-Level PY 5: Sensitivity Tests of COVID-19 PHE Covariates for Total Medicare Spending

| | Baseline (2014–2016) | | PY 5 (2022) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Difference-in-Differences | | | | | |
| | VTAPM | Comp. | VTAPM | Comp. | DID Estimate | VTAPM Change | Comp. Change | 90% CI | % Impact | p |
| **Main spending model** | $11,743 | $14,753 | $10,075 | $14,107 | -$1,021.99 | -$1,668 | -$636 | -$2,236.83, $192.86 | -8.29 | 0.166 |
| **+ COVID-19 Diagnosis Covariate** | $11,715 | $14,656 | $10,613 | $14,532 | -$977.86 | -$1,102 | -$124 | -$2,153.04, $197.31 | -8.53 | 0.171 |
| **+ Percent Vaccinated against COVID-19 Covariate** | $11,753 | $14,738 | $10,177 | $14,093 | -$930.81 | -$1,576 | -$645 | -$2,132.59, $270.96 | -7.84 | 0.203 |
| **+ Cumulative Deaths Covariate** | $11,746 | $14,747 | $10,085 | $14,103 | -$1,017.19 | -$1,661 | -$644 | -$2,224.48, $190.10 | -8.28 | 0.166 |
| **+ COVID-19 Diagnosis Covariate + Cumulative COVID-19 Deaths Covariate + Percent Vaccinated against COVID-19 Covariate** | $11,727 | $14,638 | $10,725 | $14,515 | -$879.34 | -$1,002 | -$123 | -$2,042.03, $283.36 | -8.01 | 0.213 |

SOURCE: NORC analysis of Medicare claims.

NOTE: Impacts are PBPY, in 2022 USD. Asterisks denote significance at *p<0.10, **p<0.05, ***p<0.01. Cumulative deaths covariate is the cumulative number of deaths per 100,000 population. VTAPM Change and Comp. Change columns indicate the change in average adjusted outcome for the VTAPM or comparison group between PY 5 and the baseline; cells highlighted in blue indicate a decrease between PY 5 (2022) and the baseline for the VTAPM or comparison group.

**Appendix Exhibit D.6.4.** Medicare State-Level PY 5: Sensitivity Tests of COVID-19 PHE Covariates for Total Medicare Spending

| | Baseline (2014–2016) | | PY 5 (2022) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Difference-in-Differences | | | | | |
| | Vermont | Comp. | Vermont | Comp. | DID Estimate | VTAPM Change | Comp. Change | 90% CI | % Impact | p |
| **Main spending model** | $12,662 | $13,259 | $11,099 | $12,810 | -$1,114.08 | -$1,563 | -$449 | -$2,575.92, $347.76 | -8.43 | 0.210 |
| **+ COVID-19 Diagnosis Covariate** | $12,605 | $13,195 | $11,615 | $13,236 | -$1,030.96 | -$990 | $41 | -$2,401.58, $339.66 | -8.47 | 0.216 |
| **+ Percent Vaccinated against COVID-19 Covariate** | $12,668 | $13,256 | $11,305 | $12,799 | -$905.64 | -$1,363 | -$457 | -$2,233.96, $422.67 | -7.43 | 0.262 |
| **+ Cumulative Deaths Covariate** | $12,658 | $13,271 | $11,068 | $12,814 | -$1,132.09 | -$1,590 | -$457 | -$2,612.59, $348.41 | -8.37 | 0.208 |
| **+ COVID-19 Diagnosis Covariate + Cumulative COVID-19 Deaths Covariate + Percent Vaccinated against COVID-19 Covariate** | $12,603 | $13,207 | $11,712 | $13,239 | -$922.92 | -$891 | $32 | -$2,232.44, $386.60 | -7.79 | 0.246 |

SOURCE: NORC analysis of Medicare claims.

NOTE: Impacts are PBPY, in 2022 USD. Asterisks denote significance at *p<0.10, **p<0.05, ***p<0.01. Cumulative deaths covariate is the cumulative number of deaths per 100,000 population. VTAPM Change and Comp. Change columns indicate the change in average adjusted outcome for the VTAPM or comparison group between PY 5 and the baseline; cells highlighted in blue indicate a decrease between PY 5 (2022) and the baseline for the VTAPM or comparison group.

# Appendix D.7. Medicaid Data Quality Assessment

**T-MSIS.** In constructing the VTAPM Medicaid measures for AR3, we assessed the quality of the Medicaid data using CMS's Data Quality (DQ) Atlas. The DQ Atlas is "an interactive, web-based tool that helps policy makers, analysts, researchers, and other stakeholders explore the quality and usability of the Transformed Medicaid Statistical Information System (T-MSIS) Analytic Files (TAF) to determine whether the data can meet their analytic needs. These needs include the ability to conduct insightful, methodologically sound analyses of key Medicaid and Children's Health Insurance Program (CHIP) topics such as enrollment, claims, expenditures, and service use."23 The DQ Atlas examines each state's TAF data and ranks data elements by level of concern: low concern, medium concern, high concern, unusable, or unclassified.

We use claims from four T-MSIS tables for measure construction: inpatient, long-term care, other services, and pharmacy. According to the DQ Atlas, linking claims and expenditures (spending) to beneficiaries and providers between these tables is of low concern, so we can reliably create measures that use claims for more than one table. Medicaid enrollment benchmarking and claim volume for three of the tables (inpatient, long-term care, and pharmacy) are also rated as low concern, indicating that the files are complete enough for reliable analysis; claims volume for the other services table is of medium concern, indicating that some data may be missing.

Many of the T-MSIS data elements we considered using were rated as high concern or unusable, including spending, category of service code, beneficiary zip code and eligibility group code, and inpatient hospital type and facility characteristics. Further, capitated payments—a key element of the VTAPM Medicaid ACO—were not captured in the T-MSIS data fields related to spending. Thus, in this report we do not use T-MSIS outcomes for the Medicaid population that reflect spending. Data elements required to calculate the acute care stays, ED visits, and the three SUD measures (such as procedure and diagnosis codes), were rated as low concern in the DQ Atlas; thus, those measures are derived from T-MSIS in this report.

**VHCURES.** We identified several data quality concerns within VHCURES, including issues related to the timeliness and accuracy of reporting across all spending and utilization measures for 2022 (likely due to issues related to the timeframe for claims adjudication and processing). For this reason, we report trends in spending for the ACO-attributed Medicaid population through 2021 instead of 2022 in this report. The VHCURES flag for ACO attribution became available in 2017, the year the VTAPM Medicaid ACO started.

Our VHCURES analysis was further constrained by incomplete, inconsistent, or unusable data elements. We found significant missingness or unusable values in elements required to construct utilization measures (e.g. acute care stays, ED visits, and SUD diagnosis and treatment) for the Medicaid population in a manner similar to the Medicare specifications. In addition, there were high levels of missingness (over 95%) for the race, ethnicity, and disability-status variables and inconsistent values for the gender variable in the VHCURES data. For these reasons, our VHCURES analysis for the fourth evaluation report was limited to assessing Medicaid spending trends from 2017–2021 for the ACO-attributed population, and we were unable to report on key demographic variables.

# Appendix E. Supporting Documentation for Chapter 1

**Appendix Exhibit E.1.** Hospital Participation by Payer, Performance Year, and Organizational Characteristics

| Health Service Area | Home Hospital | Type | No. of Beds[§] | System Affiliation | Payer ACO Initiatives | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 |
| Burlington | University of Vermont (UVM) Medical Center | PPS | 458 | UVM Health Network | Medicaid | All | All | All | All | All |
| Berlin | Central Vermont Medical Center | PPS | 88 | UVM Health Network | Medicaid | All | All | All | All | All |
| Middlebury | Porter Medical Center | CAH | 25 | UVM Health Network | Medicaid | All | All | All | All | All |
| St. Albans | Northwestern Medical Center | PPS | 53 | Independent | Medicaid | All | All | All | All | All |
| Brattleboro | Brattleboro Memorial Hospital | PPS | 47 | Independent | | All | All | All | All | All |
| Springfield | Springfield Hospital | CAH | 25 | Independent | | All | All | Medicaid & Commercial | Medicaid & Commercial | Medicaid & Commercial |
| Lebanon | Dartmouth-Hitchcock Medical Center | PPS | 401 | Dartmouth-Hitchcock Health | | Medicaid & Commercial | Medicaid & Commercial | Medicaid & Commercial | Medicaid & Commercial | Medicaid & Commercial |
| Bennington | Southwestern Vermont Medical Center | PPS | 78 | Independent | | Medicaid | All | All | All | All |
| Windsor | Mt. Ascutney Hospital | CAH | 25 | Dartmouth-Hitchcock Health | | Medicaid | All | All | All | All |

| Health Service Area | Home Hospital | Type | No. of Beds§ | System Affiliation | Payer ACO Initiatives | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 |
| Newport | North Country Hospital | CAH | 25 | Independent | | Medicaid | Medicaid | Medicaid & Commercial | Medicaid & Commercial | Medicaid & Commercial |
| Rutland | Rutland Regional Medical Center | PPS | 119 | Independent | | | Medicaid | Medicaid & Commercial | All | All |
| St. Johnsbury | Northeastern Regional Hospital | CAH | 25 | Independent | | | Medicaid | Medicaid & Commercial | Medicaid & Commercial | Medicaid & Commercial |
| Randolph | Gifford Medical Center | CAH | 25 | Independent | | | Medicaid | Medicaid & Commercial | Medicaid & Commercial | Medicaid & Commercial |
| Morrisville | Copley Hospital | CAH | 25 | Independent | | | | Medicaid & Commercial | Medicaid & Commercial | Medicaid & Commercial |
| Townshend | Grace Cottage | CAH | 19 | Independent | | | | | | |

SOURCES: OneCare Vermont's FY 2023 Budget Submission (September 30, 2022); NORC analysis of Hospital Cost Report public use file; CMS Provider of Service files; UNC Sheps Center 2021 U.S. Hospital List.

NOTE: PPS = prospective payment system hospital; CAH = critical access hospital. §CMS total inpatient bed count as reported by the Health Care Cost and Information Reporting System.

**Appendix Exhibit E.2.** Payer ACO Initiatives by Health Service Area in PY 5 (2022)

| Health Service Area | Home Hospital | Payer ACO Initiatives | | | |
|---|---|---|---|---|---|
| | | Medicare | Medicaid | BCBSVT | MVP QHP |
| Burlington | University of Vermont (UVM) Medical Center | ✓ | ✓ | ✓ | ✓ |
| Berlin | Central Vermont Medical Center | ✓ | ✓ | ✓ | ✓ |
| Middlebury | Porter Medical Center | ✓ | ✓ | ✓ | ✓ |
| St. Albans | Northwestern Medical Center | ✓ | ✓ | ✓ | ✓ |
| Brattleboro | Brattleboro Memorial Hospital | ✓ | ✓ | ✓ | ✓ |
| Springfield | Springfield Hospital | | ✓ | ✓ | ✓ |
| Lebanon | Dartmouth-Hitchcock Medical Center | | ✓ | ✓ | ✓ |
| Bennington | Southwestern Vermont Medical Center | ✓ | ✓ | ✓ | ✓ |
| Windsor | Mt. Ascutney Hospital | ✓ | ✓ | ✓ | |
| Newport | North Country Hospital | | ✓ | ✓ | ✓ |
| Rutland | Rutland Regional Medical Center | ✓ | ✓ | ✓ | ✓ |
| St. Johnsbury | Northeastern Regional Hospital | | ✓ | ✓ | ✓ |
| Randolph | Gifford Medical Center | | ✓ | | ✓ |
| Morrisville | Copley Hospital | | ✓ | ✓ | ✓ |
| Townshend | Grace Cottage | | | | |

SOURCE: OneCare Vermont's FY 2023 Budget Submission (September 30, 2022).

NOTE: BCBSVT includes BCBSVT's QHP, BEE, fully insured large group, and self-insured large group.

**Appendix Exhibit E.3.** Participation by Provider Type, PY 5 (2022)

| Provider Type | Total in Model's Provider Network as of PY 5 (2022) |
|---|---|
| **Hospital** | 14 |
| **FQHCs** | 9 |
| **Primary Care Practices** | 121 |
| **Specialty Care Practices** | 262 |
| **Home Health Agencies** | 5 |
| **SNFs** | 22 |
| **Designated Mental Health Agencies & Specialized Service Agencies** | 15 |
| **Regional Housing Authorities** | 21 |

SOURCE: OneCare Vermont's 2022 Budget Presentation (November 10, 2021).

**Appendix Exhibit E.4.** Clinician Participation by VTAPM ACO Initiative and County

| | Medicare | | Medicaid | | Commercial | |
|---|---|---|---|---|---|---|
| | Participants | Eligible Non-Participants | Participants | Eligible Non-Participants | Participant | Eligible Non-Participants |
| **Addison** | 144 | 64 | 135 | 332 | 135 | 332 |
| **Bennington** | 244 | 99 | 219 | 470 | 219 | 470 |
| **Caledonia** | 6 | 168 | 159 | 341 | 159 | 341 |
| **Chittenden** | 1,707 | 506 | 1,743 | 3,259 | 1,743 | 3,259 |
| **Essex** | - | 6 | 8 | 9 | 8 | 9 |
| **Franklin** | 175 | 57 | 151 | 412 | 151 | 412 |
| **Grand Isle** | 16 | 7 | 16 | 20 | 16 | 20 |
| **Lamoille** | 1 | 134 | 111 | 345 | 111 | 345 |
| **Orange** | - | 109 | 110 | 275 | 110 | 275 |
| **Orleans** | 1 | 156 | 73 | 285 | 73 | 285 |
| **Rutland** | 333 | 96 | 282 | 629 | 282 | 629 |
| **Washington** | 346 | 167 | 383 | 825 | 383 | 825 |
| **Windham** | 254 | 156 | 240 | 747 | 240 | 747 |
| **Windsor** | 115 | 182 | 179 | 862 | 179 | 862 |
| **Non-Vermont** | 34 | - | 1,235 | - | 1,235 | - |

**SOURCE**: NORC analysis of VTAPM ACO Provider Lists, Medicare Professional FFS claims, and CMS Public Use File (PECOS & NPPES).

**NOTE**: We used the VTAPM Provider Files to identify the VTAPM ACO participants. We identified the eligible non-participants based on their specialty designation; non-participants needed to have one or more of the specialty designations held by the participants. For the Medicare ACO participants and eligible non-participants, we used Medicare claims to measure the volume of services provided in each county by the clinicians and attributed the clinicians to the county in which they provided the plurality of the services. We used specialty codes in NPPES to identify non-participating clinicians who were eligible to participate in the Medicaid and BCBS ACO initiatives; NORC did not have access to usable Medicaid and BCBS claims data to validate the eligibility criteria. We used a combination of PECOS and NPPES data to attribute Medicaid and BCBS ACO participants and eligible non-participants to a specific Vermont county. Medicaid and commercial participants have 100% overlap in their individual physician clinician lists.

**Appendix Exhibit E.5.** Practice Participation by Practice Type and Clinician Participation by Specialty Designation

| | Performance Year 5 | | | | | | |
|---|---|---|---|---|---|---|---|
| | | VTAPM Participants | | | | | |
| | | | VTAPM Participants Participating in… | | | | |
| | Total | All VTAPM Participants | All-Payer Initiatives | Medicare ACO | Medicaid ACO | Commercial ACO | Non-Participants |
| **Practices and Health Centers** | | | | | | | |
| Practices (TIN) | 1,123 | 91 | 55 | 59 | 89 | 87 | 860 |
| Critical Access Hospitals | 8 | 7 | 2 | 2 | 7 | 7 | 1 |
| Federally Qualified Health Centers | 58 | 50 | 24 | 27 | 47 | 47 | 8 |
| Rural Health Centers | 9 | 8 | 0 | 0 | 8 | 8 | 1 |
| **Clinicians (NPI)** | | | | | | | |
| All Clinicians Affiliated with Eligible Practices | 7,166 | 5,452 | 2,968 | 3,376 | 5,044 | 5,044 | 1,714 |
| Primary Care Specialty | 2,556 | 2,145 | 1,230 | 1,360 | 2,015 | 2,015 | 411 |
| Non-Physician Primary Care Specialists | 1,457 | 1,214 | 650 | 760 | 1,104 | 1,104 | 243 |
| Eligible Specialists | 663 | 559 | 338 | 393 | 504 | 504 | 104 |
| Other§ | 3,947 | 2,748 | 1,400 | 1,623 | 2,525 | 2,525 | 1,199 |

SOURCE: Analysis of Medicare provider and claims data by NORC.

NOTE: §Other represents attribution-ineligible clinicians. VTAPM participants include all practices and clinicians listed in the VTAPM ACO Provider Files. Eligible non-participants are clinicians with one or more eligible specialty designations who billed Medicare for services rendered within Vermont in the PY.

**Appendix Exhibit E.6.** Practice Participation in the VTAPM Medicare ACO Initiative

| | Performance Year 5 | | | |
|---|---|---|---|---|
| | Medicare Attribution-Eligible Practices | | | |
| | Total (Excludes Preferred Practices) (N) | Participants (N) | Non-Participants (N) | Preferred Practices (N) |
| **Practices and Health Centers** | | | | |
| Practices (TIN) | 215 | 29 | 186 | 25 |
| CAHs | 8 | 2 | 6 | - |
| FQHCs | 48 | 19 | 29 | - |
| RHCs | 8 | 0 | 8 | - |
| Practice Size: 1-5 Clinicians | 180 | 18 | 162 | 9 |
| Practice Size: 6-30 Clinicians | 73 | 18 | 55 | 3 |
| Practice Size: 31+ Clinicians | 25 | 14 | 11 | 1 |
| Prior Medicare SSP Experience | 91 | 36 | 55 | 9 |

SOURCE: Analysis of Medicare provider and claims data by NORC.

