Evaluation of the Home Health Value-Based Purchasing (HHVBP) Model

Second Annual Report

Arbor Research Collaborative for Health
and L&M Policy Research

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Acronym List

Acronym	Term
ACH	Acute Care Hospitalization
ACO	Accountable Care Organization
CMMI	Center for Medicare and Medicaid Innovation
CMS	Centers for Medicare and Medicaid Services
COPD	Chronic Obstructive Pulmonary Disease
COPs	Conditions of Participation
CY	Calendar Year
D-in-D	Difference-in-Differences
ED	Emergency Department
FFS	Fee-for-Service
HH	Home Health
HH PPS	Home Health Prospective Payment System
HHA	Home Health Agency
HHC	Home Health Compare
HHCAHPS	Home Health Care Consumer Assessment of Healthcare Providers and Systems
HHRG	Home Health Resource Groups
HHS	U.S. Department of Health and Human Services
HHVBP	Home Health Value-Based Purchasing
LUPA	Low-Utilization Payment Adjustment
OASIS	Outcome and Assessment Information Set
PDGM	Patient-Driven Groupings Model
PEP	Partial Episode Payment
RQ	Research Question
QAPI	Quality Assurance and Performance Improvement
SNF	Skilled Nursing Facility
SOC	Start of Care
TPS	Total Performance Score

Executive Summary

Overview of HHVBP

In January 2016, the Center for Medicare & Medicaid Innovation (CMMI) of the Centers for Medicare & Medicaid Services (CMS) initiated the Home Health Value-Based Purchasing (HHVBP) Model in nine selected states: Arizona, Florida, Iowa, Massachusetts, Maryland, Nebraska, North Carolina, Tennessee, and Washington. CMS designed the HHVBP Model to test the impact of providing financial incentives to home health agencies (HHAs) for improvements in quality of care. Medicare payments to eligible agencies are adjusted upward or downward based on their Total Performance Score (TPS), a composite score of an agency's quality achievement/improvement. The amount of the Medicare payment adjustment for each agency is determined by comparing its TPS score with scores for other agencies in the same state (or state/HHA size cohort). The adjustment process redistributes Medicare payments among agencies within a state to reward agencies with relatively higher achieved quality or improved quality and reduce payments to agencies with lower levels of performance.

The HHVBP payment adjustments will be applied to billed Medicare payments under the Home Health Prospective Payment System (HH PPS), with the adjustments for a given year determined based on agency performance two years earlier. The initial HHVBP payment adjustments are being applied in calendar year (CY) 2018, with agencies receiving an upward or downward adjustment of up to 3% of their Medicare fee-for-service (FFS) payments based on their performance on quality measures during 2016. The percentage of Medicare payments to HHAs that is subject to the adjustment increases each year of the Model, resulting in upward or downward adjustments of up to 8% planned for CY 2022. This Annual Report focuses on the experience of home health patients and agencies through 2017, the second performance year of the HHVBP Model.

The primary goal of this evaluation is to understand how the shift in financial incentives under the HHVBP Model may influence agency behavior and in turn quality of care, Medicare spending, and beneficiary experience. We report findings based on data available for both the baseline period prior to HHVBP implementation (2013 – 2015) and the first two performance years of the Model (2016 – 2017). The analyses presented in this report consider initial effects that may result from the introduction of incentives for quality achievement and improvement that will determine the adjustments to agency HH PPS payments beginning in CY 2018. The effects observed in this report based on secondary data for the first two performance years occurred prior to any adjustments to Medicare payments to HHAs. In future Annual Reports, we will evaluate effects of HHVBP occurring both in later performance years (2018 – 2020) as well as those that are a result of the HHVBP payment adjustments that are being applied (2018 – 2022), as those data become available.

Evaluation Approach

Our evaluation is designed to capture changes in the behavior of HHAs that occur in response to the HHVBP Model and identify effects on a range of measures of quality of care, Medicare spending, and patient experience with care. To accomplish this, we employ a mixed methods research design that incorporates both qualitative and quantitative analytic approaches.

During 2018, we significantly expanded our primary data collection efforts and related analyses. In addition to conducting interviews with both HHAs and referral sources in HHVBP states, we fielded surveys to agencies in both HHVBP and non-HHVBP states. The information that we gathered reflects

the perspectives of a wide range of HHAs, and is augmented by the distinct perspectives of home health referral sources.

In carrying out these activities, we interviewed representatives of 49 HHAs across the nine HHVBP states to understand whether there are differences between the response of agencies with higher levels of performance under HHVBP (i.e., based on higher TPS scores) and lower levels of performance (i.e., lower TPS scores). We note that these activities may reflect a combination of operational changes that are carried out in response to the performance incentives under HHVBP that will affect their future Medicare payments as well as to the CY 2018 payment adjustments in effect at the time of the interviews. We also incorporate survey responses of over 2,300 HHAs that allow us to compare the structural and operational characteristics of agencies in HHVBP and non-HHVBP states as well as the impact of the HHVBP Model on agency operations in the two state groups. In addition, we interviewed 58 home health referrers (i.e., discharge planners, physicians, and physician office staff) across the nine HHVBP states to better understand their working relationships with HHAs and to discern how, if at all, these relationships have changed since the HHVBP Model was launched.

As another primary aspect of our evaluation, we conducted quantitative analyses using secondary data sources that include Medicare claims, Outcome and Assessment Information Set (OASIS) assessments, and other information about home health patients and agencies. We used these analyses to identify initial effects of HHVBP on a range of impact measures of interest. This includes quality measures that are used to calculate an agency's TPS score (a combination of indicators of patient outcomes, processes of care, and patient experience with care). This also includes other indicators of quality that are not reflected in HHVBP performance measures and several measures of Medicare spending.

For most impact measures, we employed a difference-in-differences (D-in-D) framework to compare changes observed over time among beneficiaries in the HHVBP states relative to a comparison group of beneficiaries in non-HHVBP states. The D-in-D framework rests on the critical assumption that, in the absence of the HHVBP Model, the impact measures in the treatment and comparison groups would have changed in a parallel manner over time. The D-in-D design controls both for changes occurring over time that are common to all beneficiaries as well as for unmeasured differences between the treatment and comparison populations that do not change over time. It thus assumes that if there was greater improvement in quality between the baseline period and the post-implementation period in the treatment population relative to the comparison population, that improvement is associated with participation in the HHVBP Model.

The empirical approach for this report has been updated since the First Annual Evaluation Report to reflect a consistent comparison group approach across key impact measures of interest and to provide a framework for interpreting results among these measures. As key aspects of the design of the HHVBP Model, the randomized selection of nine HHVBP states and mandatory participation of all HHAs in these states provide safeguards against selection bias. Based on the Model design and the degree of balance observed between HHVBP and non-HHVBP states in the populations of interest, we defined a single comparison population consisting of all observations in the 41 states that were not selected for participation in the HHVBP Model. To evaluate the effects of HHVBP, we use multivariate linear regression to compare observations in the nine HHVBP states with those in the 41 comparison states, adjusting for state fixed effects and a common set of covariates across measures to the extent possible. We applied this regression-based approach to impact measures corresponding to multiple home health

patient populations of interest (i.e., Medicare FFS beneficiaries only versus all patients with Medicare or Medicaid coverage) and units of analysis (i.e., home health episodes and agencies).

Key Findings

Below is an overview of key quantitative and qualitative findings reflecting the experience of home health beneficiaries and agencies through the first two performance years of the HHVBP Model that precedes the application of the initial payment adjustments to agencies in the HHVBP states, which began in CY 2018.

***Higher HHA Total Performance Scores in each of the first two years of the Model*.** TPS scores serve as broad indicators of HHA performance that are the basis for adjusting Medicare payments to agencies in the nine Model states. We found TPS scores for agencies in HHVBP states were higher overall relative to the TPS scores calculated for this report for agencies in the non-Model states in both 2016 and 2017. For both of the first two years of the Model, these differences in TPS largely reflect higher measure scores for the seven OASIS-based outcome measures. The increase in agency TPS scores over time among both HHVBP and comparison agencies, which began in 2015 prior to the implementation of the HHVBP Model, may be an indication that agencies were also responding to other quality of care initiatives, such as the introduction of the CMS Star Ratings program. Nevertheless, the higher TPS scores observed above among agencies in HHVBP states compared to non-Model states starting in 2016 is consistent with an impact of HHVBP on overall agency performance on the measures that comprise the TPS which appear to extend beyond any effects of pre-existing initiatives such as the Star Ratings program.

Reduction in unplanned hospitalizations and use of skilled nursing facilities, but increase in emergency department use. Overall, we found a modest impact of the HHVBP Model on the claims-based utilization measures that apply to FFS beneficiaries receiving home health services. Relative to non-HHVBP states, FFS beneficiaries who received home health care in the Model states had fewer unplanned hospitalizations during the first two years of the Model, with the greatest decline occurring in the first year (2016). Unplanned hospitalization rates among first and all home health episodes showed similar declines (0.21 to 0.27 percentage points, respectively), which corresponded to a 1.3%-1.6% decrease from pre-HHVBP implementation average measure values. We also found a 0.21 percentage point decline in the use of skilled nursing facilities among home health beneficiaries in HHVBP states, which reflects a 4.2% decrease relative to pre-HHVBP implementation average measure values. However, we also observe an increase in emergency department (ED) utilization not resulting in an inpatient hospital stay among agencies in HHVBP of a similar magnitude under HHVBP (0.22 percentage point increase), reflecting a 1.9% change in average measure values prior to the HHVBP Model. Our ED utilization findings reflect the HHVBP states' lower ED utilization rates in the baseline period (2013-2015), which are converging to ED rates of non-HHVBP states post-HHVBP.

Declines in Medicare spending for FFS beneficiaries receiving home health services. Through the first two years of the Model, we found HHVBP to result in just under a 1% decline in average Medicare expenditures per day for FFS beneficiaries receiving home health services in HHVBP states relative to Medicare expenditures pre-HHVBP (i.e., 2013 – 2015), for both measures of total Medicare spending *during* home health episodes and of total Medicare spending *during and within 30 days following* home health episodes. For these two spending measures, the negative D-in-D estimates correspond to HHVBP effects that reduced the rate of growth in total spending. The average annual reduction in total Medicare spending during and within 30 days following home health episodes for FFS beneficiaries

receiving home health care is $114 million. Much of these declines may reflect savings related to hospitalizations, as we found HHVBP to result in a 3.9% decline in average Medicare expenditures for unplanned hospitalizations among FFS beneficiaries receiving home health services in HHVBP states relative to average expenditures during 2013 – 2015, translating to an average annual reduction of $88 million during the first two years of the HHVBP Model.

Given our other quantitative and qualitative findings (discussed below), we also need to consider the potential sources of decreases in spending that could be attributable to HHVBP. To the extent HHVBP may be an extension or modifier of currently existing quality improvement efforts, we must consider how the Model may have achieved cost savings. As noted above, we observed modest declines in utilization for unplanned hospitalizations and skilled nursing facility (SNF) use that together might contribute to our findings for the spending measures. At the same time, our D-in-D estimate for ED use suggests one potential offset to these decreases in expenditures. As the evaluation proceeds, it will be important to understand how the use of other types of services among home health beneficiaries and their associated costs to Medicare may have been influenced by the Model.

Modest gains in quality of care. We found evidence of statistically significant positive effects of HHVBP on many of the OASIS-based quality measures used to calculate TPS scores. Our findings for most OASIS-based quality measures show a small positive impact of HHVBP through the first two years of the Model, reflecting a general tendency towards relative increases in the improvement and process measures in HHVBP states relative to non-HHVBP states. We observed greater improvements in HHVBP states for six of the seven OASIS-based improvement measures tested, typically ranging from 0.8 to 1.9 percentage points over the first two years of the Model. These relative gains occurred in a context where average measure rates were already relatively high prior to implementation of HHVBP, with most improvement measures close to 70% and most process measures exceeding 90%, and correspond to a 1.2% to 3.7% increase from pre-HHVBP implementation average measure values.

Our descriptive analyses of trends in patient status based on OASIS assessments indicate that the overall gains over time in improvement occurring in both HHVBP and non-HHVBP states at least partly reflect lower scoring of reported patient status at admission rather than attainment of higher functioning levels among patients at discharge after the start of the Model. Lower ratings of severity at admission may reflect the increased attention of agencies on OASIS reporting and documentation, as mentioned during our interviews with HHA representatives in both 2017 and 2018. In both years, nearly all HHAs mentioned undertaking quality improvement and staff training efforts to address the manner in which their staff performed functional assessments and reported them on the OASIS instrument. For each OASIS-based improvement measure that we examined, our D-in-D analyses capture the relative improvement occurring among patients in HHVBP states while accounting for changes over time in the corresponding functioning levels reported by HHAs at the time of their initial assessment for each patient. Together, the results of our D-in-D analyses of OASIS-based impact measures and agency interviews suggest a modest effect of HHVBP on the care being provided to home health patients.

No impact on patient experience. We found no evidence of an HHVBP impact on patient experience measures through the first two performance years of the Model. Performance scores for the five patient experience measures (e.g., whether a patient would recommend the agency) derived from the Home Health Care Consumer Assessment of Healthcare Providers and Systems (HHCAHPS) survey remained relatively stable over time in both HHVBP states and non-HHVBP states. This is consistent with our HHA

survey results, which also found no difference between HHAs in HHVBP and non-HHVBP states in their quality improvement activities related to the HHCAHPS measures.

***Changes in agency operations continue to be extension of ongoing activities*.** Similar to the interviews that we conducted with agencies in 2017, we found that the HHVBP agencies we interviewed in 2018 most commonly reported focusing on improving the OASIS measures in response to HHVBP, with activities aimed at improving patient functioning and improving OASIS documentation. HHAs indicated that these efforts generally pre-dated implementation. After the HHVBP Model was underway, nearly all agencies interviewed were implementing, or making incremental changes to, staff training and education activities to improve performance on the HHVBP-specific measures. Like last year, most agencies focused their efforts on improving their performance on OASIS measures, and some agencies also focused on improvement for the HHCAHPS- and claims-based HHVBP measures.

Similarly, results from our survey of HHAs in both HHVBP and non-HHVBP states found few differences between the groups in their quality improvement activities. Additionally, the activities that HHAs reported were more likely to differ based on other factors irrespective of whether or not they were located in an HHVBP state (e.g., HHA chains are implementing changes in HHVBP and non-HHVBP states). Together, these findings suggest HHAs in HHVBP and non-HHVBP states perceive operational priorities in similar ways and that the HHVBP Model has not had a major impact on agencies' activities.

No evidence of widespread HHVBP effects on utilization of home health services, or on the characteristics of patients receiving these services. When considering potential effects of HHVBP on quality of care and other impact measures of interest, it is also important to understand whether the Model has induced changes in the use of home health services and the patient population receiving these services as a potential strategy among HHAs for improving performance under the Model in ways that were not intended (e.g., by admitting patients with a more favorable case-mix) occurred. Based on our descriptive analysis of yearly trends both before and after implementation of HHVBP, we did not find a discernible effect of the Model on the overall utilization of home health services among Medicare FFS beneficiaries in HHVBP states relative to non-HHVBP states, or in the overall mix of beneficiaries receiving these services. While we did observe declines in overall home health care utilization and certain other trends in beneficiary characteristics under HHVBP, these changes were generally already underway prior to the Model's implementation.

Referrers suggest no impact on access to home health services. Based on interviews with referral sources in the HHVBP states, access to home health services for Medicare FFS beneficiaries has not been affected by HHVBP and appears to remain adequate. Our finding based on these interviews—that there is no signal of a major shift in referral patterns or patient access to home health services as a result of HHVBP—is consistent with our observations that HHVBP has not disrupted overall trends in home health utilization among FFS beneficiaries.