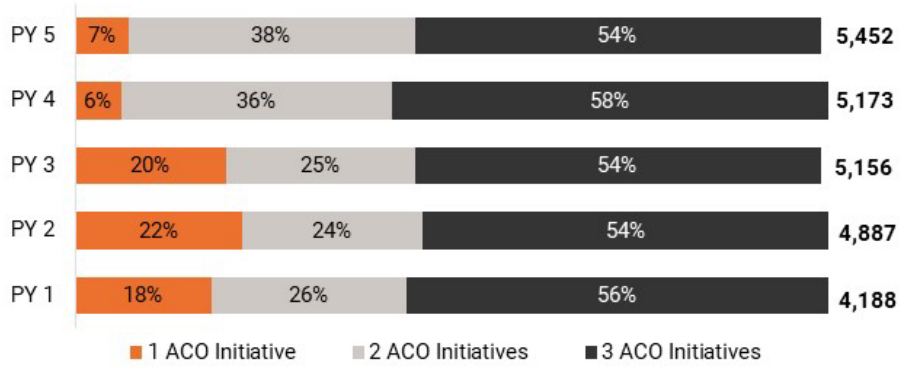
NOTE: We used the VTAPM Provider Files to identify the VTAPM ACO participants. We identified the eligible non-participants based on their specialty designation; non-participants needed to have one or more of the specialty designations held by the participants. For the Medicare ACO participants and eligible non-participants, we used Medicare claims to measure the volume of services provided in each county by the clinicians and attributed the clinicians to the county in which they provided the plurality of the services. Preferred clinicians are selected by the VTAPM ACO for their ability to contribute to the VTAPM ACO's success, but their patient panels do not qualify for attribution to the Medicare ACO initiative, and they are not required to participate in quality reporting. Definition from: https://www.jonesday.com/en/insights/2015/04/hhs-announces-next-generation-aco-model-of-payment-and-care-delivery.

**Appendix Exhibit E.7.** Vermont, VTAPM, and Scale Target Populations by Payer, PY 5 (2022)

| Payer | 2022 Vermont Population | Scale Target Denominator | Population Participating in Scale Target ACO Initiatives |
|---|---|---|---|
| Medicare | 108,723 | 100,952 | 62,607 (62%) |
| Medicaid | 155,706 | 149,514 | 126,291 (84%) |
| Commercial: Self-Insured | 154,600 | 154,600 | 33,246 (22%) |
| Commercial: Fully Insured | 94,826 | 87,766 | 37,814 (43%) |
| Total | 645,570 | 518,010 | 259,958 (50%) |

SOURCE: Vermont All-Payer ACO Model Annual ACO Scale Targets and Alignment Report: Performance Year 5 (2022).

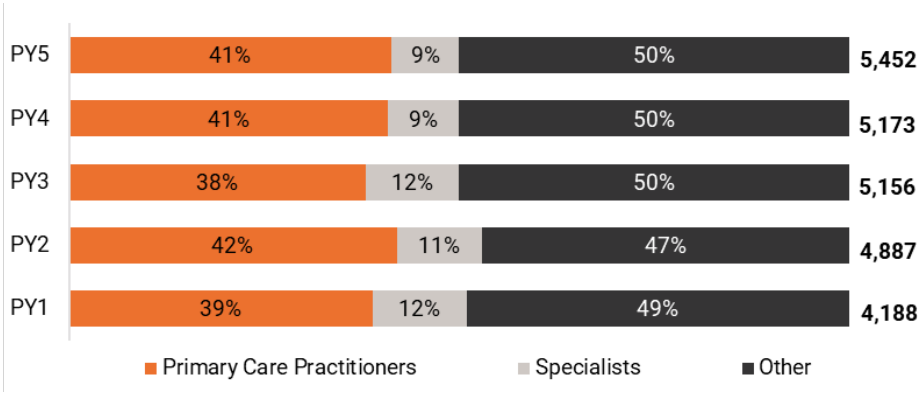
**Appendix Exhibit E.8.** Clinician Participation in ACO Payer Initiatives, PY 1-PY 5 (2018-2022)




SOURCE: OneCare 2022 Provider Network (Appendix 2, FY 2022 budget; October 2021); PY 2022 Medicare Provider List (October 2021).

NOTE: All OneCare contracted participant and preferred clinicians are shown in this exhibit. Numbers may not add to 100% due to rounding.

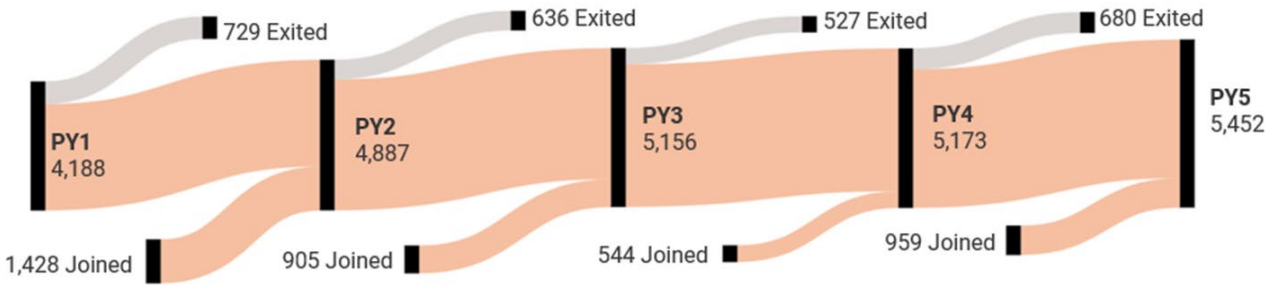
**Appendix Exhibit E.9.** Model Clinicians by Specialty, PY 1-PY 5 (2018-2022)




SOURCE: OneCare 2022 Provider Network (Appendix 2, FY 2021 budget; October 2021); PY 2022 Medicare Provider List (October 2021); NPPES.

NOTE: All OneCare contracted participant and preferred clinicians are shown in this exhibit. Participant clinicians can attribute beneficiaries to the model; preferred clinicians cannot.

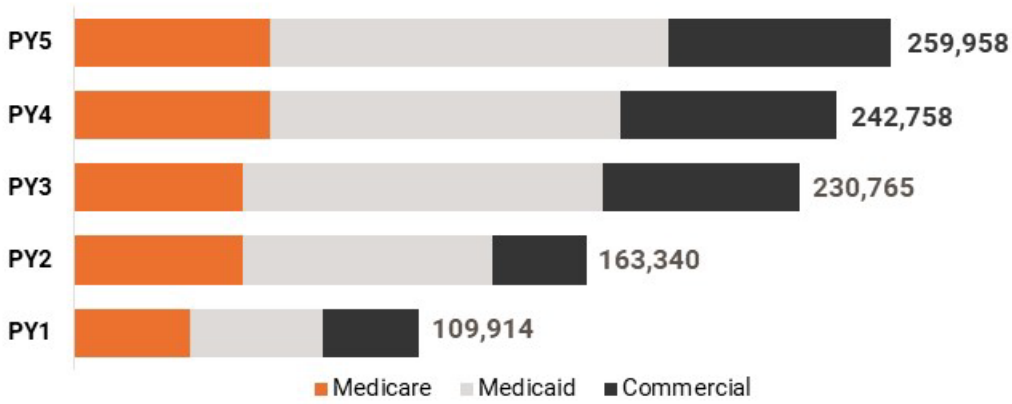
**Appendix Exhibit E.10.** Clinician Participation in VTAPM, PY 1-PY 5 (2018-2022)




SOURCES: OneCare 2021 Provider Network (Appendix 2, FY2021 budget; October 2021); PY 2021 Medicare Provider List (October 2021).

NOTE: All OneCare-contracted participant and preferred clinicians who are in one or more ACO initiatives (Medicare, Medicaid, commercial) are shown in this exhibit. Participant clinicians can attribute beneficiaries to the model; preferred clinicians cannot.

**Appendix Exhibit E.11.** Vermonters Attributed to the Model, PY 1-PY 5 (2018-2022)




SOURCE: Vermont All-Payer ACO Model Annual ACO Scale Targets and Alignment Report: Performance Year 5 (2022).

# Appendix F. Supporting Documentation for Chapters 2 and 3

**Appendix Exhibit F.1.** PY 5 Medicare ACO-Level: Descriptive Characteristics of VTAPM and Weighted Comparison Beneficiaries

| | Baseline Period | | | | | | Performance Period | |
|---|---|---|---|---|---|---|---|---|
| | BY 3 | | BY 2 | | BY 1 | | PY 5 | |
| | VTAPM | Comparison | VTAPM | Comparison | VTAPM | Comparison | VTAPM | Comparison |
| Number of Beneficiaries | 45,431 | 45,431 | 48,116 | 48,116 | 51,348 | 51,348 | 49,174 | 49,174 |
| Total Person-Months | 536,048 | 536,048 | 566,575 | 566,575 | 605,916 | 605,916 | 580,768 | 580,768 |
| Mean Months of Alignment ± SD | 11.8 ± 1.2 | 11.8 ± 1.2 | 11.8 ± 1.3 | 11.8 ± 1.3 | 11.8 ± 1.2 | 11.8 ± 1.2 | 11.8 ± 1.2 | 11.8 ± 1.2 |
| Mean Age ± SD | 71.3 ± 13.2 | 71.3 ± 13.1 | 71.5 ± 13.0 | 71.3 ± 13.1 | 71.5 ± 12.8 | 71.4 ± 13.0 | 72.5 ± 12.0 | 72.5 ± 12.0 |
| **Gender (%)** | | | | | | | | |
| Male | 43.1 | 43.1 | 43.1 | 43.1 | 43.4 | 43.4 | 44.5 | 44.5 |
| **Race/Ethnicity (%)** | | | | | | | | |
| White | 96.1 | 96.1 | 95.7 | 95.7 | 95.2 | 95.2 | 93.3 | 93.3 |
| Black | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.4 | 0.4 |
| Hispanic | 0.8 | 0.8 | 0.8 | 0.8 | 0.8 | 0.8 | 0.8 | 0.8 |
| Asian | 0.5 | 0.5 | 0.5 | 0.5 | 0.6 | 0.6 | 0.8 | 0.8 |
| Other | 2.1 | 2.1 | 2.5 | 2.5 | 3.0 | 3.0 | 4.7 | 4.7 |
| **Disability/ESRD (%)** | | | | | | | | |
| Disability | 18.9 | 18.9 | 18.4 | 18.4 | 18.1 | 18.1 | 14.1 | 14.1 |
| ESRD | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 |
| **Coverage (%)** | | | | | | | | |
| Any Dual Eligibility | 34.2 | 33.8 | 33.5 | 33.5 | 32.6 | 31.8 | 25.3 | 25.1 |
| Any Part D Coverage | 75.5 | 75.4 | 82.5 | 82.4 | 83.4 | 83.1 | 82.9 | 82.7 |

| | Baseline Period | | | | | | Performance Period | |
|---|---|---|---|---|---|---|---|---|
| | BY 3 | | BY 2 | | BY 1 | | PY 5 | |
| | VTAPM | Comparison | VTAPM | Comparison | VTAPM | Comparison | VTAPM | Comparison |
| **Chronic Conditions** | | | | | | | | |
| Mean No. of Chronic Conditions ± SD | 4.2 ± 3.3 | 4.2 ± 3.4 | 4.2 ± 3.3 | 4.2 ± 3.3 | 4.3 ± 3.4 | 4.2 ± 3.4 | 4.4 ± 3.5 | 4.4 ± 3.5 |
| Alzheimer's/Dementia (%) | 6.4 | 6.4 | 6.4 | 6.4 | 6.2 | 6.2 | 6.2 | 6.2 |
| Chronic Kidney Disease (%) | 11.3 | 11.3 | 11.8 | 11.8 | 13.1 | 13.1 | 17.7 | 17.7 |
| COPD (%) | 9.7 | 9.7 | 9.8 | 9.8 | 10.0 | 10.0 | 8.5 | 8.5 |
| Congestive Heart Failure (%) | 8.7 | 8.7 | 8.5 | 8.5 | 8.4 | 8.4 | 8.8 | 8.8 |
| Diabetes (%) | 22.3 | 22.3 | 21.9 | 21.9 | 21.3 | 21.4 | 20.3 | 20.3 |
| Ischemic Heart Disease (%) | 21.8 | 21.8 | 21.5 | 21.5 | 21.6 | 21.6 | 21.1 | 21.1 |
| Depression (%) | 20.4 | 20.4 | 20.4 | 20.4 | 20.9 | 20.9 | 19.3 | 19.3 |
| RA/OA (%) | 26.1 | 26.1 | 26.9 | 26.9 | 28.0 | 28.0 | 28.7 | 28.7 |
| Stroke/TIA (%) | 2.5 | 2.5 | 2.4 | 2.4 | 2.4 | 2.4 | 2.3 | 2.3 |
| Cancer (%) | 7.6 | 7.7 | 7.5 | 7.5 | 7.6 | 7.5 | 7.5 | 7.5 |
| **Mortality (%)** | | | | | | | | |
| Death in Reference Period | 3.7 | 3.7 | 3.9 | 3.9 | 3.7 | 3.7 | 3.5 | 3.5 |
| **Community Characteristics** | | | | | | | | |
| Median Income ($ ± SD) | 58,756 ± 13,375 | 62,118 ± 20,395 | 58,761 ± 13,440 | 62,133 ± 20,822 | 59,037 ± 13,645 | 62,375 ± 20,951 | 59,793 ± 14,227 | 63,047 ± 21,299 |
| Below Poverty Line (% ± SD) | 11.2 ± 6.1 | 11.2 ± 5.6 | 11.3 ± 6.1 | 11.2 ± 5.6 | 11.3 ± 6.2 | 11.2 ± 5.7 | 11.0 ± 6.1 | 11.3 ± 5.8 |
| Bachelor's Degree or Higher (% ± SD) | 37.6 ± 13.3 | 34.6 ± 15.8 | 37.7 ± 13.3 | 34.6 ± 15.9 | 37.8 ± 13.4 | 34.5 ± 15.9 | 38.0 ± 13.7 | 36.3 ± 15.7 |
| Unemployment (% ± SD) | 4.9 ± 2.1 | 6.0 ± 3.5 | 4.9 ± 2.1 | 6.0 ± 3.4 | 4.9 ± 2.1 | 6.0 ± 3.6 | 4.8 ± 2.1 | 6.0 ± 3.3 |
| Uninsured (% ± SD) | 4.9 ± 2.0 | 9.3 ± 4.8 | 4.9 ± 2.0 | 9.2 ± 4.9 | 4.9 ± 2.0 | 9.2 ± 4.9 | 4.9 ± 2.1 | 9.5 ± 5.0 |
| SSI (% ± SD) | 6.0 ± 2.6 | 4.3 ± 2.7 | 6.0 ± 2.6 | 4.2 ± 2.6 | 6.0 ± 2.6 | 4.1 ± 2.7 | 5.9 ± 2.7 | 3.8 ± 2.5 |
| Rurality (%) | 66.9 | 56.4 | 67.6 | 57.0 | 66.5 | 56.3 | 62.8 | 52.9 |

| | Baseline Period | | | | | | Performance Period | |
|---|---|---|---|---|---|---|---|---|
| | BY 3 | | BY 2 | | BY 1 | | PY 5 | |
| | VTAPM | Comparison | VTAPM | Comparison | VTAPM | Comparison | VTAPM | Comparison |
| Alignment-Eligible Providers (per 1,000) | 2.7 ± 1.6 | 1.8 ± 1.4 | 2.7 ± 1.6 | 1.9 ± 1.5 | 2.7 ± 1.6 | 1.9 ± 1.5 | 3.2 ± 1.8 | 2.3 ± 1.7 |
| **Participation in Medicare ACOs and Other Innovation Center Initiatives (%)** | | | | | | | | |
| Pioneer/MSSP | 88.7 | 23.6 | 82.7 | 29.3 | 73.5 | 37.6 | 0.4 | 27.2 |
| FAI | 0.0 | 0.6 | 0.0 | 1.0 | 0.0 | 1.0 | 0.0 | 0.4 |
| IAH | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| CPC | 0.0 | 1.3 | 0.1 | 1.6 | 0.0 | 1.3 | 0.0 | 0.0 |
| BPCI | 0.1 | 0.2 | 0.1 | 0.8 | 0.2 | 1.3 | 0.0 | 1.2 |
| CJR | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.2 | 0.0 | 0.0 |
| OCM | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.3 | 0.0 | 0.0 |

NOTE: SD=standard deviation; ESRD=end-stage renal disease; COPD=chronic obstructive pulmonary disease; RA=rheumatoid arthritis; OA=osteoarthritis; TIA=transient ischemic attack; SSI=Supplemental Security Income; MSSP=Medicare Shared Savings Program; FAI=Financial Alignment Initiative; IAH=Independence at Home; CPC=Comprehensive Primary Care (including CPC Plus); BPCI=Bundled Payments for Care Improvement; CJR=Comprehensive Care for Joint Replacement; OCM=Oncology Care Model.

**Appendix Exhibit F.2.** PY 5 Medicare State-Level: Descriptive Characteristics of Vermont and Weighted Comparison Beneficiaries

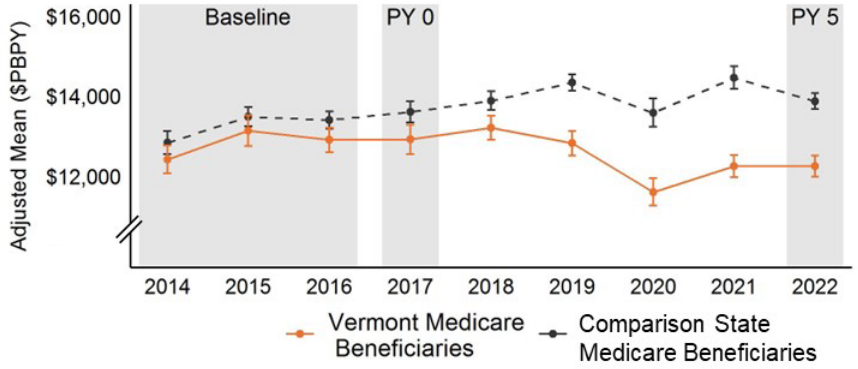
| | Baseline Period | | | | | | Performance Period | |
|---|---|---|---|---|---|---|---|---|
| | BY 3 | | BY 2 | | BY 1 | | PY 5 | |
| | Vermont | Comparison | Vermont | Comparison | Vermont | Comparison | Vermont | Comparison |
| Number of Beneficiaries | 79,313 | 79,313 | 78,840 | 78,840 | 81,885 | 81,885 | 76,511 | 76,511 |
| Total Person-Months | 934,831 | 934,831 | 927,865 | 927,865 | 965,023 | 965,023 | 902,807 | 902,807 |
| Mean Months of Alignment ± SD | 11.8 ± 1.2 | 11.8 ± 1.3 | 11.8 ± 1.3 | 11.8 ± 1.3 | 11.8 ± 1.3 | 11.8 ± 1.2 | 11.8 ± 1.2 | 11.8 ± 1.2 |
| Mean Age ± SD | 71.8 ± 13.0 | 71.7 ± 13.0 | 71.9 ± 12.8 | 71.8 ± 12.9 | 72.0 ± 12.5 | 71.9 ± 12.6 | 72.6 ± 11.9 | 72.6 ± 11.9 |
| **Gender (%)** | | | | | | | | |
| Male | 42.9 | 42.9 | 43.5 | 43.5 | 43.7 | 43.7 | 44.3 | 44.3 |
| **Race/Ethnicity (%)** | | | | | | | | |
| White | 96.4 | 96.4 | 95.9 | 95.9 | 95.5 | 95.5 | 93.6 | 93.6 |
| Black | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 |
| Hispanic | 0.7 | 0.7 | 0.7 | 0.7 | 0.7 | 0.7 | 0.7 | 0.7 |
| Asian | 0.4 | 0.4 | 0.5 | 0.5 | 0.5 | 0.5 | 0.6 | 0.6 |
| Other | 2.1 | 2.1 | 2.5 | 2.5 | 3.0 | 3.0 | 4.7 | 4.7 |
| **Disability/ESRD (%)** | | | | | | | | |
| **Disability** | 17.9 | 17.9 | 17.5 | 17.5 | 17.0 | 17.0 | 13.8 | 13.8 |
| **ESRD** | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 |
| **Coverage (%)** | | | | | | | | |
| Any Dual Eligibility | 34.3 | 33.9 | 33.3 | 33.2 | 32.5 | 31.7 | 26.4 | 26.1 |
| Any Part D Coverage | 76.3 | 76.2 | 82.5 | 82.3 | 83.4 | 83.2 | 82.9 | 82.7 |
| **Chronic Conditions** | | | | | | | | |
| Mean No. of Chronic Conditions ± SD | 4.2 ± 3.3 | 4.2 ± 3.3 | 4.1 ± 3.3 | 4.1 ± 3.3 | 4.2 ± 3.4 | 4.2 ± 3.4 | 4.3 ± 3.5 | 4.2 ± 3.5 |
| Alzheimer's/Dementia (%) | 6.8 | 6.8 | 6.7 | 6.7 | 6.6 | 6.6 | 6.6 | 6.6 |
| Chronic Kidney Disease (%) | 10.9 | 10.9 | 11.4 | 11.4 | 12.5 | 12.5 | 17.0 | 17.0 |
| COPD (%) | 9.8 | 9.8 | 9.7 | 9.7 | 10.0 | 10.0 | 8.3 | 8.3 |

| | Baseline Period | | | | | | Performance Period | |
|---|---|---|---|---|---|---|---|---|
| | BY 3 | | BY 2 | | BY 1 | | PY 5 | |
| | Vermont | Comparison | Vermont | Comparison | Vermont | Comparison | Vermont | Comparison |
| Congestive Heart Failure (%) | 8.8 | 8.8 | 8.7 | 8.7 | 8.6 | 8.6 | 8.8 | 8.8 |
| Diabetes (%) | 22.5 | 22.5 | 22.2 | 22.2 | 21.7 | 21.7 | 20.4 | 20.4 |
| Ischemic Heart Disease (%) | 21.5 | 21.5 | 21.4 | 21.4 | 21.3 | 21.3 | 20.5 | 20.5 |
| Depression (%) | 19.6 | 19.6 | 19.6 | 19.6 | 20.2 | 20.2 | 19.3 | 19.3 |
| RA/OA (%) | 26.1 | 26.1 | 27.1 | 27.1 | 28.2 | 28.2 | 28.4 | 28.4 |
| Stroke/TIA (%) | 2.4 | 2.4 | 2.3 | 2.3 | 2.4 | 2.4 | 2.2 | 2.2 |
| Cancer (%) | 7.5 | 7.4 | 7.4 | 7.4 | 7.4 | 7.3 | 7.3 | 7.3 |
| **Mortality (%)** | | | | | | | | |
| Death in Reference Period | 3.9 | 3.9 | 4.0 | 4.0 | 3.9 | 3.9 | 3.7 | 3.7 |
| **Community Characteristics** | | | | | | | | |
| Median Income ($ ± SD) | 56,788 ± 14,134 | 60,404 ± 22,465 | 57,099 ± 14,225 | 60,827 ± 23,073 | 57,022 ± 14,257 | 59,357 ± 21,457 | 57,343 ± 14,382 | 60,244 ± 22,060 |
| Below Poverty Line (% ± SD) | 11.7 ± 6.0 | 11.9 ± 6.0 | 11.6 ± 6.0 | 11.8 ± 6.1 | 11.6 ± 6.0 | 11.9 ± 6.1 | 11.4 ± 5.9 | 12.1 ± 6.2 |
| Bachelor's Degree or Higher (% ± SD) | 35.8 ± 13.5 | 33.1 ± 16.7 | 36.1 ± 13.5 | 33.6 ± 16.8 | 36.0 ± 13.4 | 33.2 ± 16.2 | 36.0 ± 13.6 | 34.8 ± 16.3 |
| Unemployment (% ± SD) | 5.0 ± 2.2 | 6.2 ± 3.7 | 4.9 ± 2.2 | 6.2 ± 3.7 | 5.0 ± 2.2 | 6.2 ± 3.7 | 5.0 ± 2.2 | 6.2 ± 3.7 |
| Uninsured (% ± SD) | 5.3 ± 2.3 | 9.8 ± 5.2 | 5.2 ± 2.3 | 9.7 ± 5.2 | 5.2 ± 2.3 | 9.8 ± 5.2 | 5.3 ± 2.3 | 10.1 ± 5.3 |
| SSI (% ± SD) | 6.1 ± 2.6 | 4.5 ± 2.9 | 6.1 ± 2.8 | 4.4 ± 2.8 | 6.1 ± 2.8 | 4.4 ± 2.8 | 6.0 ± 2.9 | 4.1 ± 2.7 |
| Rurality (%) | 72.8 | 66.3 | 72.7 | 66.3 | 73.3 | 66.8 | 72.3 | 65.4 |
| Alignment-Eligible Providers (per 1,000) | 2.7 ± 1.5 | 1.8 ± 1.5 | 2.6 ± 1.5 | 1.9 ± 1.5 | 2.6 ± 1.5 | 1.9 ± 1.5 | 3.2 ± 1.8 | 2.3 ± 1.7 |
| **Participation in Medicare ACOs and Other Innovation Center Initiatives (%)** | | | | | | | | |
| Pioneer/MSSP | 73.2 | 20.2 | 65.6 | 24.8 | 59.7 | 26.5 | 0.4 | 14.0 |
| FAI | 0.0 | 0.6 | 0.0 | 1.0 | 0.0 | 1.0 | 0.0 | 0.5 |
| IAH | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| CPC | 0.0 | 2.6 | 0.0 | 3.2 | 0.0 | 3.1 | 0.0 | 0.0 |
| BPCI | 0.1 | 0.3 | 0.1 | 0.7 | 0.2 | 1.2 | 0.0 | 0.1 |

| | Baseline Period | | | | | | Performance Period | |
|---|---|---|---|---|---|---|---|---|
| | BY 3 | | BY 2 | | BY 1 | | PY 5 | |
| | Vermont | Comparison | Vermont | Comparison | Vermont | Comparison | Vermont | Comparison |
| CJR | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.2 | 0.0 | 0.0 |
| OCM | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.3 | 0.0 | 0.0 |

NOTE: SD=standard deviation; ESRD=end-stage renal disease; COPD=chronic obstructive pulmonary disease; RA=rheumatoid arthritis; OA=osteoarthritis; TIA=transient ischemic attack; SSI=Supplemental Security Income; MSSP=Medicare Shared Savings Program; FAI=Financial Alignment Initiative; IAH=Independence at Home; CPC=Comprehensive Primary Care (including CPC Plus); BPCI=Bundled Payments for Care Improvement; CJR=Comprehensive Care for Joint Replacement; OCM=Oncology Care Model.

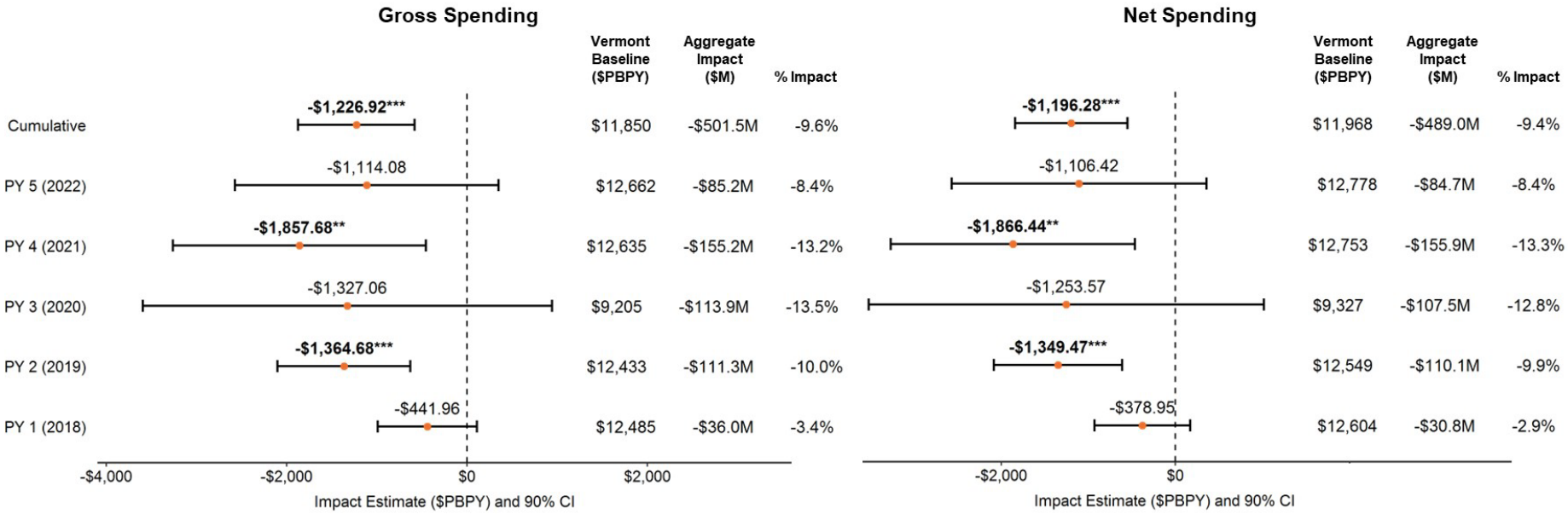
**Appendix Exhibit F.3.** Gross Medicare Spending for Vermont Medicare Beneficiaries, 2014–2022




SOURCE: NORC analysis of Medicare claims data.

NOTE: Estimates are presented in 2022 USD ($) per beneficiary per year (PBPY) and represent regression-adjusted baseline trends for PY 5 (2022) gross Medicare spending, which reflects eligible Medicare beneficiaries in Vermont and comparison states.

**Appendix Exhibit F.4.** Impact on Gross and Net Medicare Spending for Vermont Medicare Beneficiaries, Cumulatively and PY 1–PY 5 (2018–2022)




SOURCE: NORC analysis of Medicare claims data.

NOTE: We still assess net impacts at the state level, although the VTAPM Medicare ACO received the shared savings and pass-through payments, because the ACO is one of the mechanisms through which the VTAPM aims to achieve its statewide financial targets. Additionally, the payments to the ACO may have benefited non-attributed Medicare beneficiaries as well as beneficiaries attributed to the Medicare ACO initiative. Impact is presented in 2022 USD ($) per beneficiary per year (PBPY) or in aggregate for all beneficiaries in the PY(s). The Vermont baseline is the regression-adjusted mean spending of the Vermont Medicare beneficiaries averaged over the three baseline years (2014-2016). Aggregate impact is the impact estimate multiplied by the number of attributed beneficiaries in PY(s). Estimated percentage impact is the DID estimate relative to the expected outcome for the Vermont Medicare beneficiaries in the PY(s) had the model not been implemented. The PY 3 (2020) estimate represented the first three calendar quarters of 2020, to mitigate any effect of the cyberattack on the University of Vermont Health Network. For more information on the cyberattack and its effects, see the Second and Third Annual Reports. Asterisks denote significance at **p<0.05, ***p<0.01.

**Appendix Exhibit F.5.** ACO-Level: Descriptive Characteristics for Medicare ACO Beneficiary Subgroups

| | Dual Eligibility | | Rurality | | Number of Chronic Conditions | | |
|---|---|---|---|---|---|---|---|
| | Not Dual Eligible | Dual Eligible | Not Rural | Rural | 0-2 | 3-6 | 7+ |
| Number of Beneficiaries | 36,718 | 12,456 | 18,303 | 30,871 | 17,185 | 20,973 | 11,016 |
| Mean Age | 75.0 | 65.2 | 72.5 | 72.5 | 70.9 | 73.2 | 73.6 |
| % Male | 45.3 | 42.0 | 44.1 | 44.7 | 45.8 | 44.2 | 43.0 |
| % Dual Eligible | - | - | 25.0 | 25.5 | 17.2 | 23.8 | 40.9 |
| % Rural | 62.6 | 63.3 | - | - | 63.2 | 63.1 | 61.6 |
| **Race/Ethnicity (%)** | | | | | | | |
| White | 93.6 | 92.5 | 93.3 | 93.4 | 91.5 | 93.7 | 95.5 |
| Black | 0.2 | 1.1 | 0.6 | 0.3 | 0.4 | 0.4 | 0.4 |
| Hispanic | 0.6 | 1.2 | 0.8 | 0.8 | 0.9 | 0.7 | 0.8 |
| Asian | 0.5 | 1.7 | 1.2 | 0.5 | 0.9 | 0.8 | 0.5 |
| Other | 5.1 | 3.6 | 4.2 | 5.0 | 6.3 | 4.4 | 2.8 |
| **Number of Chronic Conditions (%)** | | | | | | | |
| 0-2 | 38.8 | 23.7 | 34.6 | 35.2 | - | - | - |
| 3-6 | 43.5 | 40.1 | 42.3 | 42.8 | - | - | - |
| 7+ | 17.7 | 36.2 | 23.1 | 22.0 | - | - | - |

**SOURCE**: NORC analysis of Medicare claims data.

**Appendix Exhibit F.6.** State-Level: Descriptive Characteristics for Vermont Medicare Beneficiary Subgroups

| | Dual Eligibility | | Rurality | | Number of Chronic Conditions | | |
|---|---|---|---|---|---|---|---|
| | Not Dual Eligible | Dual Eligible | Not Rural | Rural | 0-2 | 3-6 | 7+ |
| Number of Beneficiaries | 56,296 | 20,215 | 21,204 | 55,307 | 27,403 | 32,299 | 16,809 |
| Mean Age | 75.0 | 66.1 | 72.7 | 72.6 | 71.2 | 73.3 | 73.7 |
| % Male | 45.4 | 41.3 | 44.1 | 44.4 | 45.5 | 43.9 | 42.9 |
| % Dual Eligible | - | - | 24.1 | 27.3 | 17.7 | 25.1 | 43.3 |
| % Rural | 71.4 | 74.7 | - | - | 73.0 | 72.5 | 70.7 |
| **Race/Ethnicity (%)** | | | | | | | |
| White | 93.7 | 93.4 | 93.3 | 93.8 | 92.2 | 93.9 | 95.6 |
| Black | 0.2 | 0.8 | 0.5 | 0.3 | 0.3 | 0.4 | 0.4 |
| Hispanic | 0.6 | 1.0 | 0.8 | 0.7 | 0.7 | 0.7 | 0.8 |
| Asian | 0.4 | 1.2 | 1.1 | 0.4 | 0.7 | 0.6 | 0.4 |
| Other | 5.1 | 3.5 | 4.3 | 4.8 | 6.1 | 4.5 | 2.9 |
| **Number of Chronic Conditions (%)** | | | | | | | |
| 0-2 | 40.1 | 23.9 | 34.9 | 36.2 | - | - | - |
| 3-6 | 43.0 | 40.0 | 41.9 | 42.3 | - | - | - |
| 7+ | 16.9 | 36.0 | 23.3 | 21.5 | - | - | - |

**SOURCE**: NORC analysis of Medicare claims data.

**Appendix Exhibit F.7.** ACO-Level: Descriptive Characteristics for Beneficiary Subgroups Defined by the Number of Years of Participation or Attributed-Provider Characteristics

| | Beneficiaries Attributed to Providers Who: | | Beneficiaries Attributed to the Model for: | | Beneficiaries Attributed to Providers Who Participated in the Model for: | |
|---|---|---|---|---|---|---|
| | Did Not Elect AIPBP | Elected AIPBP | <5 Years[25] | All 5 Years | <5 Years[26] | All 5 Years |
| Number of Beneficiaries | 19,112 | 29,561 | 23,327 | 25,755 | 22,291 | 26,382 |
| Mean Age | 72.1 | 73.0 | 69.9 | 74.9 | 72.2 | 73.0 |
| % Male | 45.1 | 43.9 | 46.1 | 43.1 | 45.4 | 43.6 |
| % Dual Eligible | 29.4 | 22.0 | 20.9 | 29.3 | 28.9 | 21.5 |
| % Rural | 62.2 | 63.1 | 63.9 | 61.8 | 66.5 | 59.6 |
| **Race/Ethnicity (%)** | | | | | | |
| White | 93.3 | 93.4 | 91.9 | 94.6 | 93.5 | 93.2 |
| Black | 0.5 | 0.3 | 0.4 | 0.4 | 0.5 | 0.4 |
| Hispanic | 0.8 | 0.8 | 0.9 | 0.7 | 0.8 | 0.8 |
| Asian | 1.0 | 0.6 | 0.9 | 0.6 | 0.9 | 0.7 |
| Other | 4.4 | 4.9 | 6.0 | 3.6 | 4.4 | 5.0 |
| **Number of Chronic Conditions (%)** | | | | | | |
| 0-2 | 32.7 | 36.5 | 47.4 | 23.6 | 33.0 | 36.7 |
| 3-6 | 43.3 | 42.2 | 36.1 | 48.5 | 43.2 | 42.1 |
| 7+ | 24.1 | 21.3 | 16.4 | 27.8 | 23.9 | 21.1 |

**SOURCES:** OneCare 2022 Provider Network (Appendix 2, FY 2022 budget; October 2021); PY 2022 Medicare Provider List (October 2021); NORC analysis of Medicare claims data.