Agencies in HHVBP states did not report making changes in their relationship to referral sources. Results from our HHA survey suggest minor differences between agencies in HHVBP and non-HHVBP states with regard to working with referral sources since HHVBP was implemented, with non-HHVBP agencies slightly more likely to have made changes in the frequency of outreach/communication to referral sources, sharing of performance data with referral sources, and efforts to join payer or provider networks; this may reflect differences between HHVBP and non-HHVBP markets, or in the behaviors of other providers in those markets.

Conclusions

Through the first two performance years of the HHVBP Model, we found evidence of reductions in Medicare spending for FFS beneficiaries receiving home health care as well as modest improvements in many measures of quality of care. The observed improvements in quality measures include a pattern of declines in the utilization of unplanned hospitalizations and SNF use that may have contributed to the observed reductions in Medicare spending for FFS beneficiaries receiving home health services, but also note an increase in ED use.

We also found evidence of modest improvements in TPS scores. We observed higher TPS scores for HHVBP agencies compared to those that were calculated for agencies in non-Model states for each of the first two performance years. For both years, the differences we observe in TPS are largely reflective of higher measure scores for the OASIS-based outcome measures. This finding is consistent with results from our interviews with HHAs which suggested a greater focus among agencies on the OASIS-based measures.

Most of the OASIS-based measures reflecting improvement and some of the OASIS-based process measures showed modestly greater improvement in beneficiaries served in HHVBP states. We found no evidence of HHVBP effects on beneficiary responses to experience with care questions in the first two years of the Model.

Based on our interviews with HHAs and referrers, we did not find evidence of an impact of HHVBP on agency quality improvement activities or referrals to home health, respectively. Instead, the perspectives of HHAs reflected a focus on OASIS documentation and suggested that any changes in operations may have involved an extension or modification of ongoing activities. In addition, findings from our agency surveys suggest few overall differences in quality improvement activities between agencies in HHVBP and non-HHVBP states.

Incorporating data for subsequent years of the Model will be instrumental in forming conclusions about the effects of implementing this value-based purchasing program in the home health setting. Importantly, the remaining years of the Model being analyzed will reflect yearly Medicare payment adjustments, with the range of the potential payment adjustments increasing over each year of the Model's five-year span. As the financial incentive to improve performance on quality measures increases over time, we anticipate that HHVBP agencies may be motivated to intensify their quality improvement efforts, and that these efforts may differ across agency types. As the Model evolves, we will continue to examine cumulative effects as well as effects at various stages of its operation. We will also consider possible differential effects of HHVBP among HHAs of different types or those serving different beneficiary populations.

1. Introduction

The Centers for Medicare & Medicaid Services (CMS) designed the Home Health Value-Based Purchasing (HHVBP) Model to improve the quality and delivery of home health care services to Medicare beneficiaries with specific goals to:

1. Provide incentives to home health agencies (HHAs) under Medicare to provide better quality care with greater efficiency,
2. Study new potential quality and efficiency measures for appropriateness in the home health setting, and
3. Enhance the current public reporting process regarding home health quality measures (CMS, 2016).

By design, the HHVBP Model aims to give HHAs a financial incentive for quality achievement and improvement through adjustments to Medicare payments for home health services. The HHVBP payment adjustments are determined based on an agency's quality performance measures relative to peers in its state.

From calendar year (CY) 2016 through CY 2022, HHAs in Arizona, Florida, Iowa, Massachusetts, Maryland, Nebraska, North Carolina, Tennessee, and Washington are required to participate in the HHVBP Model. These states were selected at random from nine state regional groupings that contained five to six states each. These groups were defined based on geographic location, utilization, demographics, and clinical characteristics (HHS, 2015).

The Model began in 2016, with the first two years being reporting years used to set the rates used later on in the Model. Starting in January of 2018, each eligible HHA in the HHVBP states had its Medicare payments adjusted upward or downward by up to 3% based on the relative Total Performance Score (TPS) it achieved in 2016. In CY 2019, the payment adjustments have a maximum range between -5% and 5%. These adjustments modify the otherwise applicable payment rates for HHAs under the Medicare home health prospective payment system (HH PPS). The initial HHVBP payment adjustments occurring during CY 2018 are based on HHA quality performance levels achieved during CY 2016. Similarly, the payment adjustments occurring during CY 2019 will be based on HHA quality performance levels achieved during CY 2017. As shown below in Exhibit 1, the maximum adjustment range to an agency's Medicare payment amount will increase each year between CY 2018 and CY 2022 (CMS, 2016).

Exhibit 1. Potential HHVBP Model Payment Adjustment Amounts, by CY

Calendar Year	Payment Adjustment?	Maximum Payment Adjustment
2016	No	--
2017	No	--
2018	Yes, based on 2016 TPS	+/- 3%
2019	Yes, based on 2017 TPS	+/- 5%
2020	Yes, based on 2018 TPS	+/- 6%
2021	Yes, based on 2019 TPS	+/- 7%
2022	Yes, based on 2020 TPS	+/- 8%

1.1 Design of the HHVBP Evaluation

CMS has contracted with Arbor Research Collaborative for Health (Arbor Research), in collaboration with our primary partner L&M Policy Research, to understand how the financial incentives under the HHVBP Model may influence HHA behavior and impact quality of care, Medicare expenditures, beneficiary experience, and the utilization of Medicare services. To achieve this goal, the evaluation of the Model spans an eight-year period that will allow CMS to understand the impact of HHVBP throughout the Model's period of operation. This evaluation intends to understand how impact measures of interest change over time in the HHVBP Model states, and how this compares to changes that would have been observed in the absence of the HHVBP Model. The primary research questions (RQs) to be addressed over the course of this eight-year evaluation are:

- What is the impact of the HHVBP Model on the performance measures used in the HHVBP Model? (RQ1)
- What is the effect of HHVBP on home health utilization, home health quality, Medicare home health costs and payments, and home health beneficiary experience? (RQ2)
- How does HHVBP impact HHA operations, characteristics of HHAs in operation, and fiscal solvency? (RQ3)
- Are there unintended consequences of HHVBP? Do other CMS initiatives, external initiatives, or other policies have implications for the effects of HHVBP? (RQ4)
- What is the impact of HHVBP on Medicare more broadly? (RQ5)
- What is the feasibility of expansion of the HHVBP Model beyond the nine Model states and its anticipated effect on supporting CMS' goals of providing better care, lower costs, and improved health? (RQ6)

To address these research questions, we employ a mixed-methods design that incorporates both quantitative and qualitative analytic approaches. Ideally, in evaluating the impact of HHVBP, we seek to understand the counterfactual: What would have happened in the nine Model states in the absence of HHVBP? This evaluation employs a difference-in-differences (D-in-D) framework to compare changes in impact measures observed in the nine Model states with those observed for a comparison group comprising HHAs and beneficiaries in non-HHVBP states. We analyze quantitative data on spending, utilization, quality, patient experience, and beneficiary and agency characteristics from administrative sources to compare the changes in Model impacts between HHVBP states and their comparison groups throughout the course of operation of the Model.

This evaluation also collects primary data to provide information about the behavior of providers under the HHVBP Model and its potential impact on beneficiaries. Specifically, we analyze qualitative information from interviews with hospital discharge planners and physician office staff in HHVBP states about the impact of the HHVBP Model on choice of and access to home health care for their patients. We also conducted interviews with high- and low-performing HHAs in HHVBP states and fielded a survey to HHAs in HHVBP and non-HHVBP states to understand the impact of the Model on agency operations. Analysis of these primary data collection efforts may highlight issues for further quantitative analysis and provide context for interpreting results derived from Medicare claims and other administrative data. In addition, we are fielding the Home Health Consumer Assessment of Healthcare Providers and Systems (HHCAHPS) survey to a sample of home health beneficiaries receiving care from small HHAs in

CY 2018 that are exempt from collecting HHCAHPS data (due to serving fewer than 60 patients per year); these results will be presented in the Third Annual Report (2019) with other data from 2018.

1.2 Scope of this Annual Report

This Second Annual Report focuses on aspects of the HHVBP Model that can reasonably be observed after the first two years of implementation, when incentive payments have not yet been made to HHAs. Specifically, this report uses available data from CYs 2013 – 2017, allowing for evaluation of changes during the first two performance years of the HHVBP Model (2016 – 2017) relative to a baseline period prior to implementation (2013 – 2015). Building on the First HHVBP Evaluation Annual Report (Arbor Research, 2018a), we have expanded the scope of the second year's evaluation to include additional impact measures while incorporating another year of data into our analysis in an effort to understand how the shift in financial incentives under the HHVBP Model may influence agency behavior and impact quality of care, Medicare expenditures, beneficiary experience, and the utilization of Medicare services. Additionally, we present initial payment adjustment information in this year's report. Specifically, as reflected in Exhibit 1 above, the performance of HHAs during CY 2016 determines the payment adjustments of up to +/-3% applied to Medicare home health claims during CY 2018, while their performance during CY 2017 determines the payment adjustments of up to +/-5% during CY 2019. Findings that reflect the impact of applying the initial payment adjustments to HHAs will be presented in the Third Annual Report when data through 2018 will be available.

In this report we have revised our quantitative analytic approach from that presented in the First Annual Report. Notably, in response to CMS guidance, we have modified the comparison group for the evaluation to prioritize estimating the effects of all nine HHVBP states aggregated. Also consistent with CMS' priorities, we now balance HHVBP states and non-HHVBP states on a combination of beneficiary and agency characteristics at the aggregated level and baseline trends across a subset of key impact measures.[1] Our analytic approach is discussed in detail in Section 2.4 below.

Based on available data and the implementation of the Model through CY 2017, the focus of this Second Annual Report is on the following subset of research questions:

1. What are the effects of the HHVBP Model on the performance measures used in the HHVBP Model?
2. What appear to be the effects of the first two HHVBP performance years on utilization, quality, Medicare expenditures, and beneficiary experience?
3. What appear to be the effects of the HHVBP Model on performance measures that are not used in the payment adjustment methodology in the HHVBP Model?
4. How does HHVBP impact HHA operations?

We examined the full set of HHVBP performance measures as well as additional quality, utilization, and Medicare spending measures that may also be impacted by the Model. We use an ordinary least squares (OLS) D-in-D model specification to conduct quantitative analyses of available data from Medicare claims, Outcome and Assessment Information Set (OASIS) assessments, and other administrative data sources for Medicare beneficiaries and HHAs that will be described in further detail below.

[1] For a complete list of key impact measures, please refer to Exhibit 13 (p. 36).

We conducted surveys and interviews with providers/clinicians associated with HHAs during 2018 to identify changes in operations as HHAs gain experience under HHVBP and respond to payment adjustments, including clinical practices and quality improvement activities, changes in provider network relationships, and referral patterns. We also expanded the scope of qualitative inquiry from our First Annual Report to include interviews with hospital discharge planners and referring physicians to gain further perspectives on how HHVBP may affect referral patterns to HHAs. Moreover, we designed and fielded a survey to HHAs in both HHVBP states and non-HHVBP states to gain additional insights about changes in quality and performance improvement activities, interaction with referral sources, and TPS-related activities in response to HHVBP.

1.3 Future Annual Reports

As the HHVBP Model continues, future Annual Reports will address additional research questions and incorporate more impact measures of interest. This will be possible as data become available for later performance years (i.e., through 2020) and for CYs when the HHVBP payment adjustments are applied (i.e., 2018 through 2022). Future Annual Reports will also incorporate findings based on additional primary data collection activities and analyses that are relevant to the ongoing operation of the HHVBP Model. Below, we highlight several key evaluation activities to address expanded research questions in future Annual Reports:

- Conduct analyses of HHVBP performance measures for subsequent performance years and for CYs when the HHVBP payment adjustments are applied, while considering possible effects of the increasingly larger range of payment adjustments over time;
- Evaluate the potential impact of HHVBP on the use of possible substitutes for home health care among Medicare beneficiaries;
- Assess the experience of beneficiaries receiving care from small HHAs that are exempt from collecting HHCAHPS performance measures by fielding HHCAHPS surveys to these beneficiaries in both HHVBP and non-Model states;
- Examine potential changes in home health care markets (e.g., profitability, entry and exit), as a possible consequence of the application of the HHVBP payment adjustments;
- Examine if the effects of the HHVBP Model vary among beneficiaries or HHAs in ways that have policy relevant implications; and,
- Assess potential impact of other CMS initiatives or policy changes.

In addition to the evaluation activities summarized above, priorities for upcoming Annual Reports may depend on our evolving findings that can inform further data collection efforts and analyses. We will address the impact of HHVBP on Medicare more broadly as well as the feasibility of expanding the HHVBP Model beyond the nine Model states and its anticipated effect on supporting CMS' goals of providing better care, lower costs, and improved health in later stages of this evaluation and corresponding Annual Reports.

2. Evaluation Approach

This section summarizes our approach for the evaluation. We begin with brief background about the Medicare home health care benefit and HH PPS to provide context for understanding how the HHVBP Model modifies the existing payment approach under Medicare and corresponding financial incentives. Next, we provide further information about the design of the HHVBP Model and discuss our conceptual framework for this evaluation. We then describe our overall analytic approach. (We provide additional details regarding our analytic approach in the Technical Appendix.)

2.1 Background: Medicare's Home Health Benefit and Payment System

In 2016, Medicare paid a total of $18.1 billion for home health care under the HH PPS, reflecting an 80% increase since 2002 (MedPAC, 2018). Medicare's home health care benefit covers skilled nursing, physical therapy, occupational therapy, speech therapy, aide services, and medical social work services provided to Medicare beneficiaries who need intermittent skilled care or therapy services and cannot leave their homes without considerable effort. The goal of home health care is to treat illness and injury to enable patients to regain or maintain independence. While the need for skilled care is a requirement for home health eligibility, Medicare standards do not require that skilled visits comprise the majority of services a patient receives. A physician may initiate home health care as follow-up after a hospitalization (34% of initial home health episodes) or as a referral from the community (66% of initial home health episodes) (MedPAC, 2016). Medicare expects HHAs and physicians to follow program requirements for determining medical necessity and beneficiary care needs. Medicare's standards of care permit a broad range of services that can be delivered under the home health care benefit but does not include services such as homemaker or personal care or more than intermittent care. Similarly, although being homebound is a requirement for receiving home health care, many patients use physician visits or some form of outpatient services (likely with assistance) during their home health care episode, as the homebound requirement does not prohibit receipt of Medicare services outside of the home (CMS, 2012; see Section 30.1).

As noted above, home health services are paid for under Medicare's HH PPS, which pays HHAs a predetermined amount for each 60-day episode of care that is adjusted for case-mix, service use, and geographic variation in wages. Additionally, other adjustments are designed to account for episodes associated with especially low or high resource use overall.[2] The case-mix adjustment methodology for the HH PPS uses home health resource groups (HHRGs) to distinguish relatively uncomplicated patients from those who have severe medical conditions or functional limitations or need extensive therapy. Each of the 153 HHRGs has a relative weight designed to reflect the average costliness of patients in that group relative to the average Medicare home health patient. CMS assigns patients to HHRGs based on

[2] The HH PPS has an outlier policy to adjust payment for short-stay and high-cost outliers. If a beneficiary has fewer than five visits, HHAs are paid per-visit, which is referred to as a low-utilization payment adjustment (LUPA). High-cost outlier payments are made for episodes whose imputed cost exceeds a threshold amount for each case-mix group. For each HHA, high cost outlier payments are capped at 10 percent of total home health payments. Medicare also adjusts the national standardized 60-day episode payment rate for certain intervening events that are subject to a partial episode payment (PEP) adjustment (HHS, 2017).

both their reported clinical and functional status and the number of therapy visits during the episode.[3] CMS defines HHRGs using data obtained from OASIS, an instrument used to conduct a comprehensive assessment of adult home care patients.[4] HHAs are required to complete and submit OASIS assessments for all of their served Medicare beneficiaries. As discussed in the next section, OASIS data are also integral to home health quality measurement and are used in Home Health Compare, the Star Ratings program that allows consumers to more easily assess agency quality; and for measuring agency performance in the HHVBP Model.