**NOTE:** AIPBP=All Inclusive Population Based Payment. Beneficiaries attributed to providers with incomplete OneCare provider network or Medicare provider list data were excluded.

[25] Out of the total number of beneficiaries attributed to the VTAPM in PY 5 (2022), 10.8% had been attributed for one year; 10.3% had been attributed for two years; 10.5% had been attributed for three years; and 16.1% had been attributed for four years.

[26] Out of the total number of beneficiaries attributed to providers who participated in the VTAPM in PY 5 (2022), 2.4% were attributed to providers who had participated for one year; 13.1% were attributed to providers who had participated for two years; 5.5% were attributed to providers who had participated for three years; and 24.8% were attributed to providers who had participated for four years.

**Appendix Exhibit F.8.** ACO-Level: Impact on PY 5 (2022) Gross Medicare Spending for Subgroups Defined by Beneficiary Characteristics

| | VTAPM Beneficiaries | DID Estimate | SE | 90% CI | p |
|---|---|---|---|---|---|
| **Dual Eligibility** | | | | | |
| Dual Eligible | 12,456 | -$891.52 | $860.02 | -$2,306.25, $523.21 | 0.300 |
| Not Dual Eligible | 36,718 | -$572.63 | $508.34 | -$1,408.86, $263.6 | 0.260 |
| **Rurality** | | | | | |
| Rural | 30,871 | -$575.92 | $657.90 | -$1,658.17, $506.33 | 0.381 |
| Non-Rural | 18,303 | -$763.88 | $581.39 | -$1,720.26, $192.51 | 0.189 |
| **Number of Chronic Conditions** | | | | | |
| 0-2 | 17,185 | -$310.95 | $370.80 | -$920.91, $299.02 | 0.402 |
| 3-6 | 20,973 | -$187.38 | $440.35 | -$911.75, $536.99 | 0.670 |
| 7+ | 11,016 | -$374.55 | $1,365.59 | -$2,620.95, $1,871.85 | 0.784 |

**SOURCE**: NORC analysis of Medicare claims data.

**NOTE**: Difference-in-differences (DID), standard error (SE), and 90% confidence interval (CI) estimates are presented in 2022 USD ($) per beneficiary per year (PBPY).

**Appendix Exhibit F.9.** State-Level: Impact on PY 5 (2022) Gross Medicare Spending for Subgroups Defined by Beneficiary Characteristics

| | Vermont Medicare Beneficiaries | DID Estimate | SE | 90% CI | p |
|---|---|---|---|---|---|
| **Dual Eligibility** | | | | | |
| Dual Eligible | 20,215 | -$964.15 | $1,120.07 | -$2,806.65, $878.36 | 0.389 |
| Not Dual Eligible | 56,296 | -$853.65 | $611.32 | -$1,859.27, $151.97 | 0.163 |
| **Rurality** | | | | | |
| Rural | 55,307 | -$1,023.96 | $769.37 | -$2,289.58, $241.66 | 0.183 |
| Non-Rural | 21,204 | -$959.30 | $613.61 | -$1,968.7, $50.09 | 0.118 |
| **Number of Chronic Conditions** | | | | | |
| 0-2 | 27,403 | -$385.39 | $363.12 | -$982.72, $211.94 | 0.289 |
| 3-6 | 32,299 | -$598.15 | $735.86 | -$1,808.64, $612.34 | 0.416 |
| 7+ | 16,809 | -$1,065.93 | $1,807.16 | -$4,038.72, $1,906.85 | 0.555 |

**SOURCE**: NORC analysis of Medicare claims data.

**NOTE**: Difference-in-differences (DID), standard error (SE), and 90% confidence interval (CI) estimates are presented in 2022 USD ($) per beneficiary per year (PBPY).

**Appendix Exhibit F.10.** ACO-Level: Impact on PY 5 (2022) Gross Medicare Spending for Subgroups Defined by Provider Characteristics

| | VTAPM Beneficiaries | DID Estimate | SE | 90% CI | p |
|---|---|---|---|---|---|
| **Beneficiaries Attributed to Providers Who:** | | | | | |
| Elected AIPBP | 29,615 | $279.79 | $241.63 | -$117.69, $677.27 | 0.247 |
| Did Not Elect AIPBP | 19,149 | -$110.88 | $287.12 | -$583.18, $361.43 | 0.699 |

**SOURCES**: OneCare 2022 Provider Network (Appendix 2, FY 2022 budget; October 2021); PY 2022 Medicare Provider List (October 2021); NORC analysis of Medicare claims data.

**NOTE**: Difference-in-differences (DID), standard error (SE), and 90% confidence interval (CI) estimates are presented in 2022 USD ($) per beneficiary per year (PBPY). AIPBP=All Inclusive Population Based Payment. Beneficiaries attributed to providers with incomplete OneCare provider network or Medicare provider list data were excluded. We also looked at outcomes for providers who participated in all 3 ACO initiatives compared to providers who participated in less than 3 initiatives, but found that in PY 5, only two Medicare participating providers (as identified by CCNs/TINs in GMCB's budget submission) did not also participate in the Medicaid or Commercial ACOs.

**Appendix Exhibit F.11.** ACO-Level: Impact on PY 5 (2022) Gross Medicare Spending for Subgroups Defined by the Number of Years of Participation

| | VTAPM Beneficiaries | DID Estimate | SE | 90% CI | p |
|---|---|---|---|---|---|
| **Beneficiaries Attributed to the Model for:** | | | | | |
| All 5 PYs | 25,755 | -$291.20 | $271.65 | -$738.07, $155.66 | 0.284 |
| <5 PYs | 23,327 | $484.49* | $266.09 | $46.78, $922.20 | 0.069 |
| **Beneficiaries Attributed to Providers Participating in the Model for:** | | | | | |
| All 5 PYs | 26,382 | $236.72 | $256.84 | -$185.79, $659.22 | 0.357 |
| <5 PYs | 22,291 | -$20.49 | $274.47 | -$472.10, $430.92 | 0.940 |

**SOURCES**: OneCare 2018-2022 Provider Network Files; 2018-2022 Medicare Provider Lists; NORC analysis of Medicare claims data.

**NOTE**: Difference-in-differences (DID), standard error (SE), and 90% confidence interval (CI) estimates are presented in 2022 USD ($) per beneficiary per year (PBPY). Asterisks denote significance at *p<0.10, **p<0.05, ***p<0.01. Beneficiaries attributed to providers with incomplete OneCare provider network or Medicare provider list data were excluded.

**Appendix Exhibit F.12.** PY 5 Medicare ACO-Level: Unadjusted Total Medicare Spending for VTAPM and Weighted Comparison Beneficiaries

| | Total Medicare Spending | | | |
|---|---|---|---|---|
| | VTAPM | | Comparison | |
| | Mean | SD | Mean | SD |
| **BY 3 (2014)** | $11,345 | $23,266 | $11,933 | $24,534 |
| **BY 2 (2015)** | $11,926 | $24,255 | $12,210 | $44,267 |
| **BY 1 (2016)** | $11,788 | $24,090 | $11,845 | $24,804 |
| **BY 0 (2017)** | $11,978 | $24,867 | $11,842 | $39,460 |
| **PY 1 (2018)** | $12,083 | $26,239 | $11,691 | $26,511 |
| **PY 2 (2019)** | $11,871 | $25,241 | $11,732 | $24,595 |
| **PY 3 (2020)** | $10,868 | $24,766 | $11,450 | $25,913 |
| **PY 4 (2021)** | $11,433 | $25,354 | $12,220 | $26,879 |
| **PY 5 (2022)** | $11,293 | $27,122 | $11,419 | $26,775 |

NOTE: Mean and standard error (SE) estimates are presented in 2022 USD ($) per beneficiary per year (PBPY).

**Appendix Exhibit F.13.** PY 5 Medicare ACO-Level: Unadjusted Utilization for VTAPM and Weighted Comparison Beneficiaries: Acute Inpatient Stays, Acute Inpatient Days, and ED Visits and Observation Stays

| | Acute Inpatient Stays | | | | Acute Inpatient Days | | | | ED visits and observation stays | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | VTAPM | | Comparison | | VTAPM | | Comparison | | VTAPM | | Comparison | |
| | Mean | SD | Mean | SD | Mean | SD | Mean | SD | Mean | SD | Mean | SD |
| BY 3 (2014) | 237 | 673 | 272 | 742 | 1,158 | 4,751 | 1,256 | 4,559 | 607 | 1,619 | 610 | 1,678 |
| BY 2 (2015) | 250 | 703 | 259 | 711 | 1,243 | 5,147 | 1,170 | 4,320 | 608 | 1,656 | 579 | 1,536 |
| BY 1 (2016) | 247 | 682 | 254 | 688 | 1,205 | 4,939 | 1,172 | 4,487 | 603 | 1,604 | 602 | 1,595 |
| BY 0 (2017) | 252 | 700 | 254 | 707 | 1,220 | 5,008 | 1,148 | 4,654 | 581 | 1,433 | 591 | 1,548 |
| PY 1 (2018) | 251 | 698 | 237 | 690 | 1,249 | 5,180 | 1,066 | 4,214 | 589 | 1,535 | 555 | 1,573 |
| PY 2 (2019) | 247 | 708 | 230 | 663 | 1,244 | 5,337 | 1,017 | 4,127 | 577 | 1,556 | 558 | 1,402 |
| PY 3 (2020) | 211 | 645 | 189 | 580 | 1,118 | 5,145 | 936 | 4,321 | 477 | 1,373 | 452 | 1,216 |
| PY 4 (2021) | 209 | 643 | 195 | 614 | 1,149 | 5,256 | 1,032 | 4,666 | 520 | 1,380 | 506 | 1,425 |
| PY 5 (2022) | 206 | 636 | 190 | 594 | 1,218 | 5,404 | 965 | 4,407 | 556 | 1,470 | 504 | 1,285 |

NOTE: Estimates are presented per 1,000 BPY.

**Appendix Exhibit F.14.** PY 5 Medicare ACO-Level: Unadjusted Utilization for VTAPM and Weighted Comparison Beneficiaries: E&M Visits, Primary E&M Visits, and Specialty E&M Visits

| | E&M visits | | | | Primary E&M visits | | | | Specialty E&M visits | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | VTAPM | | Comparison | | VTAPM | | Comparison | | VTAPM | | Comparison | |
| | Mean | SD | Mean | SD | Mean | SD | Mean | SD | Mean | SD | Mean | SD |
| BY 3 (2014) | 14,800 | 13,312 | 13,017 | 12,052 | 8,271 | 8,049 | 6,775 | 7,722 | 6,549 | 8,212 | 6,242 | 7,312 |
| BY 2 (2015) | 15,248 | 13,902 | 13,070 | 12,104 | 7,716 | 7,868 | 6,498 | 7,141 | 7,532 | 8,972 | 6,572 | 7,711 |
| BY 1 (2016) | 15,519 | 13,955 | 13,113 | 11,960 | 7,660 | 7,849 | 6,486 | 7,213 | 7,859 | 9,006 | 6,626 | 7,478 |
| BY 0 (2017) | 15,366 | 13,667 | 12,959 | 12,204 | 7,566 | 7,854 | 6,433 | 6,891 | 7,801 | 8,694 | 6,526 | 8,191 |
| PY 1 (2018) | 15,472 | 13,743 | 12,953 | 11,722 | 7,362 | 7,867 | 6,472 | 7,016 | 8,110 | 8,820 | 6,481 | 7,348 |
| PY 2 (2019) | 15,135 | 13,545 | 12,736 | 11,698 | 7,165 | 7,662 | 6,479 | 7,108 | 7,970 | 8,716 | 6,257 | 7,133 |
| PY 3 (2020) | 12,820 | 12,419 | 11,197 | 10,955 | 7,147 | 7,947 | 6,177 | 7,171 | 5,674 | 7,185 | 5,019 | 6,200 |
| PY 4 (2021) | 14,151 | 13,269 | 12,403 | 11,970 | 8,230 | 8,701 | 6,729 | 7,761 | 5,930 | 7,584 | 5,675 | 7,053 |
| PY 5 (2022) | 14,005 | 13,158 | 12,114 | 11,490 | 8,206 | 8,596 | 6,725 | 7,350 | 5,799 | 7,518 | 5,388 | 6,782 |

NOTE: Estimates are presented per 1,000 BPY.

**Appendix Exhibit F.15.** PY 5 Medicare ACO-Level: Unadjusted Utilization for VTAPM and Weighted Comparison Beneficiaries: SNF Stays, SNF Days, and Home Health Visits

| | SNF stays | | | | SNF days | | | | Home health visits | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | VTAPM | | Comparison | | VTAPM | | Comparison | | VTAPM | | Comparison | |
| | Mean | SD | Mean | SD | Mean | SD | Mean | SD | Mean | SD | Mean | SD |
| BY 3 (2014) | 60 | 308 | 63 | 316 | 1,592 | 9,579 | 1,468 | 8,602 | 2,634 | 14,501 | 1,950 | 10,562 |
| BY 2 (2015) | 65 | 313 | 60 | 304 | 1,639 | 9,327 | 1,426 | 8,494 | 2,782 | 14,503 | 1,884 | 9,979 |
| BY 1 (2016) | 62 | 308 | 62 | 311 | 1,570 | 9,241 | 1,392 | 8,293 | 2,760 | 14,920 | 1,857 | 9,828 |
| BY 0 (2017) | 67 | 332 | 53 | 292 | 1,670 | 9,598 | 1,151 | 7,430 | 2,820 | 14,995 | 1,792 | 9,529 |
| PY 1 (2018) | 65 | 329 | 51 | 285 | 1,604 | 9,414 | 1,095 | 7,161 | 2,801 | 14,921 | 1,778 | 9,984 |
| PY 2 (2019) | 62 | 324 | 45 | 267 | 1,454 | 8,639 | 982 | 6,776 | 2,504 | 13,404 | 1,713 | 9,496 |
| PY 3 (2020) | 48 | 271 | 36 | 232 | 1,188 | 7,875 | 824 | 6,435 | 2,206 | 11,938 | 1,284 | 7,427 |
| PY 4 (2021) | 49 | 274 | 38 | 231 | 1,287 | 8,339 | 854 | 6,365 | 2,281 | 11,694 | 1,463 | 7,872 |
| PY 5 (2022) | 53 | 300 | 37 | 236 | 1,247 | 8,200 | 834 | 6,454 | 2,096 | 11,056 | 1,325 | 7,569 |

NOTE: Estimates are presented per 1,000 BPY.

**Appendix Exhibit F.16.** PY 5 Medicare ACO-Level: Unadjusted Utilization for VTAPM and Weighted Comparison Beneficiaries: Home Health Episodes, Hospice Days, and Imaging, Procedures, and Tests

| | Home health episodes | | | | Hospice days | | | | Imaging, procedures, and tests | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | VTAPM | | Comparison | | VTAPM | | Comparison | | VTAPM | | Comparison | |
| | Mean | SD | Mean | SD | Mean | SD | Mean | SD | Mean | SD | Mean | SD |
| BY 3 (2014) | 121 | 397 | 98 | 357 | 941 | 12,400 | 1,300 | 14,328 | 31,948 | 38,032 | 36,180 | 39,652 |
| BY 2 (2015) | 127 | 405 | 96 | 353 | 1,228 | 14,315 | 1,676 | 16,901 | 31,368 | 36,946 | 35,771 | 40,046 |
| BY 1 (2016) | 127 | 407 | 92 | 346 | 1,308 | 14,649 | 1,454 | 16,154 | 30,930 | 34,906 | 35,533 | 38,790 |
| BY 0 (2017) | 127 | 403 | 91 | 349 | 1,576 | 16,631 | 1,450 | 15,606 | 30,693 | 34,566 | 35,370 | 39,146 |
| PY 1 (2018) | 128 | 405 | 86 | 338 | 1,631 | 17,183 | 1,523 | 15,908 | 31,293 | 35,713 | 35,333 | 38,936 |
| PY 2 (2019) | 124 | 404 | 86 | 338 | 1,687 | 18,014 | 1,562 | 17,317 | 31,617 | 36,135 | 35,902 | 39,567 |
| PY 3 (2020) | 180 | 683 | 106 | 495 | 1,637 | 17,349 | 1,699 | 17,734 | 26,839 | 32,685 | 32,180 | 39,248 |
| PY 4 (2021) | 197 | 721 | 121 | 531 | 1,543 | 16,851 | 1,480 | 16,141 | 31,024 | 35,194 | 36,412 | 41,235 |
| PY 5 (2022) | 184 | 689 | 112 | 523 | 1,539 | 17,213 | 1,570 | 16,723 | 31,145 | 34,980 | 37,385 | 42,206 |

NOTE: Mean and standard error (SE) estimates are presented per 1,000 BPY.

**Appendix Exhibit F.17.** PY 5 Medicare ACO-Level: Unadjusted Telehealth Utilization for VTAPM and Weighted Comparison Beneficiaries

| | Telehealth visits | | | | Total E&M telehealth visits | | | | Primary care E&M telehealth visits | | | | Specialist care E&M telehealth visits | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | VTAPM | | Comparison | | VTAPM | | Comparison | | VTAPM | | Comparison | | VTAPM | | Comparison | |
| | Mean | SD | Mean | SD | Mean | SD | Mean | SD | Mean | SD | Mean | SD | Mean | SD | Mean | SD |
| BY 3 (2014) | 3 | 128 | 12 | 237 | 2 | 114 | 11 | 228 | 1 | 35 | 3 | 97 | 2 | 109 | 8 | 201 |
| BY 2 (2015) | 3 | 146 | 15 | 280 | 3 | 146 | 12 | 249 | 1 | 44 | 4 | 124 | 2 | 133 | 8 | 207 |
| BY 1 (2016) | 4 | 281 | 19 | 402 | 4 | 280 | 18 | 389 | 1 | 55 | 5 | 150 | 2 | 274 | 13 | 311 |
| BY 0 (2017) | 24 | 721 | 28 | 482 | 24 | 713 | 27 | 468 | 19 | 578 | 7 | 264 | 5 | 315 | 19 | 343 |
| PY 1 (2018) | 9 | 333 | 27 | 468 | 5 | 284 | 25 | 454 | 1 | 46 | 7 | 175 | 4 | 280 | 18 | 371 |
| PY 2 (2019) | 18 | 539 | 22 | 378 | 18 | 536 | 20 | 372 | 1 | 94 | 8 | 232 | 16 | 520 | 12 | 280 |
| PY 3 (2020) | 2,306 | 4,905 | 1,673 | 3,542 | 2,238 | 4,764 | 1,612 | 3,424 | 1,438 | 3,283 | 1,026 | 2,554 | 801 | 2,944 | 585 | 1,852 |
| PY 4 (2021) | 1,685 | 5,164 | 1,354 | 3,754 | 1,650 | 5,097 | 1,302 | 3,613 | 979 | 3,418 | 754 | 2,570 | 671 | 3,332 | 548 | 2,155 |
| PY 5 (2022) | 1,143 | 4,296 | 1,002 | 3,478 | 1,117 | 4,228 | 965 | 3,361 | 646 | 2,881 | 577 | 2,352 | 471 | 2,814 | 387 | 2,011 |

NOTE: Estimates are presented per 1,000 BPY.

**Appendix Exhibit F.18.** PY 5 Medicare ACO-Level: Unadjusted Quality-of-Care Measures for VTAPM and Weighted Comparison Beneficiaries

| | Annual wellness visit | | | | ACS hospitalizations | | | | Unplanned 30-day readmissions | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | VTAPM | | Comparison | | VTAPM | | Comparison | | VTAPM | | Comparison | |
| | Mean | SD | Mean | SD | Mean | SD | Mean | SD | Mean | SD | Mean | SD |
| BY 3 (2014) | 225 | 418 | 202 | 401 | 37 | 188 | 37 | 190 | 112 | 315 | 115 | 319 |
| BY 2 (2015) | 244 | 429 | 226 | 418 | 32 | 177 | 33 | 179 | 112 | 315 | 113 | 317 |
| BY 1 (2016) | 263 | 440 | 251 | 434 | 30 | 172 | 30 | 172 | 117 | 322 | 104 | 305 |
| BY 0 (2017) | 278 | 448 | 301 | 459 | 32 | 175 | 33 | 178 | 116 | 321 | 115 | 319 |
| PY 1 (2018) | 296 | 457 | 339 | 473 | 31 | 173 | 28 | 166 | 119 | 324 | 109 | 313 |
| PY 2 (2019) | 312 | 463 | 374 | 484 | 31 | 172 | 27 | 162 | 119 | 325 | 100 | 300 |
| PY 3 (2020) | 284 | 450 | 331 | 471 | 25 | 157 | 21 | 142 | 111 | 314 | 104 | 305 |
| PY 4 (2021) | 329 | 470 | 410 | 492 | 23 | 150 | 20 | 142 | 118 | 323 | 116 | 320 |
| PY 5 (2022) | 331 | 471 | 451 | 498 | 24 | 153 | 21 | 145 | 117 | 322 | 105 | 306 |

NOTE: Estimates are presented per 1,000 BPY.

**Appendix Exhibit F.19.** PY 5 Medicare ACO-Level: Unadjusted COVID-19 Outcomes for VTAPM and Weighted Comparison Beneficiaries

| | Total number of COVID-19 deaths per 100K population | | | | Total number of COVID-19 cases per 100K population | | | |
|---|---|---|---|---|---|---|---|---|
| | VTAPM | | Comparison | | VTAPM | | Comparison | |
| | Mean | SD | Mean | SD | Mean | SD | Mean | SD |
| PY 3 (2020) | 22.55 | 16.68 | 22.55 | 18.26 | 1,199.77 | 351.13 | 2,817.25 | 1,981.67 |
| PY 4 (2021) | 51.62 | 23.58 | 51.62 | 31.82 | 8,972.11 | 2,132.22 | 8,078.99 | 2,971.94 |
| PY 5 (2022) | 50.45 | 21.18 | 50.45 | 33.63 | 13,270.56 | 2,311.39 | 10,173.76 | 2,978.30 |
| | Case fatality rate (percent over entire year) | | | | Maximum percentage of vaccination in year | | | |
| | VTAPM | | Comparison | | VTAPM | | Comparison | |
| | Mean | SD | Mean | SD | Mean | SD | Mean | SD |
| PY 3 (2020) | 2.97 | 1.71 | 1.46 | 1.64 | -- | -- | -- | -- |
| PY 4 (2021) | 0.0056 | 0.0015 | 0.0064 | 0.0041 | 57.79 | 13.31 | 70.66 | 9.76 |
| PY 5 (2022) | 0.0037 | 0.0011 | 0.0052 | 0.0041 | 63.07 | 14.72 | 69.96 | 12.78 |

NOTE: All COVID-19 outcomes are at the county level.

**Appendix Exhibit F.20.** PY 5 Medicare State-Level: Unadjusted Total Medicare Spending for Vermont and Weighted Comparison Beneficiaries

| | Total Medicare Spending | | | |
|---|---|---|---|---|
| | Vermont | | Comparison | |
| | Mean | SD | Mean | SD |
| BY 3 (2014) | $11,441 | $23,964 | $11,879 | $24,846 |
| BY 2 (2015) | $12,103 | $24,756 | $12,327 | $28,777 |
| BY 1 (2016) | $11,882 | $24,441 | $12,074 | $25,821 |
| BY 0 (2017) | $11,928 | $24,764 | $11,956 | $27,870 |
| PY 1 (2018) | $12,197 | $26,044 | $12,134 | $26,793 |
| PY 2 (2019) | $12,084 | $25,558 | $12,277 | $25,766 |
| PY 3 (2020) | $10,858 | $25,015 | $11,635 | $27,631 |
| PY 4 (2021) | $11,353 | $25,403 | $12,373 | $27,736 |
| PY 5 (2022) | $11,313 | $26,435 | $11,671 | $26,307 |

NOTE: Estimates are presented in 2022 USD ($) per beneficiary per year (PBPY).

**Appendix Exhibit F.21.** PY 5 Medicare State-Level: Unadjusted Utilization for Vermont and Weighted Comparison Beneficiaries: Acute Inpatient Stays, Acute Inpatient Days, and ED Visits and Observation Stays

| | Acute Inpatient Stays | | | | Acute Inpatient Days | | | | ED visits and observation stays | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Vermont | | Comparison | | Vermont | | Comparison | | Vermont | | Comparison | |
| | Mean | SD | Mean | SD | Mean | SD | Mean | SD | Mean | SD | Mean | SD |
| BY 3 (2014) | 239 | 671 | 262 | 707 | 1,163 | 4,697 | 1,202 | 4,307 | 601 | 1,564 | 576 | 1,468 |
| BY 2 (2015) | 256 | 709 | 261 | 700 | 1,239 | 4,875 | 1,204 | 4,389 | 616 | 1,617 | 572 | 1,465 |
| BY 1 (2016) | 252 | 694 | 257 | 699 | 1,213 | 4,922 | 1,172 | 4,429 | 602 | 1,538 | 578 | 1,472 |
| BY 0 (2017) | 254 | 700 | 252 | 688 | 1,181 | 4,783 | 1,130 | 4,266 | 587 | 1,399 | 570 | 1,433 |
| PY 1 (2018) | 254 | 699 | 245 | 687 | 1,237 | 5,084 | 1,109 | 4,248 | 595 | 1,488 | 557 | 1,554 |
| PY 2 (2019) | 249 | 705 | 242 | 690 | 1,232 | 5,196 | 1,069 | 4,193 | 591 | 1,547 | 561 | 1,499 |
| PY 3 (2020) | 204 | 630 | 189 | 594 | 1,051 | 4,838 | 942 | 4,456 | 473 | 1,313 | 457 | 1,239 |
| PY 4 (2021) | 202 | 627 | 195 | 613 | 1,089 | 5,009 | 1,033 | 4,744 | 513 | 1,348 | 502 | 1,381 |
| PY 5 (2022) | 202 | 623 | 197 | 606 | 1,171 | 5,323 | 1,005 | 4,484 | 559 | 1,496 | 506 | 1,300 |

NOTE: Estimates are presented per 1,000 BPY.

**Appendix Exhibit F.22.** PY 5 Medicare State-Level: Unadjusted Utilization for Vermont and Weighted Comparison Beneficiaries: E&M Visits, Primary E&M Visits, and Specialty E&M Visits

| | E&M visits | | | | Primary E&M visits | | | | Specialty E&M visits | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Vermont | | Comparison | | Vermont | | Comparison | | Vermont | | Comparison | |
| | Mean | SD | Mean | SD | Mean | SD | Mean | SD | Mean | SD | Mean | SD |
| BY 3 (2014) | 13,929 | 12,878 | 12,709 | 11,720 | 7,618 | 7,650 | 6,775 | 7,521 | 6,311 | 8,075 | 5,934 | 7,163 |
| BY 2 (2015) | 14,537 | 13,378 | 12,950 | 11,738 | 7,259 | 7,505 | 6,665 | 7,147 | 7,278 | 8,785 | 6,286 | 7,509 |
| BY 1 (2016) | 14,665 | 13,309 | 13,056 | 11,773 | 7,153 | 7,398 | 6,725 | 7,288 | 7,512 | 8,789 | 6,331 | 7,306 |
| BY 0 (2017) | 14,656 | 13,164 | 12,959 | 11,818 | 7,168 | 7,436 | 6,724 | 7,277 | 7,488 | 8,581 | 6,235 | 7,400 |
| PY 1 (2018) | 14,714 | 13,168 | 13,003 | 11,766 | 7,061 | 7,437 | 6,724 | 7,248 | 7,653 | 8,570 | 6,279 | 7,268 |
| PY 2 (2019) | 14,549 | 13,126 | 12,869 | 11,706 | 6,985 | 7,419 | 6,781 | 7,377 | 7,564 | 8,517 | 6,088 | 7,077 |
| PY 3 (2020) | 12,292 | 12,136 | 11,186 | 10,975 | 6,803 | 7,701 | 6,440 | 7,489 | 5,489 | 7,176 | 4,745 | 6,084 |
| PY 4 (2021) | 13,305 | 12,727 | 12,101 | 11,882 | 7,654 | 8,353 | 6,793 | 8,124 | 5,651 | 7,367 | 5,308 | 6,666 |
| PY 5 (2022) | 13,239 | 12,747 | 12,030 | 11,692 | 7,695 | 8,370 | 6,896 | 7,851 | 5,544 | 7,321 | 5,133 | 6,683 |

NOTE: Estimates are presented per 1,000 BPY.

**Appendix Exhibit F.23.** PY 5 Medicare State-Level: Unadjusted Utilization for Vermont and Weighted Comparison Beneficiaries: SNF Stays, SNF Days, and Home Health Visits

| | SNF stays | | | | SNF days | | | | Home health visits | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Vermont | | Comparison | | Vermont | | Comparison | | Vermont | | Comparison | |
| | Mean | SD | Mean | SD | Mean | SD | Mean | SD | Mean | SD | Mean | SD |
| BY 3 (2014) | 65 | 322 | 68 | 327 | 1,712 | 9,907 | 1,683 | 9,599 | 2,561 | 14,129 | 1,874 | 10,137 |
| BY 2 (2015) | 70 | 330 | 68 | 327 | 1,740 | 9,682 | 1,690 | 9,521 | 2,748 | 14,346 | 1,898 | 10,014 |
| BY 1 (2016) | 64 | 316 | 67 | 330 | 1,566 | 9,110 | 1,565 | 9,151 | 2,642 | 14,170 | 1,868 | 9,996 |
| BY 0 (2017) | 67 | 332 | 62 | 313 | 1,591 | 9,245 | 1,421 | 8,584 | 2,738 | 14,569 | 1,871 | 10,047 |
| PY 1 (2018) | 66 | 329 | 59 | 306 | 1,583 | 9,302 | 1,387 | 8,495 | 2,765 | 14,688 | 1,864 | 10,164 |
| PY 2 (2019) | 63 | 322 | 56 | 300 | 1,466 | 8,747 | 1,297 | 8,229 | 2,576 | 13,689 | 1,772 | 9,599 |
| PY 3 (2020) | 46 | 267 | 44 | 263 | 1,126 | 7,683 | 1,089 | 7,751 | 2,223 | 12,115 | 1,269 | 7,420 |
| PY 4 (2021) | 49 | 276 | 45 | 261 | 1,255 | 8,279 | 1,084 | 7,560 | 2,285 | 12,043 | 1,367 | 7,931 |
| PY 5 (2022) | 59 | 315 | 49 | 283 | 1,424 | 8,939 | 1,218 | 8,290 | 2,080 | 11,224 | 1,367 | 7,758 |

NOTE: Estimates are presented per 1,000 BPY.

**Appendix Exhibit F.24.** PY 5 Medicare State-Level: Unadjusted Utilization for Vermont and Weighted Comparison Beneficiaries: Home Health Episodes, Hospice Days, and Imaging, Procedures, and Tests

| | Home health episodes | | | | Hospice days | | | | Imaging, procedures, and tests | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Vermont | | Comparison | | Vermont | | Comparison | | Vermont | | Comparison | |
| | Mean | SD | Mean | SD | Mean | SD | Mean | SD | Mean | SD | Mean | SD |
| BY 3 (2014) | 118 | 392 | 91 | 343 | 957 | 12,321 | 1,409 | 15,603 | 31,673 | 36,947 | 35,211 | 38,459 |
| BY 2 (2015) | 125 | 400 | 93 | 347 | 1,139 | 13,798 | 1,631 | 17,121 | 31,660 | 36,698 | 35,642 | 39,198 |
| BY 1 (2016) | 125 | 401 | 91 | 344 | 1,258 | 14,432 | 1,525 | 16,591 | 31,193 | 35,231 | 34,898 | 37,879 |
| BY 0 (2017) | 125 | 398 | 90 | 344 | 1,479 | 16,008 | 1,517 | 16,358 | 31,106 | 34,994 | 34,881 | 38,045 |
| PY 1 (2018) | 126 | 401 | 88 | 339 | 1,569 | 16,962 | 1,532 | 16,301 | 31,496 | 35,698 | 35,093 | 38,340 |
| PY 2 (2019) | 122 | 398 | 86 | 336 | 1,634 | 17,816 | 1,667 | 17,686 | 31,883 | 36,145 | 35,835 | 39,231 |
| PY 3 (2020) | 179 | 689 | 103 | 490 | 1,594 | 17,359 | 1,572 | 16,780 | 26,937 | 32,722 | 31,020 | 36,981 |
| PY 4 (2021) | 193 | 722 | 119 | 526 | 1,607 | 17,394 | 1,671 | 17,617 | 30,554 | 34,779 | 35,286 | 40,258 |
| PY 5 (2022) | 179 | 686 | 114 | 525 | 1,581 | 17,364 | 1,690 | 17,770 | 30,738 | 34,598 | 36,584 | 41,564 |

NOTE: Estimates are presented per 1,000 BPY.

**Appendix Exhibit F.25.** PY 5 Medicare State-Level: Unadjusted Telehealth Utilization for Vermont and Weighted Comparison Beneficiaries

| | Telehealth visits | | | | E&M telehealth visits | | | | Primary care E&M telehealth visits | | | | Specialist care E&M telehealth visits | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Vermont | | Comparison | | Vermont | | Comparison | | Vermont | | Comparison | | Vermont | | Comparison | |
| | Mean | SD | Mean | SD | Mean | SD | Mean | SD | Mean | SD | Mean | SD | Mean | SD | Mean | SD |
| BY 3 (2014) | 7 | 219 | 13 | 275 | 5 | 181 | 12 | 268 | 3 | 143 | 3 | 106 | 2 | 99 | 9 | 242 |
| BY 2 (2015) | 7 | 295 | 16 | 322 | 6 | 283 | 15 | 309 | 1 | 39 | 4 | 131 | 6 | 276 | 11 | 267 |
| BY 1 (2016) | 6 | 305 | 22 | 397 | 4 | 240 | 21 | 386 | 1 | 52 | 7 | 193 | 3 | 233 | 14 | 309 |
| BY 0 (2017) | 31 | 751 | 36 | 559 | 30 | 741 | 34 | 535 | 25 | 639 | 12 | 295 | 5 | 261 | 22 | 417 |
| PY 1 (2018) | 9 | 305 | 28 | 414 | 5 | 241 | 25 | 394 | 1 | 50 | 10 | 242 | 4 | 235 | 15 | 286 |
| PY 2 (2019) | 30 | 839 | 25 | 397 | 30 | 837 | 23 | 389 | 4 | 281 | 10 | 260 | 25 | 784 | 12 | 280 |
| PY 3 (2020) | 2,268 | 4,975 | 1,573 | 3,548 | 2,206 | 4,847 | 1,518 | 3,405 | 1,387 | 3,267 | 975 | 2,604 | 819 | 3,084 | 542 | 1,835 |
| PY 4 (2021) | 1,675 | 5,134 | 1,281 | 3,963 | 1,637 | 5,056 | 1,238 | 3,861 | 962 | 3,400 | 729 | 2,889 | 675 | 3,275 | 509 | 2,170 |
| PY 5 (2022) | 1,196 | 4,371 | 953 | 3,362 | 1,169 | 4,293 | 921 | 3,286 | 697 | 2,969 | 559 | 2,418 | 472 | 2,809 | 361 | 1,906 |

NOTE: Estimates are presented per 1,000 BPY.