2.2 HHVBP Performance Measures and Scores

2.2.1 HHVBP Performance Measures and Data Sources

As noted earlier, the payment adjustments for eligible HHAs under HHVBP are based on their Total Performance Score (TPS). For the first two performance years (2016 – 2017), the time period examined in this report, an HHA's TPS is derived from its performance on 20 HHVBP Model performance measures (see Exhibit 2 below). With the exception of the three self-reported measures, these measures were already collected from the following sources: Medicare claims, OASIS, or the HHCAHPS, a survey designed to measure the experiences of individuals receiving home health care from Medicare-certified HHAs. Also, most of these measures are publicly reported both on Home Health Compare and included in the CMS Star Ratings prior to the start of the Model.

For future performance years, the TPS will continue to be based on the HHVBP performance measures in effect for that year with the actual number of performance measures changing from year to year. Starting in performance year 2018, CMS made consequential changes to the TPS with respect to the three process measures derived from OASIS. For example, CMS removed Drug Education on Medications Provided to Patient/Caregiver during Episodes of Care from the HHVBP measure set for 2018 and subsequent performance years (HHS, 2017), and the remaining two OASIS-based process measures (Influenza Immunization Received for Current Flu Season and Pneumococcal Polysaccharide Vaccine Ever Received) for 2019 and subsequent performance years. The 2019 HHVBP measure set also replaced three improvement OASIS measures (Improvement in Bathing, Improvement in Bed Transferring, and Improvement in Ambulation-Locomotion) with two composite function measures: Total Normalized Composite Change in Self-Care and Total Normalized Composite Change in Mobility (HHS, 2018). These two new measures will be calculated by the HHVBP Implementation contractor from OASIS data.

[3] CMS recently finalized the Patient-Driven Groupings Model (PDGM), the new method for determining the per FFS episode reimbursement amount for HHAs. This case-mix adjustment methodology is slated to take effect on January 1, 2020. Among PDGM's changes include using a 30-day period as the basis for payment rather than 60 days; placing greater emphasis on clinical characteristics to assign patients to payment categories; and eliminates the use of counts of therapy services to determine case-mix adjust payments (HHS, 2018).

[4] Agencies do not have to complete OASIS for patients under 18 years of age or those receiving services for pre- or post-natal conditions.

Exhibit 2. HHVBP Performance Measures for Performance Years 1 – 2 (CY 2016 – 2017)

HHVBP Performance Measures	Measure Type	Data Source	Publicly Reported
Emergency Department (ED) Use without Hospitalization	Utilization Outcome	Medicare claims	HHC
Unplanned Acute Care Hospitalization (ACH)	Utilization Outcome	Medicare claims	HHC, Used in Star Ratings
Discharged to Community	Outcome	OASIS	N/A
Improvement in Ambulation-Locomotion[1]	Outcome	OASIS	HHC, Used in Star Ratings
Improvement in Bathing[1]	Outcome	OASIS	HHC, Used in Star Ratings
Improvement in Bed Transferring[1]	Outcome	OASIS	HHC, Used in Star Ratings
Improvement in Dyspnea	Outcome	OASIS	HHC, Used in Star Ratings
Improvement in Management of Oral Medications[2]	Outcome	OASIS	HHC
Improvement in Pain Interfering with Activity	Outcome	OASIS	HHC, Used in Star Ratings
Drug Education on Medications Provided to Patient/ Caregiver during Episodes of Care[3]	Process	OASIS	HHC, Used in Star Ratings
Influenza Immunization Received for Current Flu Season[1]	Process	OASIS	HHC
Pneumococcal Polysaccharide Vaccine Ever Received[1]	Process	OASIS	HHC
How often the home health team gave care in a professional way [Composite Measure]	Patient Experience Outcome	HHCAHPS	HHC, Used in Star Ratings
How well did the home health team communicate with patients [Composite Measure]	Patient Experience Outcome	HHCAHPS	HHC, Used in Star Ratings
Did the home health team discuss medicines, pain, and home safety with patients [Composite Measure]	Patient Experience Outcome	HHCAHPS	HHC, Used in Star Ratings
How do patients rate the overall care from the home health agency [Global Measure]	Patient Experience Outcome	HHCAHPS	HHC, Used in Star Ratings
Would patients recommend the home health agency to friends and family [Global Measure]	Patient Experience Outcome	HHCAHPS	HHC, Used in Star Ratings
Influenza Vaccination Coverage for Home Health Care Personnel	Process	HHA Self-report	N/A
Herpes Zoster (Shingles) Vaccination for Patient	Process	HHA Self-report	N/A
Advance Care Plan	Process	HHA Self-report	N/A

Source: CY 2017 Final Rule (HHS, 2016), (CMS, 2018a). HHC=Home Health Compare.
[1] These measures were dropped for performance year 2019 and all subsequent years of the HHVBP Model (HHS, 2018).
[2] This measure was added to the CMS Star Ratings in April 2019 (CMS, 2018a).
[3] This measure was dropped for performance year 2018 and all subsequent years of the HHVBP Model (HHS, 2017) and dropped from the CMS Star Ratings in April 2019 (CMS, 2018c).

The individual HHVBP performance measures reflect multiple data sources and differences in the underlying populations who are represented. In particular, the Medicare claims-based measures are specific to Medicare beneficiaries with fee-for-service (FFS) coverage, whereas the patient experience measures are based on the HHCAHPS survey which is administered to both Medicaid and Medicare patients. Measures derived from OASIS assessments are collected over an even broader population of home health patients, including Medicare FFS, Medicaid FFS, Medicare managed care (i.e., Medicare Advantage), Medicaid managed care, private payers, and the commercially insured. From this population, HHAs are required to submit OASIS data to CMS for all Medicare patients (including both FFS and Medicare Advantage) and Medicaid patients who are 18 years and older and receiving skilled services.[4] While the OASIS instrument is used to collect data on a wide range of home health patients, the OASIS-based HHVBP performance measures may only apply to a limited sub-population. For example, the improvement in dyspnea measure only includes HHA patients who were short of breath at the start or resumption of care. We also note that the OASIS-based measures are based on data that are self-reported by HHAs at multiple points in time during a home health episode (CMS, 2017), while the claims-based measures and HHCAHPS-based measures relay on key data elements reported by other health care providers (i.e., hospitals) and patients, respectively.

2.2.2 Total Performance Scores

While Medicare HH PPS payments were not adjusted in the first two performance years of HHVBP (2016 and 2017), agencies in HHVBP states were still incentivized to achieve high TPS scores because scores from each of those years will affect payment rates in CY 2018 and CY 2019 respectively. To determine the payment adjustments for each HHA, a TPS score for each HHA is calculated based on its scores for each of the performance measures achieved two years prior to that year. For the 17 HHVBP performance measures that contribute to agency TPS scores for payment years 2018 and 2019, HHAs receive points based either on their achievement levels relative to baseline threshold values, or improvement relative to their baseline performance that are calculated separately for each measure in each Model state.[5] For HHAs that were in operation prior to the start of 2015, their baseline period for measuring improvement is 2015. For HHAs that opened during 2015 or later, their baseline period for measuring improvement is determined based on their first full calendar year in operation For the three new HHA self-reported measures, HHAs receive points for reporting these measures; the performance on these measures do not affect the TPS score.

For calculation of the TPS score, HHAs receive the maximum points of either their achievement score or improvement score for each performance measure. In calculating an HHA's TPS score, one sums and adjusts the points for each measure for the number of eligible measures reported. To be eligible for inclusion in the TPS calculations and subsequent payment adjustments, an agency must have data for at least five measures that are in both the baseline and performance period with 20 or more episodes of care (OASIS- and claims-based measures) and/or at least 40 completed HHCAHPS surveys (HHCAHPS-based measures) in both the baseline and performance periods. Agencies must also have a Medicare participation date prior to their baseline year for measuring improvement. Therefore, to receive a TPS score for 2016, agencies must have a Medicare participation date prior to 2015. In addition, to be eligible for a payment adjustment, agencies must be in operation for the entire performance year.

[5] For states with at least eight small HHAs (i.e., exempt from collecting HHCAHPS performance measures) CMS calculates the resulting payment adjustment separately for large HHAs and small HHAs.

However, since the performance of HHAs prior to their closure is of interest for this evaluation, we include agencies that close during their final HHVBP performance year in the analyses of TPS scores for this report.

2.3 HHVBP Evaluation: Conceptual Framework

The effectiveness of the HHVBP Model in achieving improved quality for beneficiaries served by HHAs depends on the extent to which it incentivizes HHAs to modify their operations and care delivery in ways that improve the quality of home health care and patient outcomes while controlling or reducing costs to Medicare. Our evaluation emphasizes the collection, analysis, and synthesis of information that is most relevant to how HHAs in each of the nine Model states respond to the HHVBP Model, in comparison to equivalent non-Model HHAs throughout the same time period. By using observations of HHAs and the beneficiaries for whom they provide care in non-Model states, we attempt to answer the question: What would have occurred in these agencies and for their beneficiaries if the HHVBP Model had not been implemented? Our analyses will examine whether the HHVBP Model is achieving its overarching goal—to improve the quality of home health services and efficiency of care—and identify any potential unintended consequences.

The conceptual framework in Exhibit 3 highlights key pathways for change under the HHVBP Model. This framework informs our approach to addressing the evaluation research questions presented above in Section 1.1. The HHVBP Model's financial incentives aim to broadly incentivize agencies to take additional steps to improve their performance or otherwise achieve high levels of performance on the measures that determine their TPS scores. The TPS results for each HHA and their corresponding (and growing) changes in Medicare payments may in turn influence their future behavior. The design of the Model encourages agencies to review their performance and make adjustments in response to them. This may include subsequent changes in agency operations designed to raise or bolster performance in certain areas. Additionally, HHVBP payment adjustments may influence agency decisions regarding market entry/exit or perhaps consolidation.

The response of agencies to HHVBP may have implications for the manner in which they arrange for and deliver home services, which may in turn result in changes detectable in claims and OASIS data for the use of home health services among beneficiaries and corresponding Medicare expenditures. HHA responses to HHVBP may include, for example, changes to the frequency, timing, types of visits, or processes of care during home health episodes or the extent to which agencies seek recertification for an additional episode to meet patient needs. HHAs may target changes in services to patients in specific diagnosis categories if they perceive greater potential gains through doing so. In addition to potentially reflecting changes in practice pattern, changes in the delivery of home health services could also have implications for other forms of utilization. For instance, if the quality of care provided in agencies improves, they may be able to reduce the need for certain resource-intensive services such as avoidable hospitalizations, ED visits, or transfer to a skilled nursing facility (SNF), causing the utilization of these services to go down.

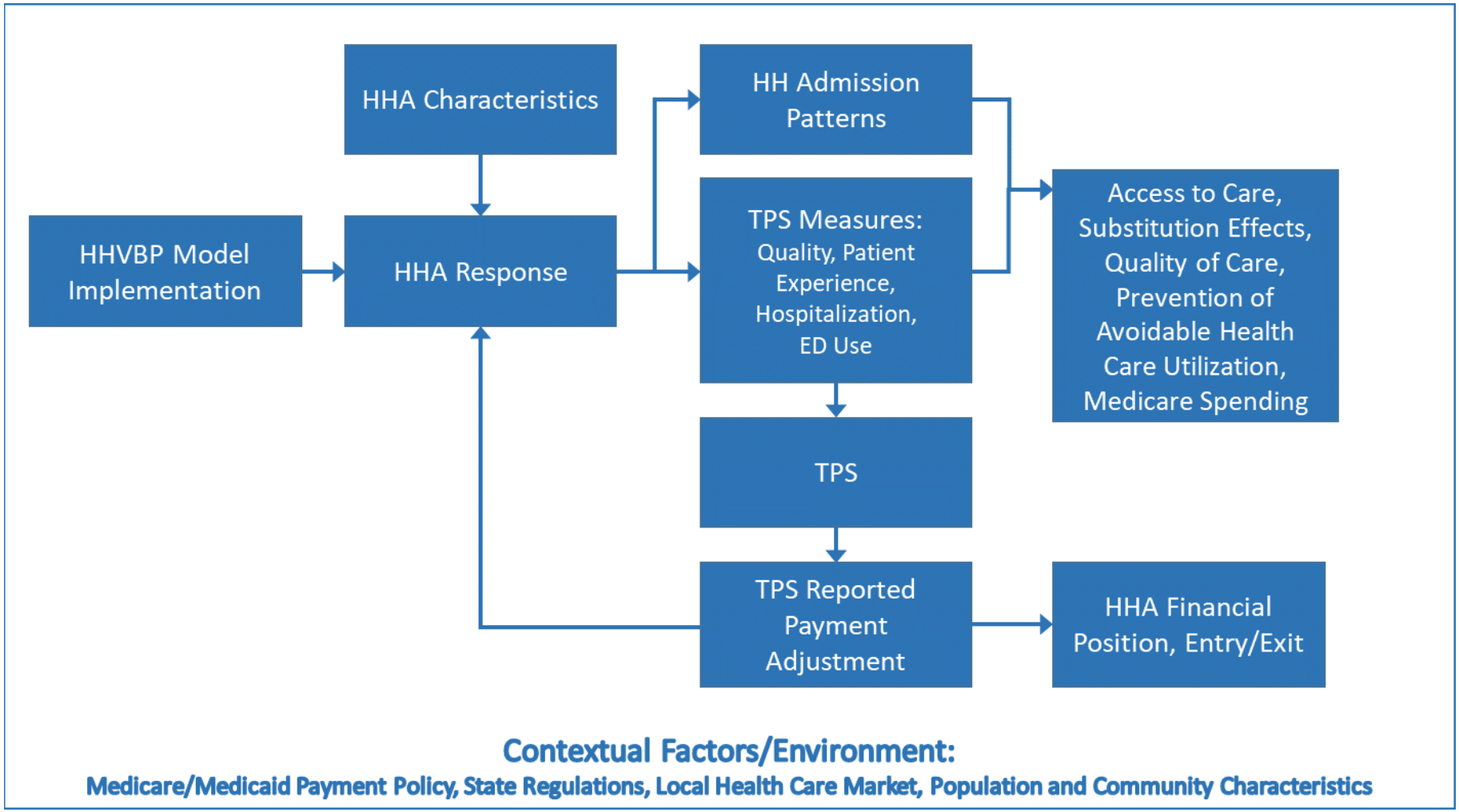
Importantly, we expect that there will be variation between agencies and between geographic areas in the impact of the Model. HHAs will respond differently to the HHVBP Model depending on their individual circumstances. For example, agencies may differ in their perceptions of the financial risks and opportunities related to HHVBP and their readiness to adopt new processes that are designed to improve performance. Some types of agencies may have more limited experience and/or resources to

successfully undertake quality improvement initiatives. Depending on factors such as the organizational characteristics of these agencies, their characteristics of geographic location and markets, and the types of populations they serve, the HHVBP Model may have a differential impact on certain beneficiary subgroups who tend to receive services from these agencies. This evaluation will attempt to shed light on what circumstances are associated with this variation and if there are any areas of concern.

As reflected in Exhibit 3, the incentives introduced under the HHVBP Model could potentially lead HHAs to make changes in their admission patterns and how they treat particular types of patients. For example, HHAs might consider avoiding initiating episodes for beneficiaries for whom higher quality outcomes in the home health setting may be seen as especially difficult to achieve. This different profile of patient needs may result in changes in the volume or mix of services used by beneficiaries, which, in turn, may result in changes in overall Medicare expenditures. Thus, it will be important to attempt to disentangle to what extent changes in practice patterns observed are associated with treating patients differently (e.g., changing the types of services provided to a given type of patient) versus treating different patients (i.e., not changing practice patterns, but admitting patients with a more favorable case-mix).