**Appendix Exhibit F.26.** PY 5 Medicare State-Level: Unadjusted Quality-of-Care Measures for Vermont and Weighted Comparison Beneficiaries

| | Annual wellness visit | | | | ACS hospitalizations | | | | Unplanned 30-day readmissions | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Vermont | | Comparison | | Vermont | | Comparison | | Vermont | | Comparison | |
| | Mean | SD | Mean | SD | Mean | SD | Mean | SD | Mean | SD | Mean | SD |
| BY 3 (2014) | 210 | 407 | 190 | 392 | 38 | 192 | 38 | 191 | 114 | 318 | 112 | 316 |
| BY 2 (2015) | 237 | 425 | 220 | 414 | 35 | 184 | 36 | 186 | 116 | 321 | 115 | 319 |
| BY 1 (2016) | 250 | 433 | 244 | 430 | 32 | 177 | 31 | 173 | 119 | 323 | 109 | 311 |
| BY 0 (2017) | 266 | 442 | 284 | 451 | 34 | 182 | 32 | 176 | 114 | 318 | 106 | 308 |
| PY 1 (2018) | 290 | 454 | 316 | 465 | 33 | 178 | 30 | 170 | 116 | 320 | 108 | 310 |
| PY 2 (2019) | 310 | 463 | 348 | 476 | 32 | 175 | 29 | 168 | 119 | 324 | 109 | 312 |
| PY 3 (2020) | 288 | 453 | 301 | 459 | 25 | 155 | 20 | 141 | 111 | 314 | 102 | 302 |
| PY 4 (2021) | 335 | 472 | 362 | 481 | 23 | 151 | 20 | 140 | 116 | 321 | 107 | 309 |
| PY 5 (2022) | 343 | 475 | 390 | 488 | 24 | 153 | 22 | 146 | 114 | 318 | 104 | 306 |

NOTE: Estimates are presented per 1,000 BPY.

**Appendix Exhibit F.27**. PY 5 Medicare State-Level: Unadjusted COVID-19 Outcomes for Vermont and Weighted Comparison Beneficiaries

| | Total number of COVID-19 deaths per 100K population | | | | Total number of COVID-19 cases per 100K population | | | |
|---|---|---|---|---|---|---|---|---|
| | Vermont | | Comparison | | Vermont | | Comparison | |
| | Mean | SD | Mean | SD | Mean | SD | Mean | SD |
| PY 3 (2020) | 19.31 | 15.54 | 19.32 | 18.25 | 1,143.37 | 336.05 | 2709.92 | 2,194.57 |
| PY 4 (2021) | 54.22 | 23.24 | 54.22 | 37.52 | 9,159.45 | 2,233.54 | 8261.34 | 3,427.85 |
| PY 5 (2022) | 48.87 | 20.23 | 48.87 | 33.25 | 12,779.10 | 2,404.22 | 9,992.57 | 3,226.55 |
| | Case fatality rate (percent over entire year) | | | | Maximum percentage of vaccination in year | | | |
| | Vermont | | Comparison | | Vermont | | Comparison | |
| | Mean | SD | Mean | SD | Mean | SD | Mean | SD |
| PY 3 (2020) | 2.56 | 1.78 | 1.18 | 1.51 | - | - | - | - |
| PY 4 (2021) | 0.0058 | 0.0015 | 0.0067 | 0.0049 | 56.49 | 12.81 | 68.46 | 10.66 |
| PY 5 (2022) | 0.0038 | 0.0011 | 0.0054 | 0.0044 | 61.61 | 14.17 | 68.25 | 14.32 |

NOTE: All COVID-19 outcomes are at the county level.

**Appendix Exhibit F.28.** PY 5 Medicare ACO-Level: Adjusted Total Medicare Spending for VTAPM and Weighted Comparison Beneficiaries

| | Total Medicare Spending | | | |
|---|---|---|---|---|
| | VTAPM | | Comparison | |
| | Mean | SE | Mean | SE |
| BY 3 (2014) | $12,597.6 | $214.6 | $12,983.6 | $224.6 |
| BY 2 (2015) | $13,248.3 | $176.6 | $13,723.9 | $234.6 |
| BY 1 (2016) | $13,028.1 | $174.3 | $13,527.9 | $146.8 |
| BY 0 (2017) | $13,146.5 | $143.3 | $13,613.8 | $207.9 |
| PY 1 (2018) | $13,237.6 | $178.9 | $13,718.3 | $173.3 |
| PY 2 (2019) | $12,720.8 | $137.2 | $14,030.1 | $175.0 |
| PY 3 (2020) | $11,792.2 | $139.5 | $13,940.7 | $199.2 |
| PY 4 (2021) | $12,497.4 | $174.8 | $14,818.2 | $210.7 |
| PY 5 (2022) | $12,339.8 | $163.1 | $14,296.8 | $164.8 |

NOTE: Estimates are presented in 2022 USD ($) per beneficiary per year (PBPY).

**Appendix Exhibit F.29.** PY 5 Medicare ACO-Level: Adjusted Utilization for VTAPM and Weighted Comparison Beneficiaries: Acute Inpatient Stays, Acute Inpatient Days, and ED Visits and Observation Stays

| | Acute Care Stays | | | | Acute Care Days | | | | ED visits and Observation Stays | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | VTAPM | | Comparison | | VTAPM | | Comparison | | VTAPM | | Comparison | |
| | Mean | SE | Mean | SE | Mean | SE | Mean | SE | Mean | SE | Mean | SE |
| BY 3 (2014) | 235.2 | 3.6 | 307.8 | 4.3 | 1,208.7 | 20.4 | 1,504.6 | 41.1 | 591.0 | 13.2 | 612.6 | 11.3 |
| BY 2 (2015) | 247.7 | 3.7 | 314.6 | 4.3 | 1,270.0 | 21.9 | 1,509.0 | 39.0 | 589.0 | 10.7 | 602.1 | 11.4 |
| BY 1 (2016) | 246.1 | 2.7 | 318.9 | 4.3 | 1,233.6 | 17.2 | 1,520.9 | 31.1 | 588.8 | 9.0 | 619.0 | 7.6 |
| BY 0 (2017) | 249.0 | 3.5 | 330.3 | 4.8 | 1,224.7 | 20.9 | 1,510.3 | 39.5 | 579.1 | 6.8 | 622.4 | 10.4 |
| PY 1 (2018) | 248.3 | 2.3 | 326.6 | 4.1 | 1,248.6 | 17.7 | 1,492.5 | 29.5 | 580.3 | 7.1 | 596.8 | 8.1 |
| PY 2 (2019) | 242.3 | 1.7 | 336.2 | 4.1 | 1,194.4 | 16.5 | 1,510.9 | 37.2 | 566.8 | 10.0 | 599.0 | 8.5 |
| PY 3 (2020) | 209.5 | 3.0 | 304.9 | 4.7 | 1,131.1 | 28.2 | 1,479.7 | 36.3 | 483.6 | 6.6 | 484.9 | 8.1 |
| PY 4 (2021) | 207.2 | 4.3 | 312.2 | 4.9 | 1,140.7 | 25.4 | 1,535.1 | 38.3 | 520.7 | 8.4 | 510.0 | 7.9 |
| PY 5 (2022) | 205.2 | 3.4 | 318.6 | 3.3 | 1,235.6 | 26.4 | 1,546.2 | 30.9 | 553.1 | 7.5 | 525.1 | 8.4 |

NOTE: Estimates are presented per 1,000 BPY.

**Appendix Exhibit F.30.** PY 5 Medicare ACO-Level: Adjusted Utilization for VTAPM and Weighted Comparison Beneficiaries: Total E&M Visits, Primary Care E&M Visits, and Specialty Care E&M Visits

| | Total E&M Visits | | | | Primary Care E&M Visits | | | | Specialty Care E&M Visits | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | VTAPM | | Comparison | | VTAPM | | Comparison | | VTAPM | | Comparison | |
| | Mean | SE | Mean | SE | Mean | SE | Mean | SE | Mean | SE | Mean | SE |
| BY 3 (2014) | 14,907.0 | 321.8 | 13,132.6 | 109.8 | 8,271.0 | 173.1 | 6,774.5 | 145 | 6,570.1 | 204.6 | 6,373.9 | 88.8 |
| BY 2 (2015) | 15,279.6 | 255.3 | 13,287.6 | 93.1 | 7,715.9 | 78.1 | 6,349.7 | 57.0 | 7,539.4 | 220.5 | 7,014.0 | 50.9 |
| BY 1 (2016) | 15,590.4 | 161.1 | 13,640.7 | 83.5 | 7,659.6 | 103.1 | 6,189.6 | 88.1 | 7,900.9 | 132.2 | 7,566.1 | 60.7 |
| BY 0 (2017) | 15,484.4 | 78.4 | 13,635.7 | 90.7 | 7,565.7 | 138.5 | 5,987.9 | 60.7 | 7,884.4 | 73.7 | 7,775.8 | 50.6 |
| PY 1 (2018) | 15,582.6 | 93.4 | 13,853.1 | 58.7 | 7,361.9 | 135.5 | 5,878.4 | 52.2 | 8,209.4 | 109.9 | 8,216.6 | 52.5 |
| PY 2 (2019) | 15,279.4 | 62.5 | 13,722.6 | 75.1 | 7,164.9 | 149.2 | 5,736.9 | 54.8 | 8,108.8 | 118.4 | 8,341.0 | 58.0 |
| PY 3 (2020) | 12,917.1 | 181.9 | 12,288.2 | 86.9 | 7,146.7 | 133.1 | 5,286.7 | 58.4 | 5,776.2 | 125.8 | 7,415.0 | 53.5 |
| PY 4 (2021) | 14,208.3 | 49.0 | 13,653.2 | 114.9 | 8,220.2 | 173.4 | 5,689.6 | 71.4 | 5,996.1 | 109.4 | 8,472.0 | 66.2 |
| PY 5 (2022) | 14,129.1 | 64.7 | 13,469.1 | 108.3 | 8,205.7 | 173.5 | 5,538.0 | 72.1 | 5,895.1 | 144.4 | 8,501.0 | 63.8 |

NOTE: Estimates are presented per 1,000 BPY.

**Appendix Exhibit F.31.** PY 5 Medicare ACO-Level: Adjusted Utilization for VTAPM and Weighted Comparison Beneficiaries: SNF Days, SNF Stays, and Home Health Visits

| | SNF Stays | | | | SNF Days | | | | Home Health Visits | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | VTAPM | | Comparison | | VTAPM | | Comparison | | VTAPM | | Comparison | |
| | Mean | SE | Mean | SE | Mean | SE | Mean | SE | Mean | SE | Mean | SE |
| BY 3 (2014) | 60.2 | 1.7 | 68.4 | 2.0 | 1,638.8 | 65.1 | 1,805.9 | 65.8 | 2,436.4 | 86.1 | 3,256.3 | 132.7 |
| BY 2 (2015) | 65.2 | 1.6 | 68.4 | 2.1 | 1,679.4 | 47.5 | 1,801.0 | 74.5 | 2,628.4 | 65.9 | 3,398.6 | 127.3 |
| BY 1 (2016) | 61.6 | 1.6 | 71.0 | 2.0 | 1,569.9 | 48.3 | 1,718.9 | 64.0 | 2,568.9 | 69.1 | 3,405.7 | 132.9 |
| BY 0 (2017) | 66.5 | 1.5 | 65.0 | 2.4 | 1,663.3 | 48.5 | 1,534.9 | 75.5 | 2,655.4 | 83.0 | 3,436.5 | 115.6 |
| PY 1 (2018) | 63.2 | 2.0 | 65.7 | 2.4 | 1,575.8 | 51.5 | 1,466.4 | 58.8 | 2,641.5 | 41.1 | 3,501.3 | 116.7 |
| PY 2 (2019) | 60.2 | 1.8 | 61.6 | 1.5 | 1,416.1 | 47.5 | 1,382.4 | 46.7 | 2,413.6 | 48.5 | 3,481.3 | 128.7 |
| PY 3 (2020) | 46.7 | 1.4 | 51.5 | 1.7 | 1,149.0 | 36.8 | 1,129.6 | 52.4 | 2,164.6 | 61.2 | 3,174.8 | 121.3 |
| PY 4 (2021) | 47.4 | 1.0 | 52.4 | 1.9 | 1,224.5 | 32.5 | 1,192.8 | 55.4 | 2,257.2 | 98.9 | 3,148.5 | 123.6 |
| PY 5 (2022) | 51.7 | 2.6 | 54.9 | 2.0 | 1,194.3 | 66.5 | 1,196.4 | 54.6 | 2,043.4 | 88.0 | 3,010.5 | 87.8 |

NOTE: Estimates are presented per 1,000 BPY.

**Appendix Exhibit F.32.** PY 5 Medicare ACO-Level: Adjusted Utilization for VTAPM and Weighted Comparison Beneficiaries: Home Health Episodes, Hospice Days, and Imaging, Procedures and Tests

| | Home Health Episodes | | | | Hospice Days | | | | Imaging, Procedures & Tests | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | VTAPM | | Comparison | | VTAPM | | Comparison | | VTAPM | | Comparison | |
| | Mean | SE | Mean | SE | Mean | SE | Mean | SE | Mean | SE | Mean | SE |
| BY 3 (2014) | 122.2 | 3.0 | 126.7 | 3.2 | 937.2 | 81.9 | 1,480.3 | 117.9 | 31,948.3 | 500.5 | 36,180.5 | 233.7 |
| BY 2 (2015) | 127.5 | 1.9 | 131.5 | 2.5 | 1,187.2 | 59.2 | 1,857.5 | 92.8 | 31,368.1 | 398.5 | 35,555.0 | 237.3 |
| BY 1 (2016) | 127.6 | 1.7 | 132.8 | 2.5 | 1,308.5 | 62.7 | 1,927.8 | 68.4 | 30,930.2 | 154.4 | 35,101.9 | 229.3 |
| BY 0 (2017) | 128.3 | 1.6 | 135.9 | 2.7 | 1,471.8 | 79.1 | 2,089.7 | 70.7 | 30,693.3 | 171.3 | 34,723.2 | 159.2 |
| PY 1 (2018) | 128.7 | 1.5 | 138.5 | 2.4 | 1,555.1 | 46.4 | 2,383.9 | 75.2 | 31,293.0 | 150.6 | 34,470.2 | 176.5 |
| PY 2 (2019) | 124.3 | 1.5 | 144.5 | 2.7 | 1,533.8 | 45.7 | 2,582.2 | 79.9 | 31,617.1 | 309.0 | 34,823.6 | 235 |
| PY 3 (2020) | 169.7 | 3.1 | 174.7 | 3.8 | 1,560.8 | 44.6 | 2,969.3 | 120.7 | 26,838.7 | 369.2 | 30,885.2 | 207.6 |
| PY 4 (2021) | 184.4 | 4.2 | 184.2 | 4.5 | 1,539.6 | 97.6 | 2,911.5 | 93.4 | 31,023.9 | 341.3 | 34,902.0 | 277.0 |
| PY 5 (2022) | 171.6 | 4.0 | 183.2 | 3.5 | 1,500.6 | 77.4 | 3,202.5 | 100.5 | 31,144.8 | 257.1 | 35,659.0 | 249.0 |

NOTE: Estimates are presented per 1,000 BPY.

**Appendix Exhibit F.33.** PY 5 Medicare ACO-Level: Adjusted Utilization for VTAPM and Weighted Comparison Beneficiaries: Annual Wellness Visits, ACS Hospitalizations, and Unplanned 30-Day Readmissions

| | Annual Wellness Visits | | | | ACS Hospitalizations | | | | Unplanned 30-Day Readmissions | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | VTAPM | | Comparison | | VTAPM | | Comparison | | VTAPM | | Comparison | |
| | Mean | SE | Mean | SE | Mean | SE | Mean | SE | Mean | SE | Mean | SE |
| BY 3 (2014) | 225.5 | 7.5 | 201.7 | 8.4 | 36.8 | 1.4 | 37.4 | 0.8 | 111.7 | 3.2 | 114.8 | 3.6 |
| BY 2 (2015) | 244.0 | 8.7 | 220.5 | 7.5 | 32.4 | 1.0 | 33.8 | 1.3 | 111.8 | 2.9 | 122.6 | 3.6 |
| BY 1 (2016) | 263.3 | 6.1 | 239.7 | 8.1 | 30.4 | 0.8 | 31.5 | 0.8 | 117.3 | 3.7 | 122.1 | 6.2 |
| BY 0 (2017) | 278.0 | 7.1 | 284.0 | 7.5 | 31.8 | 0.7 | 34.3 | 1.2 | 116.2 | 2.3 | 143.0 | 3.9 |
| PY 1 (2018) | 296.4 | 5.9 | 315.9 | 4.5 | 30.8 | 0.8 | 30.7 | 0.8 | 119.0 | 2.6 | 146.2 | 3.0 |
| PY 2 (2019) | 311.5 | 7.6 | 345.8 | 5.4 | 30.7 | 1.0 | 29.9 | 0.6 | 119.2 | 1.7 | 146.2 | 2.9 |
| PY 3 (2020) | 282.2 | 8.0 | 297.0 | 8.9 | 25.2 | 1.0 | 23.8 | 0.5 | 111.0 | 5.5 | 159.6 | 4.6 |
| PY 4 (2021) | 329.4 | 7.3 | 369.9 | 8.0 | 22.9 | 1.3 | 24.3 | 0.8 | 118.0 | 2.5 | 180.6 | 5.6 |
| PY 5 (2022) | 331.2 | 8.7 | 405.6 | 6.4 | 24.1 | 0.5 | 25.8 | 0.8 | 117.5 | 3.0 | 178.7 | 3.1 |

NOTE: Estimates are presented per 1,000 BPY.