As noted earlier, our focus in this Annual Report is to understand any initial effects of HHVBP during CYs 2016 and 2017. Most pertinent aspects of the evaluation framework (Exhibit 3) for this Annual Report include the initial response of agencies to the introduction of the reporting phase of the performance incentives; as well as effects of the Model on agency performance on the impact measures that comprise the TPS score and if there were any changes observed on the indicators of quality and Medicare spending for home health services. We describe our analytic approach for addressing these questions in the following section (Section 2.4). In later years of the evaluation, as the HHVBP Model progresses, we will explore other pathways for change under the Model (Exhibit 3).

Exhibit 3. HHVBP Evaluation Conceptual Framework



2.4 Quantitative Analytic Approach

We designed our quantitative analysis to address the question: What was the effect of the HHVBP Model on quality of health care, health care utilization, health outcomes, and health care costs? The HHVBP Model establishes financial incentives for HHAs to improve the quality of home health care through operational and care delivery changes. Any resulting quality improvements may, in turn, reduce overall costs to the Medicare program.

To evaluate the impact of HHVBP on a range of impact measures of interest, we are able to compare the experience of beneficiaries and HHAs in the nine Model states with those in other states where the Model was not implemented. In doing so, our empirical model must address differing characteristics of beneficiaries, HHAs, and market conditions between the HHVBP and non-Model groups. We used regression adjustment to address *observed* differences like agency size and patient mix and a D-in-D framework to address *unobserved* differences that are constant over time at the treatment and comparison group level, such as average agency resources, management approaches, and nursing practices.[6]

The comparison strategy we employed in our First Annual Report used a combination of approaches (e.g., entropy balancing, reweighting, and matching) designed for specific categories of impact measures (Arbor Research, 2018b). For this Second Annual Report, we adopted a more unified comparison group methodology to examine a diverse set of impact measures of interest to help facilitate the interpretation of findings across measures. In the sections that follow, we present key considerations and data that informed the development of our analytic approach.

2.4.1 HHVBP Model Design

Selection bias could occur if HHVBP participation was completely voluntary and if HHAs with greater ability to improve the quality and efficiency of services joined the Model while HHAs without such ability did not. Because Model participation would be confounded with ability to improve efficiency and quality, such self-selection into the Model would bias estimation of impacts from changing to a new financial incentive scheme under the HHVBP Model. In particular, such selection bias would result in attribution of more favorable effects to the Model than its true effects. As important aspects of the design of the HHVBP Model, the randomized selection of nine HHVBP states and mandatory participation of all HHAs in these selected states helps to guard against selection bias. However, even with the randomized selection of states within geographic regions under the Model, differences may remain between HHVBP and non-HHVBP states in the characteristics of HHAs and the populations they serve that, if uncontrolled, would cause imprecise estimation of HHVBP impacts. A comparison of the HHAs in operation in HHVBP and non-Model states prior to implementing the HHVBP Model helps to identify which factors warrant consideration when specifying the analytic approach and interpreting results. These factors were used to adjust estimates that compared home health episodes in the nine participating states to those in non-HHVBP states. Future reports will assess the generalizability of the findings by predicting likely impacts, accounting for differences in population and HHA characteristics

[6]As discussed later in this report, a D-in-D framework is not used for certain impact measures: (a) agency TPS scores, which are calculated based on a combination of an agency's level of achievement on quality measures relative to historical state standards and levels of improvement relative to an agency's own past performance, and where the methodology used to calculate these scores is changing over time; and (b) three new measures that are self-reported by HHAs via the Secure Web Portal since these data are only available for HHAs in the HHVBP states.

between HHVBP and non-HHVBP states, if the policy were implemented nationwide. At this time and in this report, the focus is on assessing the average impact of the HHVBP Model.

Further, given the volatility of the home health market and variability in home health benefits, relative to other health care settings, the assessment of trends in home health care practices and outcomes prior to implementing the HHVBP Model offers a valuable benchmark for assessing whether observed changes in quality, utilization, and spending are plausibly driven by the HHVBP Model.

2.4.2 Characteristics of HHAs and Patients

Comparisons of the patterns and underlying trends in the characteristics of HHAs and patients between HHVBP and non-HHVBP states informed both our analytic approach and subsequent interpretation of results. For a more in depth discussion of the comparison group creation and how these factors are handled, please see Section A.1.3 (Page 3) in the Technical Appendix. In brief, we compared HHVBP and non-HHVBP states both for degree of balance on these characteristics in the baseline period and for indications of any relative changes occurring throughout the baseline period. We also include data for the post-implementation period to allow for observations regarding either a continuation of underlying baseline trends or a divergence in trends when HHVBP was implemented. We include comparisons for HHAs (Exhibit 4), Medicare and Medicaid home health patients with OASIS data (Exhibits 5 and 6), and Medicare FFS home health beneficiaries (Exhibits 7 and 8). Our focus in this analysis is on looking at similarities to the combined sample of the non-selected states as a whole. At this time, we are not examining the differential impact across states on these measures. However, we acknowledge that HHS selected states from different geographic regions to ensure that the participating HHVBP states reflect observed regional differences in beneficiary demographics, rural and urban status, and cost and quality of care (HHS, 2015).

Overall, the nine HHVBP combined and 41 remaining non-HHVBP states are broadly similar with regard to a range of home health provider, patient, and episode characteristics. Differences between the two groups prior to covariate adjustment were generally within two to three percentage points for HHA ownership, setting, and age (Exhibit 4); patient sex, presence of chronic conditions, and reason for Medicare entitlement (Exhibit 7); and home health episode type, risk factors for hospitalization, surgical wound, and pressure ulcer (Exhibit 6).

Differences in agency and beneficiary characteristics. There were some differences in agency and beneficiary characteristics between the two groups during 2013 – 2015. HHAs in HHVBP states were relatively more likely to be affiliated with a chain (25.8% vs. 18.8%; Exhibit 4). A somewhat higher percentage of agencies in HHVBP states reported profit margins exceeding 10%, (55.8% vs. 50.0%) based on Medicare Cost Reports. Home health patients in HHVBP states were relatively less likely to be black and non-Hispanic (10.1% vs. 16.5% of episodes for Medicare FFS beneficiaries; Exhibit 7), less likely to live in rural areas (5.1% vs. 9.6%), and were more likely to have an orthopedic condition (43.0% vs. 38.4% of episodes for home health patients based on OASIS data; Exhibit 6).

We also considered whether the composition of home health provider and patient characteristics in HHVBP and non-HHVBP states changed over time to become less similar. The majority of the characteristics examined (shown in Exhibits 4 through 8) tend to be either relatively stable over time or exhibit similar trends for the two groups that started during the baseline period.

Consistent agency trends. There have been declines over time in the number of HHAs at similar rates in both the HHVBP and non-HHVBP states. This phenomenon began during the baseline period. In the context of these declines and the types of agencies more likely to exit, agencies affiliated with chains, in operation for a longer period of time, and larger in size became increasingly prevalent among those that remained.

Consistent patient trends. While many patterns in the characteristics of home health patients and the types of care provided by agencies remained relatively stable in both HHVBP and non-HHVBP states, certain factors exhibited similar trends for the two groups that began during the baseline period. This includes an increase over time in therapy visits, declines in skilled nursing and home health aide visits, and declines in the frequency of multiple hospitalizations reported within the previous six months.

There were larger changes over time in patient ambulatory status from the OASIS Start of Care (SOC) assessment as patients were increasingly reported as having impaired mobility and needing assistance from others (Exhibit 6). A relatively similar trend is apparent among patients in both HHVBP and non-HHVBP states starting during the baseline period and tending to continue into the post-implementation period. For example, the percentage of patients in HHVBP states who were reported as walking only with supervision or assistance from another at all times increased from 37.0% in 2013 to 47.9% in 2015. The comparable figures for patients in non-HHVBP states are 35.8% and 44.6% respectively. We note that these baseline trends appeared to continue into the post-implementation period, for both HHVBP and non-HHVBP states (61.9% and 56.3%, respectively, in 2017). As discussed in greater detail below in Chapter 6 in the context of examining agency performance on OASIS-based outcome improvement measures, these trends may be a combination of increasing severity of activities of daily living limitations and changes in reporting standards in OASIS SOC assessments that began prior to the start of HHVBP.

With the exception of a growing prevalence of chronic kidney disease, trends for other clinical indicators (see Exhibit 7) generally do not suggest an overall increasing clinical acuity of home health patients, in either HHVBP or non-HHVBP states.

Non-consistent patient trends. Generally, there were not notable differences in trends in agency and beneficiary characteristics between the HHVBP and non-HHVBP groups. Possible exceptions to this overall finding are reflected in the trends for patient race/ethnicity and dual eligibility (Exhibit 7). There were somewhat larger declines in HHVBP states between 2013 and 2015 in the percentage of episodes for Hispanic FFS beneficiaries (from 10.9% to 7.9% and 8.8% to 8.2%, respectively) and dual eligible FFS beneficiaries (from 32.0% to 28.4% and 35.1% to 33.7%, respectively), and there was a decline in the percentage of episodes for black non-Hispanic FFS beneficiaries in non-HHVBP states (from 17.1% to 15.8%) that remained stable in HHVBP states. The baseline trends for these factors generally also continued into the post-implementation period.

Exhibit 4. HHA Characteristics in 2013 – 2017, by Year, All HHVBP States, and All Non-HHVBP States

	HHVBP						Non-HHVBP					
	2013-2015	2013	2014	2015	2016	2017	2013-2015	2013	2014	2015	2016	2017
Total number of HHAs	2,584	2,413	2,301	2,192	2,119	2,028	10,446	9,869	9,871	9,707	9,557	9,168
Received a TPS score					76.6%	79.7%						
Ownership												
For-profit	80.4%	79.3%	78.9%	78.3%	78.1%	78.3%	80.0%	79.4%	79.8%	80.0%	80.5%	81.2%
Non-profit	13.8%	14.5%	14.6%	15.0%	15.4%	15.5%	15.1%	15.5%	15.3%	15.5%	15.3%	15.3%
Government-owned	5.8%	6.1%	6.5%	6.7%	6.5%	6.1%	4.9%	5.1%	4.8%	4.5%	4.2%	3.5%
Setting												
Hospital-based	7.8%	8.2%	8.4%	8.6%	8.2%	8.0%	9.5%	9.9%	9.3%	8.6%	8.1%	7.7%
Freestanding	92.2%	91.8%	91.6%	91.4%	91.8%	92.0%	90.5%	90.1%	90.7%	91.4%	91.9%	92.3%
Chain Affiliation												
Chain affiliated	25.8%	26.9%	28.5%	29.7%	31.1%	32.7%	18.8%	18.4%	18.5%	19.4%	20.3%	20.7%
No chain affiliation	63.1%	61.1%	61.5%	62.7%	62.4%	63.1%	73.5%	72.5%	72.7%	72.7%	72.9%	75.2%
Chain affiliation missing	11.0%	12.0%	10.0%	7.6%	6.5%	4.2%	8.6%	9.1%	8.8%	7.9%	6.8%	4.1%
HHA Age												
HHA age < 4 years	30.9%	27.7%	20.5%	17.5%	15.2%	12.4%	26.7%	23.7%	19.3%	15.8%	12.8%	10.1%
HHA age 4-10 years	31.2%	32.5%	36.3%	35.3%	33.3%	32.1%	32.0%	33.3%	35.8%	36.4%	36.3%	35.0%
HHA age > 10 years	38.0%	39.9%	43.2%	47.2%	51.5%	55.5%	41.3%	43.0%	44.9%	47.8%	50.9%	54.9%
HHA Size												
1-59 OASIS Episodes	22.7%	19.5%	18.8%	19.5%	19.7%	20.7%	28.3%	25.7%	27.0%	27.0%	27.3%	26.5%
60-249 OASIS Episodes	28.8%	29.5%	28.8%	27.1%	26.7%	23.9%	33.5%	34.5%	33.9%	33.1%	31.3%	30.9%
250-499 OASIS Episodes	17.5%	18.4%	19.0%	17.4%	16.4%	16.2%	15.9%	16.6%	16.3%	16.1%	16.2%	15.6%
500-999 OASIS Episodes	14.0%	14.8%	15.1%	16.1%	15.2%	15.7%	11.0%	11.4%	10.9%	11.1%	11.6%	12.3%
≥1,000 OASIS Episodes	17.0%	17.9%	18.2%	19.8%	21.9%	23.6%	11.3%	11.8%	11.9%	12.7%	13.6%	14.7%
Profitability*												
Profit margin <0%	27.0%	26.8%	27.3%	24.4%	23.7%	N/A	30.8%	30.8%	32.0%	25.8%	25.8%	N/A
Profit margin 0-10%	17.2%	17.1%	17.0%	14.2%	13.3%	N/A	19.1%	19.2%	18.1%	16.7%	17.0%	N/A
Profit margin >10%	55.8%	56.0%	55.7%	61.4%	63.0%	N/A	50.0%	50.0%	49.9%	57.5%	57.2%	N/A

	HHVBP						Non-HHVBP					
	2013-2015	2013	2014	2015	2016	2017	2013-2015	2013	2014	2015	2016	2017
Entry/Exit												
Number of new HHAs that entered	286	109	79	98	76	57	1116	525	343	254	289	211
Number of HHAs that terminated	544	191	207	149	148		1193	341	418	439	600	
Change in number of HHAs			-4.6%	-4.7%	-3.3%	-4.3%			0.0%	-1.7%	-1.5%	-4.1%

These numbers reflect all HHAs with at least one OASIS episode or Medicare claims episode in a given year, regardless if the HHA received a TPS in 2017.

** The number of HHAs used to calculate profitability margins is a subset of all HHAs, given incomplete and/or missing Medicare Cost Report data and the trimming methodology employed to calculate the variable (See Section A.2.1.3 on Page 34 of the Technical Appendix for more detail). For example, among the 2,413 HHVBP and 9,869 non-HHVBP HHAs in 2013, only 1,576 and 6,750, respectively, had Cost Report data that could be used to estimate profitability.*

Exhibit 5. OASIS Home Health Beneficiary Characteristics in 2013 – 2017, by Year, All HHVBP States, and All Non-HHVBP States

	HHVBP						Non-HHVBP					
	2013-2015	2013	2014	2015	2016	2017	2013-2015	2013	2014	2015	2016	2017
Total number of home health patients with an OASIS episode	2,964,717	985,169	982,192	997,356	1,004,495	1,029,864	9,781,824	3,203,628	3,243,139	3,335,057	3,378,160	3,505,384
Total number of OASIS episodes	4,512,851	1,494,074	1,492,362	1,526,415	1,566,624	1,605,509	14,698,704	4,777,349	4,865,159	5,056,196	5,253,138	5,468,480
Average age	75.5	75.4	75.4	75.5	75.6	75.8	74.4	74.5	74.3	74.4	74.5	74.6
Female	61.4%	61.7%	61.4%	61.1%	60.9%	60.6%	61.6%	61.9%	61.6%	61.3%	61.1%	60.8%
Race/Ethnicity												
Hispanic (regardless of race)	8.9%	9.9%	9.0%	7.8%	7.5%	7.0%	7.2%	7.2%	7.2%	7.1%	7.1%	7.1%
Black, non-Hispanic	10.6%	10.5%	10.6%	10.8%	11.1%	11.3%	14.9%	15.1%	15.0%	14.7%	14.5%	14.2%
White, non-Hispanic	78.9%	78.1%	78.9%	79.8%	79.7%	80.0%	74.7%	74.6%	74.7%	74.9%	75.1%	75.4%
Other, non-Hispanic	1.4%	1.3%	1.4%	1.5%	1.6%	1.6%	3.0%	2.9%	3.0%	3.0%	3.1%	3.2%
Multiracial, non-Hispanic	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%
Rural	4.3%	4.4%	4.3%	4.3%	4.2%	4.3%	7.3%	7.4%	7.3%	7.2%	7.2%	7.1%
Insurance												
% Dual eligible	27.3%	28.7%	27.4%	25.9%	24.9%	24.2%	26.8%	27.3%	26.8%	26.2%	25.6%	25.8%
% Medicaid only (either managed care or FFS without dual)	4.1%	3.7%	4.2%	4.4%	4.6%	4.4%	6.0%	5.5%	6.1%	6.3%	6.3%	6.1%
Persons aged ≥25 years with less than high-school (HS) diploma in the beneficiary's county	12.7%	12.9%	12.7%	12.6%	12.5%	12.5%	13.9%	14.0%	13.9%	13.8%	13.8%	13.8%
Change in % of home health beneficiaries from previous year	N/A	N/A	-0.3%	1.5%	0.7%	2.5%	N/A	N/A	1.2%	2.8%	1.3%	3.8%

These numbers reflect all OASIS episodes in the CY, regardless if their HHA received a TPS in 2017.

Exhibit 6. OASIS Clinical Factors in 2013 – 2017, by Year, All HHVBP States, and All Non-HHVBP States

	HHVBP						Non-HHVBP					
	2013-2015	2013	2014	2015	2016	2017	2013-2015	2013	2014	2015	2016	2017
Total number of OASIS episodes	4,512,851	1,494,074	1,492,362	1,526,415	1,566,624	1,605,509	14,698,704	4,777,349	4,865,159	5,056,196	5,253,138	5,468,480
Discharged from inpatient facility in last 14 days	67.8%	67.1%	67.4%	68.8%	68.8%	69.4%	71.4%	71.5%	71.3%	71.5%	71.3%	71.5%
Receiving psychiatric nursing services	2.1%	2.3%	2.1%	2.1%	1.9%	1.6%	1.4%	1.5%	1.4%	1.4%	1.3%	1.2%
Neoplasm diagnosis	8.1%	8.0%	8.1%	8.2%	8.5%	8.6%	8.7%	8.7%	8.7%	8.6%	8.9%	8.9%
Requires urinary catheter	4.4%	4.3%	4.4%	4.4%	4.5%	4.6%	4.6%	4.6%	4.6%	4.6%	4.6%	4.7%
Requires oxygen therapy	14.3%	14.6%	14.1%	14.1%	13.8%	13.7%	16.2%	16.6%	16.1%	15.8%	15.6%	15.4%
Orthopedic diagnosis	43.0%	43.5%	43.4%	41.9%	39.3%	37.8%	38.4%	38.0%	38.6%	38.5%	37.3%	36.8%
Non-surgical wound or skin lesion	23.1%	20.8%	23.6%	24.8%	26.5%	26.5%	24.1%	22.8%	24.8%	24.7%	25.1%	25.2%
Surgical wound	24.4%	24.0%	24.4%	24.7%	25.4%	25.5%	25.6%	25.2%	25.9%	25.8%	26.3%	26.6%
Ambulation-Locomotion												
Able to independently walk with the use of a one-handed device	13.9%	16.3%	13.6%	11.8%	9.0%	6.8%	15.1%	17.4%	15.0%	13.0%	10.3%	8.1%
Requires two handed device or human assistance	32.3%	35.9%	32.5%	28.7%	22.5%	17.7%	32.8%	35.2%	33.0%	30.3%	26.1%	22.4%
Walks only with supervision or assistance from another at all times	42.6%	37.0%	42.8%	47.9%	55.8%	61.9%	40.2%	35.8%	40.1%	44.6%	50.9%	56.3%
Chairfast to bedfast	11.2%	10.8%	11.2%	11.6%	12.6%	13.6%	11.9%	11.7%	11.9%	12.1%	12.7%	13.3%
Pressure Ulcer												
Pressure Ulcer Stage 2	3.2%	3.2%	3.2%	3.2%	3.0%	2.9%	3.4%	3.5%	3.4%	3.3%	3.2%	3.0%
Pressure Ulcer Stage 3	0.9%	0.9%	0.9%	0.9%	0.9%	0.8%	1.0%	1.0%	1.0%	1.0%	1.0%	0.9%
Pressure Ulcer Stage 4	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.6%	0.6%	0.6%	0.6%	0.6%	0.6%
Pressure Ulcer Not Stageable	0.9%	0.9%	0.9%	1.0%	1.0%	1.0%	1.1%	1.0%	1.0%	1.1%	1.1%	1.0%
Risk for Hospitalization*												
Multiple hospitalizations in past 6 months	36.4%	37.4%	38.4%	33.6%	32.0%	32.2%	37.1%	38.7%	38.9%	34.0%	32.2%	32.5%
History of falls	32.8%	31.6%	33.5%	33.4%	33.6%	34.7%	31.4%	30.8%	31.9%	31.6%	31.6%	32.3%
Currently taking 5 or more medications	88.3%	87.6%	87.8%	89.5%	91.1%	92.1%	87.0%	86.2%	86.6%	88.2%	90.0%	91.6%

*These numbers reflect all OASIS episodes in the CY, regardless if their HHA received a TPS in 2017. | *Categories for this condition are not mutually exclusive*

Exhibit 7. FFS Home Health Beneficiary Characteristics in 2013 – 2017, by Year, All HHVBP States, and All Non-HHVBP States

	HHVBP						Non-HHVBP					
	2013-2015	2013	2014	2015	2016	2017	2013-2015	2013	2014	2015	2016	2017
Total number of beneficiaries with Medicare FFS home health claims	2,525,841	850,868	834,565	840,408	833,486	814,992	7,898,642	2,631,986	2,618,829	2,647,827	2,659,592	2,588,262
Total number of FFS episodes	4,422,930	1,501,589	1,460,096	1,461,245	1,430,348	1,391,679	15,417,548	5,173,186	5,113,875	5,130,487	5,080,946	4,871,654
Average age (years)	77.0	76.8	77.0	77.2	77.3	77.5	75.8	75.8	75.8	76.0	76.1	76.2
Female	62.1%	62.5%	62.0%	61.7%	61.4%	61.0%	62.8%	63.2%	62.7%	62.4%	62.1%	61.7%
Race/Ethnicity												
Hispanic (regardless of race)	9.5%	10.9%	9.6%	7.9%	6.8%	6.0%	8.5%	8.8%	8.5%	8.2%	8.0%	7.7%
Black, non-Hispanic	10.1%	10.1%	10.0%	10.2%	10.2%	10.1%	16.5%	17.1%	16.6%	15.8%	14.8%	14.1%
White, non-Hispanic	79.1%	77.7%	79.1%	80.5%	81.6%	82.3%	71.8%	71.0%	71.7%	72.7%	73.9%	74.7%
Other, non-Hispanic	1.2%	1.2%	1.2%	1.3%	1.4%	1.4%	3.0%	2.9%	3.0%	3.1%	3.2%	3.3%
Multiracial, non-Hispanic	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%
Rural	5.1%	5.2%	5.1%	5.1%	5.2%	5.3%	9.6%	9.6%	9.6%	9.5%	9.4%	9.4%
Dual eligible	30.3%	32.0%	30.4%	28.4%	27.0%	25.8%	34.5%	35.1%	34.7%	33.7%	32.9%	32.7%
Persons aged ≥25 years with less than HS diploma in the beneficiary's county	13.0%	13.2%	13.0%	12.8%	12.7%	12.6%	15.1%	15.2%	15.1%	15.0%	14.9%	14.8%
Reason for Medicare Entitlement												
Original End-Stage Renal Disease	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.6%	1.6%	1.6%	1.6%	1.6%	1.5%
Original Disabled	25.3%	25.4%	25.4%	25.2%	25.1%	24.8%	28.8%	28.7%	29.0%	28.7%	28.5%	28.1%
Current End-Stage Renal Disease	0.8%	0.8%	0.8%	0.7%	0.5%	0.4%	1.1%	1.1%	1.1%	0.9%	0.6%	0.6%
Current Disabled	12.1%	12.4%	12.1%	11.6%	11.3%	10.8%	14.4%	14.6%	14.5%	14.1%	13.6%	13.0%
Chronic Conditions												
Chronic kidney disease	46.4%	44.0%	45.9%	49.5%	55.0%	57.3%	46.0%	43.8%	45.1%	49.1%	55.0%	57.3%
Congestive heart failure	42.7%	42.8%	42.5%	42.8%	42.8%	43.2%	46.5%	46.9%	46.3%	46.3%	46.2%	46.1%
Diabetes	46.3%	46.5%	46.4%	45.9%	45.8%	45.6%	49.0%	49.2%	49.1%	48.9%	48.8%	48.8%
Pressure ulcers and chronic ulcers	24.6%	24.2%	24.7%	25.0%	25.2%	25.5%	23.6%	23.4%	23.6%	23.7%	23.8%	23.9%
Alzheimer's disease and related disorders or senile dementia	36.7%	36.0%	36.5%	37.6%	39.6%	40.6%	33.4%	33.0%	33.2%	34.1%	36.4%	37.5%
Ischemic heart disease	57.5%	58.3%	57.4%	56.7%	56.5%	56.4%	58.2%	58.9%	58.2%	57.6%	57.1%	56.7%
Anemia	61.7%	62.5%	61.7%	60.9%	60.5%	60.2%	58.7%	59.3%	58.5%	58.2%	57.9%	58.2%
% Change in home health beneficiaries from previous year	N/A	N/A	-1.9%	0.7%	-0.8%	-2.2%	N/A	N/A	-0.5%	1.1%	0.4%	-2.7%

These numbers reflect the percentages of all Medicare FFS home health episodes in the CY, regardless if their HHA received a TPS score in 2017.

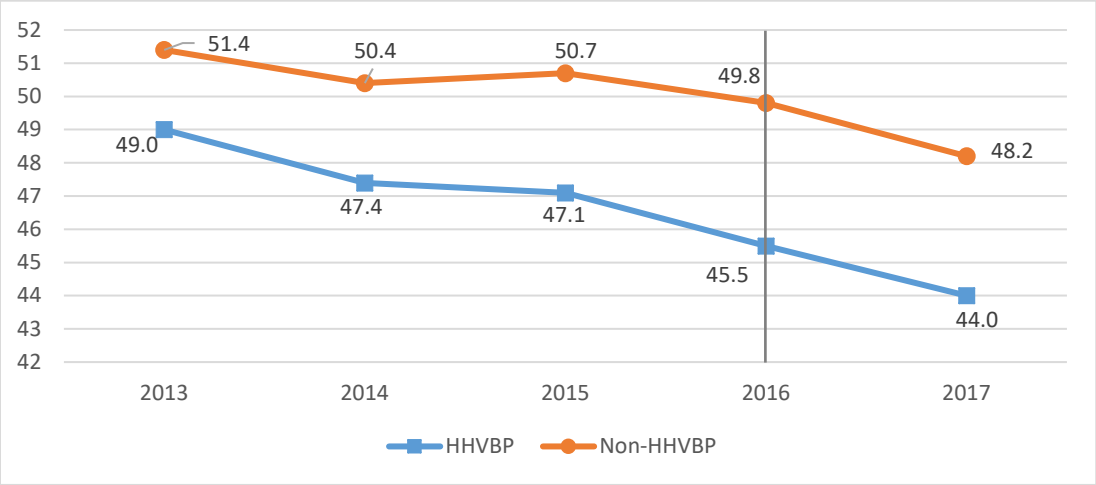
Exhibit 8. FFS Episode Characteristics in 2013 – 2017, by Year, All HHVBP States, and All Non-HHVBP States

	HHVBP						Non-HHVBP					
	2013-2015	2013	2014	2015	2016	2017	2013-2015	2013	2014	2015	2016	2017
Total number of FFS episodes	4,422,930	1,501,589	1,460,096	1,461,245	1,430,348	1,391,679	15,417,548	5,173,186	5,113,875	5,130,487	5,080,946	4,871,654
Episodes Type*												
Normal	84.3%	83.9%	84.5%	84.4%	83.9%	83.9%	86.6%	86.3%	86.9%	86.6%	86.1%	85.4%
LUPA	9.1%	9.2%	9.1%	9.1%	9.1%	8.9%	8.7%	8.8%	8.7%	8.7%	8.6%	8.6%
High cost outlier	4.1%	4.4%	3.9%	4.1%	4.5%	4.5%	2.7%	2.9%	2.5%	2.7%	3.3%	3.9%
PEP	3.6%	3.7%	3.6%	3.6%	3.7%	3.9%	2.9%	3.0%	2.8%	2.9%	3.0%	3.1%
Episodes within a Sequence												
1st in sequence	59.2%	59.3%	59.4%	58.9%	59.5%	59.9%	49.2%	48.6%	49.2%	49.9%	50.9%	52.0%
2nd in sequence	15.5%	15.3%	15.6%	15.8%	16.0%	16.4%	15.2%	15.0%	15.2%	15.4%	15.6%	16.0%
3rd+ in sequence	25.3%	25.5%	25.0%	25.3%	24.5%	23.8%	35.6%	36.4%	35.6%	34.7%	33.5%	32.0%
Average number of visits in an episode	18.0	18.1	18.0	17.9	17.8	17.5	16.3	16.4	16.3	16.3	16.3	16.3
Average # of Visits by Type												
Therapy (OT, PT, speech)	7.7	7.5	7.7	7.9	8.2	8.4	5.8	5.5	5.7	6.1	6.5	6.8
Skilled nurse	8.6	8.8	8.6	8.4	8.1	7.9	8.3	8.5	8.3	8.2	8.1	7.9
Home health aide	1.6	1.7	1.6	1.5	1.3	1.2	2.1	2.3	2.1	1.9	1.7	1.5
Medical social services	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1

**PEP (Partial Episode Payment) is not mutually exclusive with LUPA (Low-Utilization Payment Adjustment) and Outlier, so percentages may sum to > 100%. A PEP occurs when a beneficiary changes HHAs or is discharged and readmitted within a 60-day episode and results in an adjusted, partial payment to the HHA to reflect the time the beneficiary received care. | These numbers reflect all FFS home health episodes in the CY, regardless if their HHA received a TPS score in 2017.*

Ongoing declines in Medicare FFS utilization. We also examined patterns and trends in the utilization of home health care among Medicare FFS beneficiaries in both HHVBP and non-HHVBP states. Based on a measure of home health episodes per Medicare FFS beneficiaries, differences in overall levels of utilization between the two groups are within 5-8% during the baseline period (2013 – 2015). Moreover, there is evidence of a decline over time in the number of home health episodes per 1,000 FFS beneficiaries for both groups prior to implementation of HHVBP with HHVBP states having a somewhat steeper decline of -3.9% relative to -1.4% for non-HHVBP states (Exhibit 9). This downward trend continued into the post-implementation period for both HHVBP and non-HHVBP states. These declines in the use of home health services are not uniform across states. In particular, among HHVBP states, the decline during the baseline period was largely driven by Florida and Tennessee, while the decline in non-HHVBP states was disproportionately affected by Texas, Illinois, Louisiana, and Michigan (not shown). We will further explore state-level changes under HHVBP in future reports.

Exhibit 9. Home Health Episodes per 1,000 FFS Beneficiaries, 2013 – 2017



Each annual estimate is based on an average of the quarterly measure values for that year.

In summary, based on the observed yearly trends both before and after implementation of HHVBP, there is no indication that the HHVBP Model led to a marked shift in either the characteristics of FFS beneficiaries or in the utilization of home health services. While we observe declines in overall home health care utilization (Exhibit 9) and certain other trends in beneficiary characteristics under HHVBP, these changes were generally already underway prior to the Model's implementation. In comparison to the overall stability of the claims-based chronic conditions (Exhibit 7) as relatively objective measures of clinical severity, the increasingly lower levels of some measures of physical functioning being reported over time among patients at admission (based on OASIS assessments in Exhibit 6) may reflect changes in coding or assessment of relatively subjective measures of patient status rather than actual changes in patient condition.