**Appendix Exhibit F.34.** PY 5 Medicare State-Level: Adjusted Total Medicare Spending for Vermont and Weighted Comparison Beneficiaries

| | Total Medicare Spending | | | |
|---|---|---|---|---|
| | Vermont | | Comparison | |
| | Mean | SE | Mean | SE |
| BY 3 (2014) | $12,410.1 | $214.7 | $12,830.5 | $174.8 |
| BY 2 (2015) | $13,133.5 | $235.6 | $13,478.7 | $143.8 |
| BY 1 (2016) | $12,897.9 | $184.6 | $13,393.7 | $132.4 |
| BY 0 (2017) | $12,909.4 | $221.4 | $13,595.7 | $160.1 |
| PY 1 (2018) | $13,200.4 | $181.2 | $13,880.6 | $143.2 |
| PY 2 (2019) | $12,813.1 | $184.7 | $14,337.1 | $124.8 |
| PY 3 (2020) | $11,596.0 | $207.0 | $13,578.0 | $215.0 |
| PY 4 (2021) | $12,243.3 | $170.3 | $14,460.1 | $173.6 |
| PY 5 (2022) | $12,246.5 | $160.7 | $13,869.2 | $121.9 |

NOTE: Estimates are presented in 2022 USD ($) per beneficiary per year (PBPY).

**Appendix Exhibit F.35.** PY 5 Medicare State-Level: Adjusted Utilization for Vermont and Weighted Comparison Beneficiaries: Acute Inpatient Stays, Acute Inpatient Days, and ED Visits and Observation Stays

| | Acute Care Stays | | | | Acute Care Days | | | | ED visits and observation stays | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Vermont | | Comparison | | Vermont | | Comparison | | Vermont | | Comparison | |
| | Mean | SE | Mean | SE | Mean | SE | Mean | SE | Mean | SE | Mean | SE |
| BY 3 (2014) | 236.3 | 3.7 | 310.9 | 3.2 | 1,194.2 | 21.4 | 1,543.4 | 28.9 | 584.1 | 10.9 | 616.1 | 9.5 |
| BY 2 (2015) | 253.3 | 5.1 | 320.1 | 3.2 | 1,260.2 | 29.5 | 1,578.4 | 26.1 | 597.7 | 12.3 | 617.9 | 9.0 |
| BY 1 (2016) | 250.3 | 4.2 | 329.0 | 3.3 | 1,231.7 | 28.1 | 1,603.3 | 26.8 | 589.9 | 10.7 | 629.7 | 9.3 |
| BY 0 (2017) | 251.0 | 6.0 | 339.0 | 3.5 | 1,178.0 | 30.6 | 1,617.2 | 27.7 | 584.1 | 10.8 | 636.0 | 9.2 |
| PY 1 (2018) | 251.6 | 5.4 | 341.7 | 3.1 | 1,238.4 | 30.2 | 1,639.9 | 22.7 | 587.6 | 11.3 | 627.7 | 9.5 |
| PY 2 (2019) | 245.2 | 4.3 | 349.9 | 3.3 | 1,194.7 | 28.1 | 1,645.1 | 26.7 | 582.1 | 12.4 | 627.4 | 9.1 |
| PY 3 (2020) | 203.4 | 3.0 | 312.2 | 3.8 | 1,055.1 | 25.0 | 1,641.6 | 36.5 | 479.5 | 7.6 | 536.3 | 9.9 |
| PY 4 (2021) | 201.3 | 4.4 | 317.4 | 3.4 | 1,089.8 | 26.9 | 1,704.7 | 27.0 | 515.5 | 10.6 | 578.0 | 10.2 |
| PY 5 (2022) | 200.7 | 3.5 | 326.1 | 2.5 | 1,178.1 | 27.8 | 1,703.6 | 25.4 | 555.4 | 9.9 | 566.8 | 8.8 |

NOTE: Estimates are presented per 1,000 BPY.

**Appendix Exhibit F.36.** PY 5 Medicare State-Level: Adjusted Utilization for Vermont and Weighted Comparison Beneficiaries: Total E&M Visits, Primary Care E&M Visits, and Specialty Care E&M Visits

| | Total E&M Visits | | | | Primary Care E&M Visits | | | | Specialty Care E&M Visits | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Vermont | | Comparison | | Vermont | | Comparison | | Vermont | | Comparison | |
| | Mean | SE | Mean | SE | Mean | SE | Mean | SE | Mean | SE | Mean | SE |
| BY 3 (2014) | 13,992.1 | 335.7 | 12,833.1 | 112.9 | 7,618.5 | 189.9 | 6,774.9 | 133.7 | 6,311.0 | 236.6 | 5,934.3 | 79.1 |
| BY 2 (2015) | 14,586.4 | 283.9 | 13,287.5 | 107.6 | 7,258.7 | 153.8 | 6,547.0 | 71.8 | 7,277.9 | 260.6 | 6,588.2 | 59.2 |
| BY 1 (2016) | 14,759.3 | 223.1 | 13,609.9 | 120.1 | 7,152.7 | 165.3 | 6,489.5 | 68.4 | 7,512.2 | 221.2 | 6,936.0 | 66.9 |
| BY 0 (2017) | 14,776.3 | 180.4 | 13,693.3 | 109.0 | 7,168.2 | 175.4 | 6,370.8 | 65.2 | 7,487.7 | 186.2 | 7,142.2 | 63.5 |
| PY 1 (2018) | 14,869.4 | 187.2 | 13,955.7 | 95.0 | 7,060.5 | 145.8 | 6,253.7 | 50.1 | 7,653.3 | 191.0 | 7,488.3 | 56.9 |
| PY 2 (2019) | 14,728.3 | 166.7 | 14,017.5 | 88.1 | 6,985.1 | 163.1 | 6,193.0 | 52.2 | 7,563.7 | 170.1 | 7,599.6 | 53.2 |
| PY 3 (2020) | 12,329.3 | 158.7 | 12,364.9 | 165.4 | 6,803.0 | 118.7 | 5,734.5 | 152.4 | 5,488.9 | 159.3 | 6,559.7 | 45.7 |
| PY 4 (2021) | 13,316.2 | 153.9 | 13,386.5 | 135.9 | 7,654.1 | 151.4 | 5,970.0 | 98.9 | 5,651.1 | 114.8 | 7,424.7 | 50.4 |
| PY 5 (2022) | 13,286.1 | 182.8 | 13,511.9 | 99.2 | 7,695.3 | 145.8 | 5,955.1 | 74.8 | 5,544.0 | 109.4 | 7,552.5 | 55.0 |

NOTE: Estimates are presented per 1,000 BPY.

**Appendix Exhibit F.37.** PY 5 Medicare State-Level: Adjusted Utilization for Vermont and Weighted Comparison Beneficiaries: SNF Days, SNF Stays, and Home Health Visits

| | SNF Stays | | | | SNF Days | | | | Home Health Visits | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Vermont | | Comparison | | Vermont | | Comparison | | Vermont | | Comparison | |
| | Mean | SE | Mean | SE | Mean | SE | Mean | SE | Mean | SE | Mean | SE |
| BY 3 (2014) | 65.5 | 2.1 | 79.8 | 1.3 | 1,736.8 | 65.6 | 2,157.4 | 49.7 | 2,418.6 | 86.8 | 3,054.2 | 116.9 |
| BY 2 (2015) | 70.1 | 1.8 | 81.2 | 1.5 | 1,762.4 | 52.0 | 2,190.1 | 63.5 | 2,612.6 | 94.8 | 3,158.9 | 108.4 |
| BY 1 (2016) | 64.5 | 1.5 | 81.9 | 1.7 | 1,582.1 | 46.1 | 2,043.5 | 52.2 | 2,480.9 | 81.4 | 3,158.4 | 111.5 |
| BY 0 (2017) | 66.9 | 1.8 | 78.0 | 2.1 | 1,593.3 | 50.8 | 1,885.0 | 63.7 | 2,573.6 | 89.2 | 3,198.2 | 106.4 |
| PY 1 (2018) | 65.1 | 1.7 | 76.1 | 2.0 | 1,577.9 | 47.4 | 1,813.2 | 56.8 | 2,598.3 | 87.8 | 3,256.5 | 112.4 |
| PY 2 (2019) | 61.6 | 1.3 | 73.8 | 1.4 | 1,459.5 | 35.8 | 1,725.9 | 45.0 | 2,475.5 | 113.1 | 3,134.1 | 110.4 |
| PY 3 (2020) | 45.8 | 1.4 | 62.0 | 1.8 | 1,108.7 | 35.4 | 1,462.1 | 60.5 | 2,156.3 | 115.2 | 2,439.1 | 97.5 |
| PY 4 (2021) | 48.4 | 1.2 | 62.1 | 1.5 | 1,219.8 | 35.7 | 1,404.3 | 51.6 | 2,231.5 | 151.1 | 2,587.8 | 114.1 |
| PY 5 (2022) | 57.3 | 1.9 | 65.9 | 1.9 | 1,353.7 | 55.0 | 1,471.1 | 54.5 | 2,003.4 | 118.2 | 2,310.9 | 83.2 |

NOTE: Estimates are presented per 1,000 BPY.

**Appendix Exhibit F.38.** PY 5 Medicare State-Level: Adjusted Utilization for Vermont and Weighted Comparison Beneficiaries: Home Health Episodes, Hospice Days, and Imaging, Procedures and Tests

| | Home Health Episodes | | | | Hospice Days | | | | Imaging, Procedures & Tests | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Vermont | | Comparison | | Vermont | | Comparison | | Vermont | | Comparison | |
| | Mean | SE | Mean | SE | Mean | SE | Mean | SE | Mean | SE | Mean | SE |
| BY 3 (2014) | 119.6 | 3.7 | 121.8 | 3.5 | 983.3 | 84.1 | 1,534.3 | 67.0 | 31,673.3 | 457.0 | 35,210.8 | 277.4 |
| BY 2 (2015) | 126.2 | 3.9 | 128.0 | 3.2 | 1,122.4 | 80.9 | 1,822.8 | 63.4 | 31,660.3 | 494.9 | 35,481.0 | 268.0 |
| BY 1 (2016) | 125.9 | 3.2 | 130.1 | 3.2 | 1,273.7 | 91.2 | 1,969.1 | 65.8 | 31,193.0 | 401.1 | 34,577.3 | 182.4 |
| BY 0 (2017) | 126.2 | 3.1 | 132.7 | 3.1 | 1,436.8 | 100.8 | 2,099.3 | 60.5 | 31,106.4 | 393.1 | 34,399.6 | 172.7 |
| PY 1 (2018) | 127.3 | 2.5 | 133.9 | 3.1 | 1,520.4 | 68.7 | 2,324.8 | 59.2 | 31,496.1 | 328.9 | 34,450.4 | 211.0 |
| PY 2 (2019) | 123.7 | 3.2 | 135.4 | 3.1 | 1,519.2 | 103.5 | 2,598.8 | 62.1 | 31,882.7 | 348.1 | 35,032.0 | 277.8 |
| PY 3 (2020) | 169.2 | 7.0 | 159.6 | 4.7 | 1,536.8 | 82.5 | 2,859.1 | 87.3 | 26,936.9 | 420.3 | 30,056.4 | 410.3 |
| PY 4 (2021) | 181.1 | 8.3 | 174.2 | 4.6 | 1,578.9 | 104.9 | 2,841.7 | 76.3 | 30,552.8 | 381.3 | 34,161.9 | 295.5 |
| PY 5 (2022) | 167.6 | 7.3 | 169.6 | 4.0 | 1,514.5 | 81.2 | 2,983.7 | 66.4 | 30,737.8 | 272.7 | 35,299.3 | 257.2 |

NOTE: Estimates are presented per 1,000 BPY.

**Appendix Exhibit F.39.** PY 5 Medicare State-Level: Adjusted Utilization for Vermont and Weighted Comparison Beneficiaries: Annual Wellness Visits, ACS Hospitalizations, and Unplanned 30-Day Readmissions

| | Annual Wellness Visits | | | | ACS Hospitalizations | | | | Unplanned 30-Day Readmissions | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Vermont | | Comparison | | Vermont | | Comparison | | Vermont | | Comparison | |
| | Mean | SE | Mean | SE | Mean | SE | Mean | SE | Mean | SE | Mean | SE |
| BY 3 (2014) | 210 | 13.0 | 189.7 | 6.4 | 38.2 | 1.1 | 37.9 | 0.8 | 114.1 | 3.0 | 112.2 | 2.8 |
| BY 2 (2015) | 236.9 | 13.7 | 211.9 | 7.5 | 35.0 | 1.1 | 36.4 | 0.8 | 116.3 | 3.8 | 119.2 | 2.5 |
| BY 1 (2016) | 249.6 | 15.6 | 228.6 | 7.6 | 32.4 | 0.9 | 32.0 | 0.5 | 118.6 | 2.8 | 117.6 | 2.7 |
| BY 0 (2017) | 265.7 | 16.3 | 260.5 | 7.9 | 34.3 | 1.0 | 33.6 | 0.7 | 114.0 | 2.2 | 119.9 | 2.3 |
| PY 1 (2018) | 289.6 | 15.2 | 284.2 | 8.5 | 32.9 | 0.7 | 32.1 | 0.6 | 115.5 | 2.3 | 126.0 | 2.1 |
| PY 2 (2019) | 310.5 | 15.3 | 308.3 | 8.1 | 31.6 | 1.0 | 31.9 | 0.5 | 118.9 | 2.3 | 131.5 | 2.0 |
| PY 3 (2020) | 288.1 | 16.2 | 253.3 | 11.1 | 24.8 | 0.8 | 23.6 | 0.7 | 111.2 | 4.1 | 129.0 | 1.8 |
| PY 4 (2021) | 334.9 | 17.7 | 306.4 | 16.5 | 23.3 | 1.1 | 23.8 | 0.8 | 116.4 | 2.8 | 138.6 | 2.8 |
| PY 5 (2022) | 343.1 | 16.8 | 327.0 | 10.0 | 24.1 | 0.7 | 26.2 | 0.5 | 114.2 | 3.6 | 140.5 | 2.1 |

NOTE: Estimates are presented per 1,000 BPY.

**Appendix Exhibit F.40.** PY 5 Medicare ACO-Level: Common Baseline Trend Metrics for VTAPM and Weighted Comparison Beneficiaries

| | BY 3 vs. BY 2 | | | BY 3 vs. BY 1 | | | Linear Interaction Term | | |
|---|---|---|---|---|---|---|---|---|---|
| | Effect | Std. Error | p | Effect | Std. Error | p | Effect | Std. Error | p |
| **Spending ($ PBPY)** | | | | | | | | | |
| Total Medicare spending (Parts A and B) | $112.73 | $332.05 | 0.73 | $345.40 | $260.11 | 0.18 | $198.16 | $123.06 | 0.11 |
| **Utilization (per 1,000 BPY)** | | | | | | | | | |
| Acute care stays | 16.72 | 6.20 | 0.23 | 22.22 | 6.51 | 0.00 | 11.08 | 3.20 | 0.00 |
| Acute care days | 124.48 | 50.03 | 0.01 | 96.54 | 51.78 | 0.06 | 39.71 | 22.89 | 0.08 |
| ED visits and observation stays | 13.00 | 16.44 | 0.43 | -4.75 | 15.71 | 0.76 | -2.38 | 7.77 | 0.76 |
| Total E&M visits | 329.05 | 201.37 | 0.10 | 439.94 | 338.50 | 0.19 | 152.84 | 139.18 | 0.27 |
| Primary E&M visits | -294.34 | 229.97 | 0.20 | -393.74 | 291.40 | 0.18 | -148.42 | 142.11 | 0.30 |
| Specialty E&M visits | 785.60 | 154.50 | 0.00 | 1057.15 | 233.13 | 0.00 | 384.18 | 94.46 | 0.00 |
| SNF stays | 3.46 | 2.57 | 0.18 | 2.03 | 2.53 | 0.42 | 1.30 | 1.16 | 0.26 |
| SNF days | 13.95 | 97.85 | 0.89 | 87.34 | 95.45 | 0.36 | 12.76 | 41.29 | 0.76 |
| Home health visits | 150.88 | 157.62 | 0.33 | 130.52 | 183.01 | 0.48 | 76.45 | 92.19 | 0.41 |
| Home health episodes | 4.89 | 3.76 | 0.19 | 8.81 | 4.26 | 0.04 | 5.14 | 2.46 | 0.04 |
| Hospice days | 67.84 | 216.46 | 0.75 | 313.62 | 243.75 | 0.20 | 208.35 | 101.78 | 0.04 |
| Imaging, procedures, and tests | 56.23 | 336.01 | 0.87 | -197.46 | 549.91 | 0.72 | -215.76 | 273.68 | 0.43 |
| **Quality of Care (per 1,000 BPY)** | | | | | | | | | |
| Annual wellness visit | -6.71 | 6.66 | 0.31 | -17.31 | 14.63 | 0.24 | -5.67 | 8.29 | 0.49 |
| ACS hospitalizations | 1.12 | 1.88 | 0.55 | 3.87 | 1.89 | 0.04 | 0.55 | 0.74 | 0.46 |
| Unplanned 30-day readmissions | 0.75 | 6.11 | 0.90 | 18.79 | 9.76 | 0.05 | 9.25 | 4.73 | 0.05 |

SOURCE: NORC analysis of Medicare claims.

NOTE: PBPY=per beneficiary per year; BPY=beneficiary per year. Asterisks denote significance at *p<0.10, **p<0.05, ***p<0.01.