2.4.3 Considerations for the Analytic Approach

Several key considerations informed the design of our analytic approach. Even with the benefits of a randomized model design and mandatory participation of HHAs, there remains a task of controlling for characteristics that can vary over time and may matter differently for different measures. Given multiple research questions of interest involving quality of care, utilization, Medicare spending, and patient experience of care, there are numerous and diverse impact measures of interest for the evaluation. For

some impact measures, there may be a need to account for changing definitions or coding of observed characteristics (i.e., instrumentation issues). In addition, there is a need to consider effects of other interventions, policies, and environmental factors that could obscure effects of the HHVBP Model.

Balance between Treatment and Comparison Groups

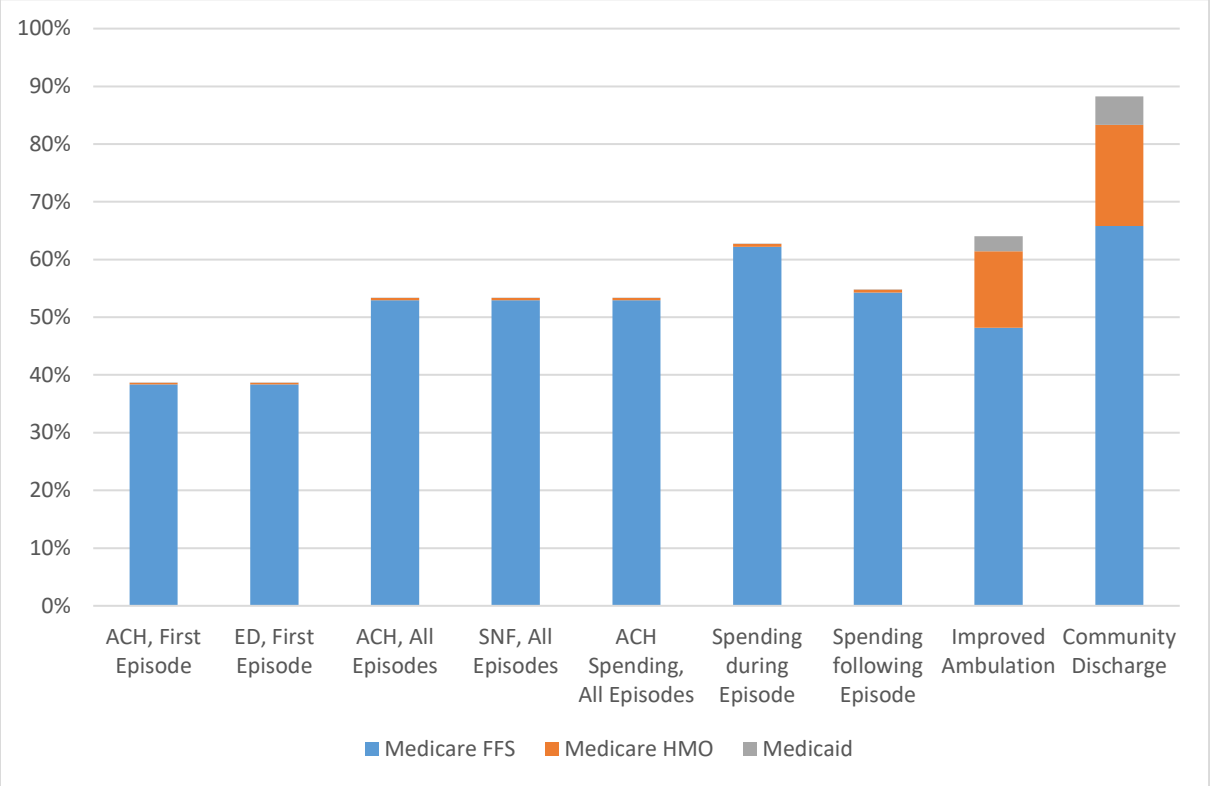
In the context of a model design that includes randomization and mandatory participation of HHAs, we demonstrated in the prior section that a reasonably strong degree of balance was achieved between HHVBP and non-HHVBP states on many characteristics of agencies and home health patients as well as generally similar underlying baseline trends in these factors prior to implementation. However, we also observed certain differences between the two groups. In developing our analytic approach, we therefore sought to attain balance between HHVBP states and the comparison group on beneficiary and agency characteristics that are relevant to the impact measures of interest and differences across HHVBP and non-HHVBP populations in both average levels of these measures over the full baseline period and trends during the baseline period. Such considerations informed our estimation methods, including our approach to covariate adjustment through regression modeling.

Impact Measures Are Diverse and Correspond to Specific Sub-Populations

A key challenge for the evaluation is that there are numerous and diverse impact measures of interest that correspond to different sub-populations (e.g., based on insurance and other patient characteristics), involve different units of analysis (e.g., episode, agency), and are measured using different data sources (e.g., Medicare claims, OASIS assessments, HHCAHPS). In addition to the HHVBP performance measures (See Exhibit 2), this includes other measures of utilization, quality of care, and Medicare spending. Some measures correspond to Medicare FFS beneficiaries who receive home health care, while other measures include all home health patients with Medicare or Medicaid coverage. In addition, some measures are applicable to only a subset of home health patients based on their functional or clinical status (e.g., OASIS-based measures of improvement in functioning). Further, certain impact measures are only defined at the agency level, such as agency TPS scores.

The extent of the variation across measures in the relevant patient groups is illustrated in Exhibit 10, which reports the proportion of OASIS episodes that contribute to several impact measures of interest. In this figure, we see that none of the measures reflect the entire population (100%) of OASIS episodes in that year, with the proportions ranging from 38% to 88% of episodes across measures. Therefore, both the number of episodes and overlap among episodes represented in the denominators of the impact measures vary across measures.

Exhibit 10. Percentage of all OASIS Episodes from HHVBP States in the Denominators of Selected Impact Measures, 2016



Note: Each bar graph represents the percentage of OASIS episodes in HHVBP states in 2016 accounted for by episodes included in the denominator of each measure

The different home health populations reflected in the HHVBP performance measures have important implications for the evaluation. For instance, if impact measures (and changes in impact measures) vary with the mix of populations defined by payer source, then we may expect to find inconsistencies in OASIS-based and claims-based impact measures. Additionally, changes made by other payer sources (e.g., state Medicaid funding or Medicare Advantage activity) may directly influence impact measures for the OASIS population since these patients are included in the OASIS-based impact measures but not Medicare claims-based impact measures for FFS beneficiaries. Thus, the mix of patients by payer source and its resulting influence will vary between agencies and across states. Changes by payer source and changes in the mix of patients by payer source that occur during the evaluation period may hinder our ability to capture time-varying changes necessary to meet the assumptions of our D-in-D estimator.

Environment/Industry Considerations

There are broader changes occurring in the home health environment and industry that may have varying implications for the evaluation and potentially for individual impact measures. The HHVBP Model is implemented within an industry that experiences significant HHA and staff churn, and often-changing payments, incentives, and benefit coverage clarifications. For example, CMS has refined the Medicare HH PPS several times since its implementation in CY 2000, to include payment system refinements such as re-calculations of the base rate and recalibration of the case-mix weights, and adjustments for case-mix growth, with its most recent change—the Patient-Driven Groupings Model (PDGM)—to be implemented in CY 2020 (see Exhibit 11).[3]

Additionally, while CMS has publicly reported home health quality measures on its Home Health Compare website since 2005, CMS also developed two Star Ratings systems to enhance its public reporting process. The intention of the Star Ratings is to make it easier for consumers to assess differences in HHA quality and make informed health care decisions. In turn, this can motivate HHAs to improve their performance on the measures that comprise the Star Ratings. The introduction of Star Ratings on Medicare.gov's Home Health Compare website is relatively recent as the Quality of Patient Care Star Ratings was first published on Home Health Compare in July 2015. The original star rating reflected composite scores of nine measures based on OASIS assessments and Medicare claims, and all but one of the nine measures (i.e., the OASIS-based process measure that reflects how often the HHA initiated patient care in a timely manner) also serve as HHVBP performance measures.[7] Six months later, CMS debuted Patient Survey Star Ratings based on HHCAHPS data. All four of the HHCAHPS-based measures comprising the Patient Survey Star Ratings are HHVBP performance measures.[8] While the HHVBP Model launched after these initiatives, the timing complicates the ability of the empirical approach to isolate the effects of HHVBP from these initiatives, especially if the HHVBP effects are small.

[7] See Exhibit 2 for subsequent changes to the measure set that is used to calculate the Quality of Patient Care Star Ratings.
[8] See Exhibit 2 for the HHVBP measures that are used to calculate the Patient Survey Star Ratings.

Exhibit 11. Recent Changes to Medicare's Home Health Payment System and Related Requirements

	2010	2011	2012	2013	2014	2015	2016	2017	2018
Payments	2.75% payment reduction to the national standardized 60-day episode rate for nominal case-mix growth April: 3% rural add-on payment implemented Cap on outlier payments implemented	3.79% payment reduction to the national standardized 60-day episode rate for nominal case-mix growth	3.79% payment reduction to the national standardized 60-day episode rate for nominal case-mix growth. Changes to relative weights for episodes with therapy visits	1.32% payment reduction to the national standardized 60-day episode rate for nominal case-mix growth	Begin 4-year (CYs 2014 to 2017) rebasing adjustments to national standardized 60-day episode payment amount, national per-visit rates, and non-routine supplies conversion factor.		Begin 3-year phase-in (CYs 2016 to 2018) of payment reduction for nominal case-mix growth of 0.97% per year.		Bipartisan Budget Act was signed, which includes a rural add-on and a 30-day episode of care for payment of home health services (Feb) Finalization of PDGM (e.g., changes payment units from 60 to 30-days) to be implemented in 2020 (Nov)
OASIS	OASIS-C effective					OASIS-C1/ICD-9 effective OASIS-C1/ICD-10 effective (Oct)		OASIS-C2 effective	OASIS-D Guidance Manual released for changes effective Jan 2019 (July)
Quality and Patient Experience					CMS announces Star Ratings program for HHAs (Dec)	Quality of Patient Care Star Ratings (based on OASIS and claims) debuts (July) HHVBP Proposed Rule (July) and Final Rule (Nov)	Patient Survey Star Ratings (based on HHCAHPS) debuts HHVBP Model begins	CMS launches its Meaningful Measures initiative (Oct)	

	2010	2011	2012	2013	2014	2015	2016	2017	2018
Program Integrity		Added requirement for tighter supervision of therapy services Added face-to-face requirement implemented (April)		Moratorium on new agencies in Miami-Dade and Chicago metro areas (Aug)	Moratorium expanded to new agencies in Fort Lauderdale, Detroit, Houston, and Dallas metro areas (Feb)		Moratorium expanded to be statewide in Florida, Illinois, Michigan, and Texas (Aug)	Updated Conditions of Participation (COPs) announced Final Rule (Jan) and interpretive guidelines (Oct) Moratorium extended for six months statewide in Florida, Illinois, Michigan and Texas (July)	New COPs effective (Jan) Moratorium extended for six months statewide in Florida, Illinois, Michigan and Texas (Jan and July) Review Choice Demonstration begins in Illinois (Dec)

Notes: Changes were implemented in January of each year unless otherwise noted. Rebasing adjustment entails a reduction of the national standardized 60-day episode payment amount in each year from CYs 2014 – 2017 by $80.95 (3.5% of the national standardized 60-day episode payment amount as of the date of Affordable Care Act enactment: $2,312.94 in CY 2010), an increase in the national per-visit payment amounts by 3.5% of the national per-visit payment amounts in CY 2010, and a reduction in the non-routine supplies conversion factor in each year from CYs 2014 – 2017 by 2.82%. Total intended reduction of 2.88% for nominal case-mix growth is phased in over 3 years (CYs 2016, 2017, 2018). The updated COPs are effective January 13, 2018.

We also note that the types of agencies entering/leaving the market under the HHVBP Model may differ in both observed and unobserved ways from agencies that would have entered and exited the market in the absence of the Model (e.g., chain affiliated agencies may have greater resources to implement changes in their practices). Given comparatively frequent turnover among HHAs prior to implementation of the Model and the expected lower barrier to entry/exit among HHAs relative to other institutional providers, we will conduct supporting analyses in future reports to examine HHVBP impacts on the composition of agency types in HHA markets. These supporting analyses may reveal important mechanisms through which HHVBP affects patient care.

Defining the Model beneficiary population and an accompanying comparison population as the population of beneficiaries receiving home health care alleviates the fundamental endogeneity concerns related to entry and exit of HHAs. As one aspect of our approach, we examine the impact of care on beneficiaries within the Model and comparison states, rather than finding comparisons for HHAs in the Model states that may enter and exit the market or otherwise change due to HHVBP.

2.4.4 Developing a Common Approach across Measures

Given the above considerations, there are considerable challenges in developing a unified comparison group approach for *all* impact measures reflecting varying populations, data sources, and units of analysis. In designing our overall approach, we therefore prioritized a subset of key impact measures that encompass important aspects of home health quality of care, utilization of services, Medicare spending, and that reflect a range of home health populations that are relevant to the HHVBP measure set (Exhibit 12). In doing so, we developed an approach informed by a focus on factors relevant to the analysis of these key impact measures in particular, but could also be extended to the analysis of a broader set of impact measures of interest for the evaluation. Detailed definitions for each of these measures are included in Section A.2 on Page 28 of the Technical Appendix.

Exhibit 12. Key Impact Measures Used to Inform Comparison Group Approach

Measure	Underlying Population
Quality	
Unplanned Acute Care Hospitalization/First FFS Home Health (HH) Episodes	FFS Beneficiaries who Received HH Care
ED Use (no Hospitalization)/First FFS HH Episodes	FFS Beneficiaries who Received HH Care
Improvement in Ambulation-Locomotion	Medicare and/or Medicaid Beneficiaries (including Managed Care Enrollees)
Discharged to Community	Medicare and/or Medicaid Beneficiaries (including Managed Care Enrollees)
Spending	
Average Medicare Spending per Day during FFS HH Episodes of Care	FFS Beneficiaries who Received HH Care
Average Medicare Spending per Day following FFS HH Episodes of Care	FFS Beneficiaries who Received HH Care
Average Medicare Spending per Day during and following FFS HH Episodes of Care	FFS Beneficiaries who Received HH Care
Average Medicare Spending per Day for Unplanned Acute Care Hospitalizations among all FFS HH Episodes	FFS Beneficiaries who Received HH Care
TPS Score	**HHAs**

HHVBP Measures indicated by italic text.

2.4.5 Multivariate Regression Approach

We designed the quantitative analyses for this Annual Report to evaluate the effect of the HHVBP Model on a range of impact measures that include quality of care, utilization, Medicare spending, and patient experience. As discussed above, we prioritized a subset of impact measures in the design of our overall approach that we extended to include other impact measures of interest. We established a common comparison group approach for our analyses to facilitate the interpretation of findings across impact measures. These analyses involve comparisons for both beneficiaries and agencies between HHVBP and non-HHVBP states.

The results of our descriptive analyses above reflected that most of the beneficiary, HHA characteristics and other aspects of health care achieved reasonably close balance between HHVBP states and non-HHVBP states. Under the attributes of randomization and mandatory participation and the degree of balance observed over a range of factors, we implemented a multivariate linear regression to evaluate the effects of HHVBP and defined a single comparison population consisting of beneficiaries and agencies in the 41 states that were not selected for participation.[9] The parametric regression framework allowed the empirical approach to examine differences in the nine intervention states with those in the 41 comparison states while adjusting for a common set of covariates across measures to the extent possible.