**Appendix Exhibit F.41.** PY 5 Medicare State-Level: Common Baseline Trend Metrics for Vermont and Weighted Comparison Beneficiaries

| | BY 3 vs. BY 2 | | | BY 3 vs. BY 1 | | | Linear Interaction Term | | |
|---|---|---|---|---|---|---|---|---|---|
| | Effect | Std. Error | p | Effect | Std. Error | p | Effect | Std. Error | p |
| **Spending ($ PBPY)** | | | | | | | | | |
| Total Medicare spending (Parts A and B) | $282.08 | $292.25 | 0.33 | $256.87 | $248.97 | 0.30 | $134.13 | $126.14 | 0.29 |
| **Utilization (per 1,000 BPY)** | | | | | | | | | |
| Acute care stays | 21.47 | 4.93 | 0.00 | 21.71 | 5.48 | 0.00 | 10.45 | 2.62 | 0.00 |
| Acute care days | 99.74 | 36.15 | 0.01 | 106.41 | 36.63 | 0.00 | 49.71 | 17.23 | 0.00 |
| ED visits and observation stays | 18.38 | 9.89 | 0.06 | 2.50 | 11.13 | 0.82 | 1.08 | 5.33 | 0.84 |
| Total E&M visits | 343.67 | 166.29 | 0.04 | 398.92 | 235.71 | 0.09 | 171.22 | 115.64 | 0.14 |
| Primary E&M visits | -143.59 | 130.20 | 0.27 | -253.52 | 147.89 | 0.09 | -117.62 | 71.41 | 0.10 |
| Specialty E&M visits | 559.46 | 99.01 | 0.00 | 718.14 | 150.31 | 0.00 | 302.38 | 74.76 | 0.00 |
| SNF stays | 4.89 | 2.42 | 0.04 | 1.17 | 3.16 | 0.71 | 0.59 | 1.49 | 0.69 |
| SNF days | 5.68 | 91.75 | 0.95 | -25.71 | 93.77 | 0.78 | -11.06 | 40.82 | 0.79 |
| Home health visits | 261.36 | 110.74 | 0.02 | 21.26 | 124.90 | 0.86 | 4.18 | 50.72 | 0.93 |
| Home health episodes | 6.46 | 4.28 | 0.13 | 7.23 | 4.32 | 0.09 | 2.97 | 2.04 | 0.15 |
| Hospice days | 22.33 | 117.61 | 0.85 | 235.86 | 120.84 | 0.05 | 169.99 | 74.29 | 0.02 |
| Imaging, procedures, and tests | -545.62 | 271.38 | 0.04 | -293.66 | 420.05 | 0.48 | -160.56 | 212.78 | 0.45 |
| **Quality of Care (per 1,000 BPY)** | | | | | | | | | |
| Annual wellness visit | -2.32 | 7.50 | 0.76 | -12.27 | 9.39 | 0.19 | -7.91 | 5.25 | 0.13 |
| ACS hospitalizations | -0.69 | 1.00 | 0.49 | 1.35 | 1.36 | 0.32 | 0.55 | 0.54 | 0.31 |
| Unplanned 30-day readmissions | 1.72 | 4.43 | 0.70 | 9.13 | 6.43 | 0.16 | 4.53 | 3.18 | 0.15 |

SOURCE: NORC analysis of Medicare claims.

NOTE: PBPY=per beneficiary per year; BPY=beneficiary per year. Asterisks denote significance at *p<0.10, **p<0.05, ***p<0.01.

**Appendix Exhibit F.42.** PY 5 Medicare ACO-Level: Impact of VTAPM on Spending, Utilization, and Quality of Care

| | Baseline (2014–2016) | | PY 5 (2022) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Difference-in-Differences | | | | | |
| | VTAPM | Comp. | VTAPM | Comp. | DID Estimate | VTAPM Change | Comp. Change | 90% CI | % Impact | p |
| **Spending ($ PBPY)** | | | | | | | | | | |
| Total Medicare spending (Parts A and B) | $11,743 | $14,753 | $10,075 | $14,107 | -$1,021.99 | -$1,668 | -$636 | -$2,236.83, $192.86 | -8.29 | 0.166 |
| **Utilization (per 1,000 BPY)** | | | | | | | | | | |
| Acute care stays | 210 | 306 | 103 | 234 | -35.59* | -107 | -72 | -68.65, -2.52 | -25.6 | 0.077 |
| Acute care days | 1,513 | 1,450 | 1,223 | 1,226 | -66.53 | -290 | -224 | -392.31, 259.25 | -5.1 | 0.737 |
| ED visits and observation stays | 494 | 623 | 465 | 554 | 40.65 | -20 | -69 | -27.05, 108.35 | 9.6 | 0.323 |
| Total E&M visits | 16,156 | 12,521 | 13,988 | 11,598 | -1,245.04 | -2,168 | -923 | -3,023.10, 533.03 | -7.7 | 0.249 |
| Primary E&M visits | 8,112 | 6,390 | 9,572 | 6,595 | 1,255.77 | 1,460 | 205 | -502.46, 3,014.00 | 17.9 | 0.240 |
| Specialty E&M visits | 7,615 | 6,398 | 3,037 | 5,190 | -3,370.07*** | -4,578 | -1,208 | -4,916.97, -1,823.18 | -34.7 | 0.000 |
| SNF stays | 29 | 73 | 9 | 49 | 3.51 | -20 | -24 | -3.70, 10.73 | 62.4 | 0.423 |
| SNF days | 874 | 1,863 | 275 | 1,180 | 83.84 | -599 | -683 | -147.73, 315.41 | 43.9 | 0.551 |
| Home health visits | 2,254 | 3,307 | 1,131 | 2,434 | -251.04 | -1,123 | -873 | -999.98, 497.89 | -18.1 | 0.581 |
| Home health episodes | 90 | 129 | 99 | 148 | -9.90 | 9 | 19 | -40.86, 21.06 | -9.1 | 0.599 |
| Hospice days | 991 | 1,570 | -691 | 1,599 | -1,711.12 | -1,682 | 29 | -4,587.81, 1,165.58 | -1,670 | 0.328 |
| Imaging, procedures, and tests | 29,390 | 38,437 | 30,329 | 39,058 | 317.19 | 939 | 621 | -1,987.35, 2,621.74 | 1.12 | 0.821 |
| **Quality of Care (per 1,000 BPY)** | | | | | | | | | | |
| Annual wellness visit | 209 | 270 | 265 | 428 | -102.23 | 56 | 158 | -204.65, 0.18 | -27.8 | 0.101 |
| ACS hospitalizations | 27 | 42 | 14 | 30 | 0.13 | -13 | -12 | -5.72, 5.97 | 0.9 | 0.971 |
| Unplanned 30-day readmissions | 90 | 143 | 32 | 145 | -59.61 | -58 | 2 | -134.09, 14.87 | -64.9 | 0.188 |

SOURCE: NORC analysis of Medicare claims.

NOTE: PBPY=per beneficiary per year; BPY=beneficiary per year. Asterisks denote significance at *p<0.10, **p<0.05, ***p<0.01. VTAPM Change and Comp. Change columns indicate the change in average adjusted outcome for the VTAPM or comparison group between PY 5 (2022) and the baseline; minor deviations are due to rounding. Cells highlighted in blue indicate a decrease between PY 5 (2022) and the baseline for the VTAPM or comparison group.

**Appendix Exhibit F.43.** PY 5 Medicare State-Level: Impact of Vermont on Spending, Utilization, and Quality of Care

| | Baseline (2014–2016) | | PY 5 (2022) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Difference-in-Differences | | | | | |
| | Vermont | Comp. | Vermont | Comp. | DID Estimate | Vermont Change | Comp. Change | 90% CI | % Impact | p |
| **Spending ($ PBPY)** | | | | | | | | | | |
| Total Medicare spending (Parts A and B) | $12,662 | $13,259 | $11,099 | $12,810 | -$1,114.08 | -$1,563 | -$449 | -$2,575.92, $347.76 | -8.43 | 0.210 |
| **Utilization (per 1,000 BPY)** | | | | | | | | | | |
| Acute care stays | 274 | 309 | 154 | 242 | -53.47*** | -120 | -67 | -87.39, -19.56 | -25.7 | 0.009 |
| Acute care days | 1,424 | 1,519 | 1,024 | 1,305 | -185.47 | -400 | -214 | -443.42, 72.48 | -15.3 | 0.237 |
| ED visits and observation stays | 639 | 619 | 583 | 558 | 6.00 | -56 | -61 | -54.53, 66.54 | 1.040 | 0.870 |
| Total E&M visits | 14,144 | 13,362 | 11,862 | 12,347 | -1,266.82* | -2,282 | -1,015 | -2,504.81, -28.82 | -8.86 | 0.092 |
| Primary care E&M visits | 7,372 | 6,694 | 8,611 | 6,942 | 991.09** | 1,239 | 248 | 310.61, 1,671.57 | 15.26 | 0.017 |
| Specialty care E&M visits | 6,662 | 6,556 | 2,866 | 5,295 | -2,534.39*** | -3,796 | -1,261 | -3,529.18, -1,539.61 | -31.6 | 0.000 |
| SNF stays | 74 | 80 | 63 | 61 | 7.78 | -11 | -19 | -7.48, 23.04 | 14.11 | 0.402 |
| SNF days | 2,149 | 2,126 | 1,873 | 1,553 | 297.55 | -276 | -573 | -123.52, 718.61 | 18.88 | 0.245 |
| Home health visits | 4,079 | 3,081 | 3,524 | 2,252 | 273.98 | -555 | -829 | -369.69, 917.65 | 8.430 | 0.484 |
| Home health episodes | 155 | 123 | 179 | 145 | 1.32 | 24 | 23 | -36.77, 39.41 | 0.742 | 0.955 |
| Hospice days | 1,039 | 1,611 | 69 | 1,649 | -1,008.12 | -970 | 38 | -2,421.48, 405.25 | -93.6 | 0.241 |
| Imaging, procedures, and tests | 32,067 | 34,639 | 31,585 | 34,894 | -736.35 | -482 | 255 | -2,995.71, 1,523.00 | -2.3 | 0.592 |
| **Quality of Care (per 1,000 BPY)** | | | | | | | | | | |
| Annual wellness visit | 237 | 214 | 373 | 352 | -2.45 | 136 | 138 | -76.65, 71.76 | -0.6 | 0.957 |
| ACS hospitalizations | 34 | 36 | 21 | 24 | -1.06 | -13 | -12 | -6.19, 4.06 | -4.9 | 0.732 |
| Unplanned 30-day readmissions | 110 | 118 | 79 | 114 | -26.50 | -31 | -4 | -68.13, 15.12 | -25.2 | 0.295 |

SOURCE: NORC analysis of Medicare claims.

NOTE: PBPY=per beneficiary per year; BPY=beneficiary per year. Asterisks denote significance at *p<0.10, **p<0.05, ***p<0.01. VTAPM Change and Comp. Change columns indicate the change in average adjusted outcome for the VTAPM or comparison group between PY 5 (2022) and the baseline; minor deviations are due to rounding. Cells highlighted in blue indicate a decrease between PY 5 (2022) and the baseline for the VTAPM or comparison group.

**Appendix Exhibit F.44.** PY4 Quality Measure Crosswalk

| Measure | Vermont All-Payer ACO Model Agreement | 2021 Vermont Medicaid | 2021 Medicare Initiative | 2021 BCBSVT QHP / Primary | 2021 MVP Next Gen | Notes |
|---|---|---|---|---|---|---|
| Percent of adults with a usual primary care provider | X | | | | | |
| Statewide prevalence of Chronic Obstructive Pulmonary Disease | X | | | | | |
| Statewide prevalence of Hypertension | X | | | | | |
| Statewide prevalence of Diabetes | X | | | | | |
| % of Medicaid children and adolescents with well-care visits | X | X | | X | X | For APM Agreement, all Medicaid adolescents in VHCURES, excluding dual-eligible. For Payer programs, payer-specific measure of well-care visits for attributed commercial population. |
| Initiation of alcohol and other drug dependence treatment | X | X | X | X | X | BCBSVT and MVP Next Gen treat these measures as a single composite measure; All-Payer ACO Model, Medicare Initiative and Vermont Medicaid Next Gen treat them as separate measures. |
| Engagement of alcohol and other drug dependence treatment | X | X | X | X | X | |
| 30-day follow-up after discharge from emergency department for mental health | X | X | X | X | X | |
| 30-day follow-up after discharge from emergency department for alcohol or other drug dependence | X | X | X | X | X | |

| Measure | Vermont All-Payer ACO Model Agreement | 2021 Vermont Medicaid | 2021 Medicare Initiative | 2021 BCBSVT QHP / Primary | 2021 MVP Next Gen | Notes |
|---|---|---|---|---|---|---|
| % of Vermont residents receiving appropriate asthma medication management | X | | | | | |
| Screening for clinical depression and follow-up plan (ACO-18) | X | X | X | X | | Reported in Statewide Health Outcomes and Quality of care Report. Measure is a combination of claims and clinical data (chart review). Annual reported scores are weighted based on participating program data received from the ACO and/or payer. |
| Tobacco use assessment and cessation intervention (ACO-17) | X | X | X | | | Reported in Statewide Health Outcomes and Quality of care Report. Measure is a combination of claims and clinical data (chart review). Annual reported scores are weighted based on participating program data received from the ACO and/or payer. |
| Deaths related to suicide | X | | | | | |
| Deaths related to drug overdose | X | | | | | |
| % of Medicaid enrollees aligned with ACO | X | | | | | |
| # per 10,000 population ages 18-64 receiving medication assisted treatment for opioid dependence | X | | | | | |
| Rate of growth in mental health or substance abuse-related emergency department visits | X | | | | | |

| Measure | Vermont All-Payer ACO Model Agreement | 2021 Vermont Medicaid | 2021 Medicare Initiative | 2021 BCBSVT QHP / Primary | 2021 MVP Next Gen | Notes |
|---|---|---|---|---|---|---|
| # of queries of Vermont Prescription Monitoring System by Vermont providers (or their delegates) divided by # of patients for whom a prescriber writes prescription for opioids | X | | | | | |
| Hypertension: Controlling high blood pressure | X | X | X | X | X | |
| Diabetes Mellitus: HbA1c poor control | X | X | X | X | X | |
| All-Cause unplanned admissions for patients with multiple chronic conditions | X | X | X | | | |
| Consumer Assessment of Healthcare Providers and Systems (CAHPS) patient experience survey | X | | X | X | X | Surveys vary by program. All-Payer ACO Model includes ACO CAHPS Survey composite of Timely Care, Appointments, and information for ACO-attributed Medicare beneficiaries. Medicare Initiative includes multiple ACO CAHPS composites for ACO-attributed Medicare beneficiaries. BCBSVT Next Gen includes care coordination composite and tobacco cessation question from CAHPS PCMH for ACO-attributed BCBSVT members. MVP Next Gen includes the care coordination composite score. |
| ACO all-cause readmissions (HEDIS measure for commercial plans) | | | | X | X | |

| Measure | Vermont All-Payer ACO Model Agreement | 2021 Vermont Medicaid | 2021 Medicare Initiative | 2021 BCBSVT QHP / Primary | 2021 MVP Next Gen | Notes |
|---|---|---|---|---|---|---|
| Risk-standardized, all-condition readmission (ACO-8) | | | X | | | |
| Influenza immunization (ACO-14) | | | X | | | |
| Colorectal cancer screening (ACO19) | | | X | | | |
| Developmental screening in the first 3 years of life | | X | | X | | |
| Follow-up after hospitalization for mental Illness (7-Day Rate) | | X | X | X | X | |

SOURCE: Vermont All-Payer ACO Model Annual Health Outcomes and Quality of Care Report Performance Year 4 (2021)

**Appendix Exhibit F.45.** Characteristics of Vermont Medicaid Enrollees Attributed to the Model, 2017-2021

| | 2017 | 2018) | 2019 | 2020 | 2021 |
|---|---|---|---|---|---|
| Number of attributed members | 40,783 | 57,556 | 86,320 | 116,894 | 126,939 |
| Mean Age (SD) | 25.7 (18.49) | 25.46 (18.47) | 25.98 (18.33) | 26.55 (18.1) | 26.65 (18.24) |
| **Age group (%)** | | | | | |
| 1 - 17 | 47.95 | 48.16 | 45.59 | 41.56 | 40.64 |
| 18 - 64 | 51.09 | 50.84 | 53.23 | 57.17 | 57.93 |
| 65+ | 0.96 | 1.00 | 1.18 | 1.27 | 1.42 |
| **Gender (%)** | | | | | |
| Male | 48.17 | 49.08 | 48.70 | 48.38 | 49.01 |
| **Location (%)** | | | | | |
| Rural | 58.11 | 67.32 | 67.94 | 69.39 | 67.82 |

SOURCE: NORC analysis of VHCURES data

Notes: Race, ethnicity, and disability status not reported due to high levels of missingness (>95%). Rural status is defined using Rural-Urban Continuum Codes.

**Appendix Exhibit F.46.** Characteristics of Vermont Attribution-Eligible VTAPM Medicaid ACO-Attributed Enrollees, 2020-2022

| | 2020 | 2021 | 2022 |
|---|---|---|---|
| Number of attribution-eligible members | 149,265 | 159,208 | 168,738 |
| Mean Age (SD) | 26.66 (18.12) | 27.46 (18.24) | 28.04 (18.32) |
| **Age group (%)** | | | |
| 1 - 17 | 39.86 | 37.8 | 36.23 |
| 18 - 64 | 59.28 | 60.84 | 61.89 |
| 65+ | 0.87 | 1.36 | 1.87 |
| **Gender (%)** | | | |
| Male | 47.94 | 48.11 | 48.25 |
| **Race/Ethnicity (%)** | | | |
| White | 78 | 77.05 | 77.01 |
| Black | 2.6 | 2.65 | 2.82 |
| Hispanic | 0.57 | 0.56 | 0.63 |
| Asian | 1.59 | 1.6 | 1.7 |
| Other | 0.41 | 0.42 | 0.48 |
| Missing | 16.82 | 17.72 | 17.36 |
| **Location (%)** | | | |
| Rural | 46.32 | 54.08 | 59.23 |
| **Disability (%)** | | | |
| Disability | 5.33 | 4.73 | 4.44 |

SOURCE: NORC analysis of T-MSIS Data. Data are shown starting in PY 3 (2020) because the expanded attribution approach, which was introduced in 2020, allowed us to identify the population attributed to the VTAPM Medicaid ACO rather than only the attribution-eligible population. Rural status is defined using Rural-Urban Continuum Codes.