Given the extent of diversity in beneficiary and HHA characteristics and treatment patterns across states, randomization alone was not able to achieve balance on all factors during the three-year baseline

[9] The evaluation restricts comparisons to the 41 non-HHVBP states, and excludes the District of Columbia and US Territories as they were not eligible for selection into the HHVBP Model.

period or avoid differential yearly trends in all factors during this period. We therefore used covariate adjustment to improve upon the imbalance observed for certain factors between the treatment and the comparison population throughout the baseline period. In addition to the degree of imbalance between HHVBP and non-HHVBP groups, we weighed several other criteria in selecting factors for covariate adjustment in the regression model. For instance, we sought to include factors having a stronger relationship with impact measures of interest while avoiding selection of factors that are plausibly intermediate effects of the HHVBP Model or that were seen as being very subjective measures of patient status and hence more susceptible to changes over time in reporting. While not every factor chosen was equally preferred based on each criterion that we considered, each factor that was chosen was seen as important for achieving balance across characteristics possibly confounded with HHVBP participation, with an eye towards maintaining the uniformity of the analytic approach across impact measures.

The result of this process was a core set of covariates used for examining a broad range of impact measures for the evaluation. These covariates included demographic, insurance, and clinical characteristics of beneficiaries along with several agency characteristics and state fixed effects. In certain instances, this core list of covariates was augmented or otherwise refined for specific impact measures. This was the case, for example, where specific covariates were obtained from a data source that was not available for the entire population of interest for a given measure or the rationale for inclusion did not apply to all measures. We provide further details regarding both the process used and the model covariates selected in Section A.1.3.2 on Page 6 of the Technical Appendix.

In the context of a parametric regression framework, we are able to control for observed differences between the treatment and comparison groups, generate a D-in-D estimator, and examine adjusted baseline differences for consideration of the estimator's key parallel trend assumption. To address the various research questions that are of interest for this evaluation given the goals of the HHVBP Model and the incentives reflected in the HHVBP performance measures, we used this uniform comparison group and multivariate regression approach to examine a range of impact measures for this report (Exhibit 13).

Exhibit 13. Impact Measures Used to Evaluate the HHVBP Model

Measure	Unit of Analysis	Baseline Period
HHA TPS Score	HHA-Level	2015*
FFS Claims-Based Utilization Measures		
ED Use (no Hospitalization)/First FFS HH Episodes	FFS Episode-Level	2013-2015
Unplanned Acute Care Hospitalization/First FFS HH Episodes	FFS Episode-Level	2013-2015
Unplanned Acute Care Hospitalization/All FFS HH Episodes	FFS Episode-Level	2013-2015
Unplanned Hospital Readmission in the First 30 days of HH Care	FFS Episode-Level	2013-2015
ED Use Following Hospitalization (without Hospital Readmission) in the First 30 Days of HH Care	FFS Episode-Level	2013-2015
SNF Use/All FFS HH Episodes	FFS Episode-Level	2013-2015
FFS Claims-Based Spending Measures		
Average Medicare Spending per Day for Unplanned Acute Care Hospitalizations Among all FFS HH Episodes	FFS Episode-Level	2013-2015
Average Medicare Spending per Day during and following FFS HH Episodes of Care	FFS Episode-Level	2013-2015
Average Medicare Spending per Day during FFS HH Episodes of Care	FFS Episode-Level	2013-2015
Average Medicare Spending per Day following FFS HH Episodes of Care	FFS Episode-Level	2013-2015
OASIS-Based Outcome Measures		
Discharged to Community	OASIS Episode-Level	2013-2015
Improvement in Ambulation-Locomotion	OASIS Episode-Level	2013-2015
Improvement in Bathing	OASIS Episode-Level	2013-2015
Improvement in Bed Transferring	OASIS Episode-Level	2013-2015
Improvement in Dyspnea	OASIS Episode-Level	2013-2015
Improvement in Management of Oral Medications	OASIS Episode-Level	2013-2015
Improvement in Pain Interfering with Activity	OASIS Episode-Level	2013-2015
Improvement in Status of Surgical Wounds	OASIS Episode-Level	2013-2015
OASIS-Based Process Measures		
Drug Education on Medications Provided to Patient/Caregiver during Episodes of Care	HHA-Level	2013-2015
Influenza Immunization Received for Current Flu Season	HHA-Level	2013-2015
Pneumococcal Polysaccharide Vaccine Ever Received	HHA-Level	2013-2015
Depression Assessment Conducted	HHA-Level	2013-2015
Diabetic Foot Care and Patient/Caregiver Education Implemented during All	HHA-Level	2013-2015
Multifactor Fall Risk Assessment Conducted for All Patients who Can Ambulate	HHA-Level	2013-2015
Timely Initiation of Care	HHA-Level	2013-2015
HHCAHPS-Based Patient Experience Measures		
How often the home health team gave care in a professional way	HHA-Level	2013-2015
How well did the home health team communicate with patients	HHA-Level	2013-2015
Did the home health team discuss medicines, pain, and home safety with patients	HHA-Level	2013-2015
How do patients rate the overall care from the HHA	HHA-Level	2013-2015
Would patients recommend the HHA to friends and family	HHA-Level	2013-2015

*HHVBP Measures indicated by italic text. | *As discussed below, a D-in-D approach is not used for analysis of agency TPS. In calculating the TPS, the baseline period for measuring achievement on HHVBP performance measures is 2015. The baseline period for measuring agency improvement on individual measures is the earliest of 2015 or their first full year in operation. | The duration of OASIS episodes of care may differ from that of Medicare FFS episodes. | Note: We do not include the three new measures that are self-reported by HHAs since these data are only available for HHAs in the HHVBP states.*

2.4.6 Difference-in-Differences Approach

Using a comparison group consisting of home health populations receiving care from HHAs located in the 41 states that were not selected for inclusion in the HHVBP Model, we used a D-in-D framework to compare changes in impact measures observed over time in the HHVBP states relative to those in the comparison group to evaluate the effects of HHVBP. The D-in-D framework offers a quasi-experimental design that can address many threats to validity and rests on the critical assumption that, in the absence of the HHVBP Model, the impact measures in the two groups would have changed in a parallel manner over time. For example, as discussed further below, the D-in-D design enables us to control both for changes occurring over time that are common to all beneficiaries as well as for unmeasured differences between Model and comparison states that do not change over time.

The D-in-D analysis compared changes in impact measures observed over time in the HHVBP Model states to those in the comparison group. The basic D-in-D estimate is defined as the difference in an impact measure of interest over time in the Model states, and subtracting the difference, over time, in the comparison group:

$$D\text{-}in\text{-}D = [Y_{INT,POST} - Y_{INT,PRE}] - [Y_{COMP,POST} - Y_{COMP,PRE}]$$

With this model specification, the impact estimate is the differential change in an outcome for the HHVBP states between the baseline and follow-up period(s), relative to that same change for the comparison group. That is, the differential change in the outcome over time for the HHVBP states relative to non-HHVBP states represents the estimated effect of HHVBP. Positive (or negative) D-in-D estimates can be interpreted to mean that the HHVBP group has measure values that are higher (or lower) than what it is estimated they would have been in the absence of HHVBP (i.e., the counterfactual). The D-in-D design controls for unobserved, time-varying changes that are common to all beneficiaries (i.e., cyclical or seasonal trends or broader changes in the health system). The inclusion of state fixed effects controls for unmeasured differences that vary at the state level between HHVBP and comparison states' markets and beneficiary populations, that do not change over time, on average. Moreover, through the use of a multivariate regression, we are able to adjust for observed characteristics of beneficiaries that influence the outcome. For additional information regarding the D-in-D approach and specification of the multivariate regression model, please reference Section A.1.4 on Page 12 of the Technical Appendix.

In the context of this evaluation, the mandatory requirement for all HHAs to participate in the HHVBP Model in the nine HHVBP states helps to minimize potential selection bias because individual HHAs are not self-selected into the Model in ways that could lead estimates of the impact of HHVBP to be biased. Our empirical approach considered important factors that may differ between HHVBP and non-HHVBP states prior to Model implementation and tested the parallel trends assumption of our D-in-D design by examining pre-intervention trends in impact measures in the HHVBP and non-HHVBP states (results discussed below). However, as with any quasi-experimental design, other inherent threats to validity are present. Even in the context of similar pre-intervention trends, a remaining threat is the potential for a concurrent change in impact measures in the HHVBP states that occurs during the operation of HHVBP but is not attributable to the Model, which we explore using our qualitative data collection activities. For most of the impact measures of interest for this Annual Report, we used a D-in-D approach to estimate

effects of the Model for all HHVBP states combined.[10] We implement this approach in a consistent multivariate linear regression framework for a broad range of impact measures of interest for this evaluation.

2.4.7 Parallel Trends

To facilitate interpretation of the findings, we conducted a number of tests of the performance of our comparison group approach. Our primary investigations of model performance used available information for HHVBP and non-HHVBP states and time periods to test whether consistent differences (i.e., parallel trends) existed in the impact measures between the HHVBP and comparison groups during the three years prior to the implementation of HHVBP (2013 – 2015). We conducted these analyses to help inform our analytic approach for estimating impacts, including decisions regarding model covariate selection. We used analyses of baseline trends in adjusted impact measures to ascertain how well a particular model specification satisfied the parallel trends assumption. With the results of these analyses, we were able to assess whether certain covariates helped to strengthen the validity of this assumption.

To accomplish these goals, we conducted parallel trends or "placebo" tests for the impact measures estimating effects of HHVBP in CY 2015 for the HHVBP states where the effect should be null. Performing the falsification tests using an otherwise similar modeling approach allowed us to examine the performance of the D-in-D estimator obtained from the multivariate regression model. We also compared annual trends in adjusted impact measures between the two groups during the baseline period and examined whether differences between the two groups changed over time. The results of these analyses informed our level of confidence in using model results to make valid inferences about the effects of HHVBP.

Results from our analyses suggest that the adjusted impact measures largely moved in a parallel or close to parallel manner over the baseline period between the HHVBP states and the non-HHVBP states. For measure sets where we found evidence of a lack of parallel trends during the baseline period (FFS claims-based spending measures, OASIS outcome and process impact measures), we applied an alternative model specification that incorporated state-specific linear time trends for both the HHVBP and comparison groups. With this model, the D-in-D estimator measures the difference in the deviation from the trend line between the HHVBP and comparison group in the post-HHVBP period. Although incorporating state-specific linear time trends in our D-in-D framework allows us to account for non-parallel trends in the baseline period between the HHVBP and comparison groups for certain impact measures, it assumes that the average difference in slopes between the HHVBP state trends and the comparison state trends observed in the baseline period would have continued to change at the same rate in the absence of HHVBP. This will be an increasingly strong assumption to make throughout the course of this eight-year evaluation. Therefore, we only incorporated state-specific linear time trends in D-in-D models for impact measure sets with a pattern of non-parallel baseline trends based on falsification tests (i.e., the FFS claims-based spending measures and OASIS-based measures; see Section A.1.4.3 on Page 14 of the Technical Appendix for additional details).

[10] We are unable to use a D-in-D approach for the three new measures that are self-reported by HHAs via the Secure Web Portal since these data are only available for HHAs in the HHVBP states. As such, we instead focus on reporting rates among HHAs in the nine HHVBP states. In addition, we use an alternative analytic approach for examining agency TPS scores, as described in the following section.

2.5 Analytic Approach for Agency Total Performance Scores

As a metric that combines agency performance on the range of quality measures included in HHVBP and is used to determine Medicare payment adjustments for HHAs in the HHVBP states, the TPS score represents a broad measure of agency performance that is incentivized under HHVBP. As such, the TPS score is of interest as an overall performance indicator for comparison between agencies in Model states with those in non-Model states where this metric does not affect Medicare payments to HHAs.

Given the considerations discussed in this section, we examined the impact of the HHVBP Model on overall agency performance by comparing TPS scores in Model states with those in non-Model states. We used multivariate linear regression to examine 2016 and 2017 TPS scores while accounting for differences in certain characteristics of HHAs between HHVBP and non-HHVBP states. These factors include agency size, chain status, ownership type, age, and freestanding versus hospital-based, as well as indicators of patient demographic characteristics and insurance.

As discussed in the prior section, our primary analytic approach for this evaluation involves a D-in-D methodology, where we test for differential changes from the baseline period to the post-HHVBP period in the Model group relative to the comparison group. A D-in-D approach to examining TPS scores, however, is not optimal over the duration of this evaluation and was not used. A key consideration is that the methodology for computing TPS scores is expected to change over time. For example, one of the initial performance measures, the Drug Education on All Medications Provided to Patient/Caregiver during All Episodes of Care, was removed from the HHVBP measure set starting in the third performance year of the Model (2018) since many HHAs were found to be achieving full performance on this measure (HHS, 2017). Further changes to both the HHVBP measure set and to the measure weights will take effect in 2019, the fourth performance year of the Model (HHS, 2018). One effect of such changes in methodology is that TPS scores from different payment years will be less comparable, as changes in TPS scores across payment years may in part reflect changes in the components of the TPS rather than necessarily changes in agency performance.

In addition, the TPS score already captures changes over time in performance. For each HHA, the TPS score is calculated by summing the applicable measure scores. For each measure, the performance of individual HHAs is measured based on a combination of (a) their levels of achievement on the measure relative to their state cohort's performance during the baseline period and (b) their improvement over time relative to their own previous performance levels. For each measure, agencies receive the higher of their achievement score or their improvement score. However, regardless of which score is higher for a specific measure, the average score that results among HHAs in a state represents a measure of improvement in performance relative to that observed in a prior period—whether to that of the overall state cohort or of those particular HHAs. As a result, the TPS calculation inherently captures changes over time in performance making it reasonable to use a cross-sectional regression analysis, as opposed to a D-in-D approach.

To evaluate the extent to which HHA measure scores which comprise the TPS reflect improvement relative to an HHA's own baseline as well as its state cohort's baseline, we examined correlations between average measure scores among HHAs in each state and each of the following:

- The average difference between the measure rate for each HHA during the performance period and its state-level achievement threshold (HHS, 2015).

- The average difference between the measure rate for each HHA during the performance period and its own baseline performance measure rate.

Among the individual performance measures, we generally found correlations of between 0.6 and 0.9 for both of the above types of correlations (see Exhibit C-3 on Page 86 in the Technical Appendix). These results indicate that average HHA measure scores in a state have a moderately strong correlation with *both* (a) the amount by which average HHA performance levels in a given performance year exceed their state cohort's baseline performance and (b) the extent of the improvement in an HHA's performance over their baseline performance. That is, in the aggregate, higher measure scores tend to indicate greater improvement in HHA performance relative to both the state cohort's baseline performance and to an HHA's own baseline performance.

A limitation of comparing TPS scores across states is that each agency's achievement on a measure is determined relative to the baseline performance for that agency's specific state cohort. The achievement thresholds and benchmarks that are used to determine agency achievement scores are calculated separately for each state. HHA achievement scores are therefore calculated relative to baseline performance levels that can vary across states. Large differences across states in baseline performance levels used to calculate measure scores could theoretically have implications for comparisons of measure scores and, in turn, TPS scores across states or groups of states. Therefore, we examined relative performance in HHVBP and non-Model states to rule out the possibility of higher average achievement scores among agencies in HHVBP states being due to a lower baseline level of performance among agencies in those states. This scenario would indicate greater room for improvement at the time the HHVBP Model was implemented. Below, we examine (and reject) the possibility that differences in baseline performance levels between agencies in HHVBP and non-Model states might have implications for comparisons of TPS scores between these groups.

For each HHVBP measure, we examined achievement thresholds and benchmarks among agencies in HHVBP states relative to non-HHVBP states in 2017 (Exhibit 14).[11] For HHVBP measures that reflect indicators of utilization based on Medicare claims (i.e., ACH and ED visits), indicators of care processes based on OASIS data, and indicators of patient satisfaction based on HHCAHPS data, average achievement thresholds and average benchmarks were within one half of one percentage point. For example, during 2017, the average achievement threshold for the unplanned ACH measure was 15.9% among agencies in HHVBP states and 15.6% among those in non-Model states.

[11] Achievement threshold is defined as the median measure value for all HHAs in the state during the baseline period, and the benchmark is defined as the mean measure value for the top decile of all HHAs in the state during the baseline period (HHS, 2015).

Exhibit 14. Average Measure Achievement Thresholds and Benchmarks, HHVBP Performance Year 2017

HHVBP Performance Measure	Average Achievement Threshold		Average Benchmark	
	HHVBP	Non-HHVBP	HHVBP	Non-HHVBP
ED Use (no Hospitalization)/First FFS Home Health Episodes	11.9%	12.3%	6.2%	6.0%
Unplanned ACH/First FFS Home Health Episodes	15.9%	15.6%	9.0%	8.8%
Discharged to Community	71.2%	69.5%	83.5%	85.0%
Improvement in Ambulation/Locomotion	66.1%	63.0%	85.0%	84.5%
Improvement in Bathing	70.9%	67.4%	88.1%	88.5%
Improvement in Bed	62.0%	57.8%	81.6%	82.3%
Improvement in Management of Oral Medications	54.0%	52.1%	74.4%	76.0%
Improvement in Dyspnea	69.7%	64.5%	88.0%	87.3%
Improvement in Pain Interfering with Activity	71.4%	67.0%	90.6%	90.9%
Drug Education on Medications Provided to Patient/Caregiver during Episodes of Care	97.2%	97.4%	99.9%	99.9%
Influenza Immunization Received for Current Flu Season	67.8%	68.6%	91.0%	90.3%
Pneumococcal Polysaccharide Vaccine Ever Received	71.4%	73.3%	93.6%	94.5%
How often the home health team gave care in a professional way	89.1%	88.9%	94.2%	94.0%
How well did the home health team communicate with patients	86.3%	85.9%	91.9%	92.3%
Did the home health team discuss medicines, pain, and home safety with patients	83.8%	84.0%	90.3%	91.6%
How do patients rate the overall care from the home health agency	84.8%	84.8%	93.1%	93.2%
Would patients recommend the home health agency to friends and family	80.2%	79.8%	90.5%	90.5%

For the OASIS-based measures of patient outcomes, differences between the two groups in the average achievement thresholds typically ranged between two and five percentage points, with higher thresholds for the HHVBP group. This includes the six outcome improvement measures and the discharge to community measure. For example, the average achievement threshold for the measure of improvements in ambulatory status was 66.1% among HHAs in HHVBP states and 63.0% among those in non-Model states. Differences in the average benchmarks were smaller, generally within one percentage point.

Comparisons of average agency achievement thresholds and benchmarks between agencies in HHVBP and non-Model states for 2016 reveal similar overall patterns (see Exhibit C-4 on Page 87 in the Technical Appendix). These comparisons for both of the first two performance years do not suggest systematic, large differences between the HHVBP and non-Model groups in baseline performance levels when comparing HHA measure scores and TPS scores.

2.6 HHA Survey Analytic Approach

We conducted a survey of HHAs to examine key agency structural and operational characteristics and the impact of the HHVBP Model on agency operations in HHVBP states compared to similar agencies in non-HHVBP states.

Agencies that had been in operation since 2016 and who received a TPS score in 2016 were eligible for the survey. Among HHVBP states, we surveyed all HHAs. To construct a comparable sample of HHAs in non-HHVBP states, we sampled non-HHVBP HHAs such that their distribution mimicked that of the Model state agencies in terms of ownership, chain affiliation, setting, and HHA size. We fielded the survey to 4,800 HHAs beginning in March through June 2018, using a mixed mode approach of mail and web administration with telephone follow-up to non-responders. We received 2,328 responses—759 from HHVBP agencies and 1,569 from non-HHVBP agencies—for an overall response rate of 49% (response rate for agencies in HHVBP states and non-HHVBP states was 47.1% and 49.2%, respectively; see Section of A.3.13 on Page 61 of the Technical Appendix for more detail).

The HHA survey provides quantitative information on agency responses to HHVBP not available from other data sources (e.g., claims). We used the survey results to provide explanatory context to the quantitative impact analyses—which rely on FFS claims, OASIS assessments, and other administrative data. The results also provide a quantitative backdrop for the qualitative data collected through interviews with HHAs and referrers (discussed below).

2.7 Qualitative Analytic Approach

For this Second Annual Report, we interviewed key informants at 49 high-TPS and low-TPS HHAs in the nine HHVBP states in September and October 2018 to look for preliminary evidence of differences regarding how these agencies are responding to the HHVBP Model. To select interview participants, we stratified agencies by TPS score within each Model state (sampling was done based on 2016 TPS scores which were used to adjust payments in 2018) and excluded agencies we previously interviewed in 2017 to minimize burden. We also expanded our interview efforts in 2018 to include 58 referrers in the nine HHVBP states during May through August 2018 to better understand working relationships between HHAs and their referral sources, and to discern how, if at all, these relationships have changed since the beginning of the HHVBP Model.

We allocated both agency and referrer interviews across the HHVBP states to approximately reflect the relative concentration of HHAs. The findings from these interviews are not representative of all HHVBP agencies or their referral patterns. Rather, this information provides context for evaluation results and informs hypotheses for future data collection activities and analyses. We provide more information on primary data collection and analysis in Sections B.1 (Page 73) and B.2 (Page 75) of the Technical Appendix.

To support integration of results across the evaluation, we applied a structured approach to analyzing qualitative data, whereby the core quantitative results serve as the framework, and the qualitative data are used to examine the Model and mechanisms through which the HHVBP Model affects impact measures (Wisdom & Cresswell, 2013). Initially, we will use qualitative data collection to document and understand HHAs' plans and approaches to quality improvement and the context in which they are implemented. Later, we will use qualitative data collection to identify any evidence of success and any challenges and identify priority areas for further analysis.

The following chapters present key findings based on our evaluation of the experience of home health patients, agencies, and referrers during the first two years of the HHVBP Model. Chapter 3 presents our analyses of the impact of the HHVBP Model on overall agency performance by comparing TPS scores in HHVBP states with those in non-Model states. The subsequent chapters present our results on the effect

of HHVBP on the impact measures of interest using the comparison group approach, D-in-D framework, and other analytic methods described above. We examine Medicare utilization and spending in Chapters 4 and 5, respectively, before presenting results for the OASIS-based quality measures in Chapter 6 and patient experience in Chapter 7. In Chapter 8, we present results based on the surveys we fielded to HHAs in both HHVBP and non-HHVBP states, followed by findings from the interviews we conducted with representatives of HHVBP HHAs. Both primary data collection efforts were designed to inform our understanding of any operational changes made by HHAs in response to the HHVBP Model. We also present our findings on HHVBP HHAs' use of the HHVBP Connect website and self-reporting rates of the three HHVBP measures. In Chapter 9, we summarize our findings from our interviews with home health referral sources in the Model states to identify any changes in access to home health care or patterns of referral to HHAs that may have occurred since the implementation of HHVBP. We conclude with a discussion of limitations and future activities in Chapter 10.

3. Results: Analysis of Agency Total Performance Scores and Payment Adjustments

This chapter presents our analyses of the impact of the HHVBP Model on overall agency performance by comparing TPS scores in Model states with those in non-Model states. As discussed above, Total Performance Scores serve as broad indicators of agency performance under the HHVBP Model and are the basis for adjusting Medicare payments to agencies in the nine Model states. Specifically, CMS used agency 2016 TPS scores to determine the initial payment adjustments that were applied to eligible HHAs in the nine HHVBP states starting in CY 2018. As such, the TPS score is of interest as an overall performance indicator for comparison between agencies in Model states with those in non-Model states where this metric does not affect Medicare payments to HHAs. Using multivariate linear regression, we found ***higher HHA Total Performance Scores in each of the first two years of the Model*** relative to TPS scores for agencies in non-Model states.

Below, we present descriptive information on TPS scores in the first two performance years followed by results from our multivariate analyses. We conclude with our descriptive analyses of the initial (CY2018) HHVBP payment adjustments.

3.1 TPS Scores among Agencies in HHVBP States in First Two Performance Years

As noted above, we calculated a TPS score for each agency that was eligible to receive one, based on having at least five HHVBP measures with sufficient data and a Medicare participation date prior to the CY used as a baseline period for measuring improvement. In 2017, a TPS score was calculated for 80.4% of HHAs in HHVBP states and 75.3% of HHAs in non-Model states (Exhibit 15). As expected, a key distinguishing characteristic of HHAs without a TPS score is that they tend to be relatively small. In addition to being notably smaller overall, agencies without a TPS score tended to be in operation for a relatively shorter period of time, for both those in HHVBP states and in non-Model states (see Exhibits C-6 and C-7, Pages 88-89 in the Technical Appendix).

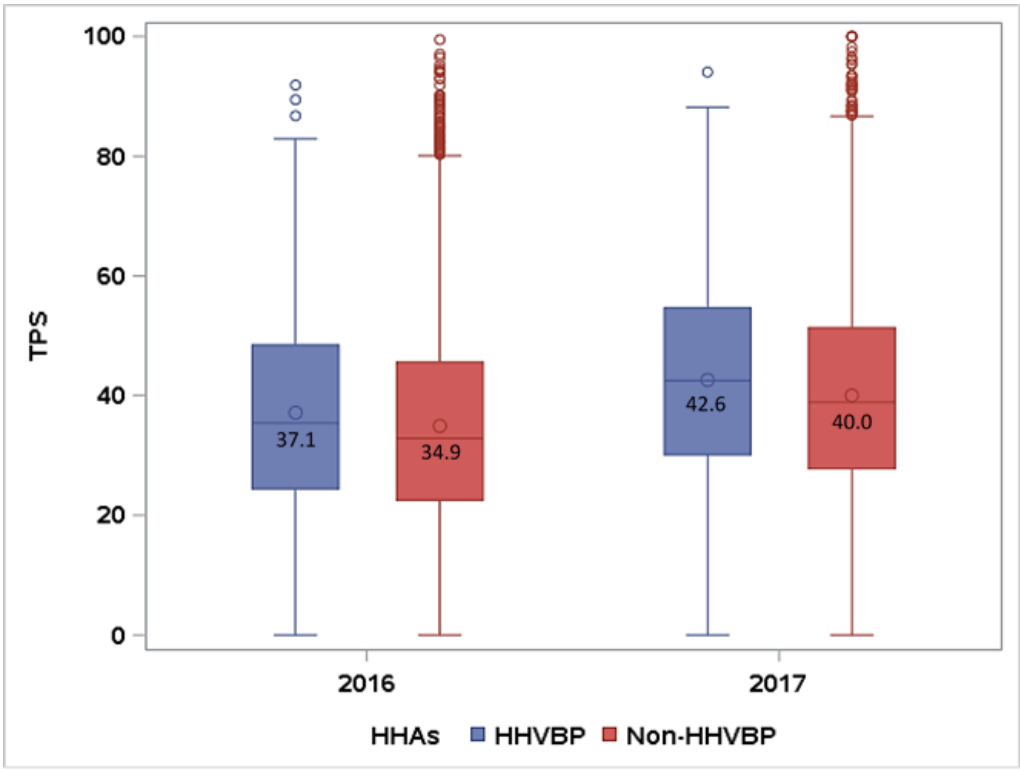
While TPS scores were calculated for roughly 80% of agencies, the small size of the omitted agencies translate to a large majority of episodes associated with an agency with a TPS score. Specifically, our analyses of 2017 TPS scores included HHAs that accounted for 98.6% of OASIS episodes in HHVBP states and 98.1% of OASIS episodes in non-Model states. Similar rates also were observed in 2016 (see Exhibit C-5 on Page 87 in the Technical Appendix).

Exhibit 15. HHA Eligibility for TPS Scores, 2017

	Agencies in HHVBP States			Agencies in Non-HHVBP States		
	Eligible for TPS		Total	Eligible for TPS		Total
	Yes	No		Yes	No	
Total number of HHAs	1,631	397	2,028	6,919	2,272	9,191
% of HHAs	80.4%	19.6%	100.0%	75.3%	24.7%	100.0%
Number of OASIS episodes	1,582,587	22,889	1,605,476	5,369,543	105,049	5,474,592
% of OASIS episodes	98.6%	1.4%	100.0%	98.1%	1.9%	100.0%
Number of Medicare claims episodes	1,372,604	19,075	1,391,679	4,742,807	135,339	4,878,146
% of Medicare claims episodes	98.6%	1.4%	100.0%	97.2%	2.8%	100.0%

Overall, TPS scores were higher among HHAs in HHVBP states relative to those in non-Model states, in both of the first two performance years (Exhibit 16). There was also a shift upward in the distribution of agency TPS scores between 2016 and 2017, for both groups of agencies. This shift reflects ongoing improvement in agency performance in 2017 over 2016 relative to a combination of the fixed baseline thresholds used to measure achievement and each agency's own baseline performance used to measure improvement.

Exhibit 16. Distribution of Agency TPS Scores, 2016 and 2017



*The box shows the interquartile range, with the median represented by the line and the circle reflecting the mean value. The lower line or "whisker" reflects the minimum observation, and the upper whisker reflects the maximum TPS score that occurs within the 75th percentile and 1.5*IQR (the "fence"). The circles above the upper whisker reflect outliers (i.e., observations that are higher than "fence").*

There is also variation in TPS scores across the nine HHVBP states, with average scores among HHAs varying from 39.2 in Florida to 52.8 in Washington in 2017 (Exhibit 17). Variation across the nine HHVBP states in agency performance as well as beneficiary and agency characteristics will be examined in future reports.

Exhibit 17. Distribution of 2017 TPS scores, by HHVBP State

State	# HHAs	Minimum	Mean	Maximum
Arizona	118	10.5	45.0	83
Florida	798	0	39.2	85.4
Iowa	121	13.2	41.9	77.9
Maryland	49	22.9	50.9	87.1
Massachusetts	147	3.4	40.5	80.4
North Carolina	162	14.9	49.6	80.1
Nebraska	58	2	41.4	88.1
Tennessee	121	0.6	49.4	94
Washington	57	16.4	52.8	75.7

We also examined the extent to which agencies were in the same relative position within their state cohort between years. As shown in Exhibit 18, among HHVBP agencies that received a TPS score in 2016 and 2017 (N=1,515), over half that were in the lowest TPS quartile in 2016 were also in the lowest TPS quartile in 2017. Of the 365 agencies in this group, nearly one fifth (19.8%) moved up to quartile 3 or 4 in 2017. Similarly, over half (59.9%) of agencies in the highest TPS quartile in 2016 were also in the highest quartile in 2017, and only 15.0% moved down to quartiles 1 or 2 in the subsequent year.

Exhibit 18. Changes in HHAs' TPS Score Quartile between 2016 and 2017

	2017 TPS Score Quartiles			
2016 TPS Score Quartiles	Q1 (Lowest)	Q2	Q3	Q4 (Highest)
Q1 (Lowest)	57.3%	23.0%	14.3%	5.5%
Q2	25.1%	37.3%	25.1%	12.5%
Q3	8.7%	30.5%	38.4%	22.4%
Q4 (Highest)	4.6%	10.4%	25.1%	59.9%

Row percentages are shown. Percentiles are state-specific.
Q1 = [0,25] Percentile; Q2 = (25,50] Percentile; Q3 = (50,75] Percentile; Q4 =(75,100] Percentile.

Because the TPS score encompasses agency performance across a wide range of process and outcome measures, it is also important to understand which measures represent the source(s) of the relative gains observed for agencies in HHVBP states. We therefore also compared measure scores for each of the 17 HHVBP performance measures for agencies in HHVBP and non-Model states (see Section A.2.6 on Page 53 of the Technical Appendix). The results of these comparisons show that for both 2016 and 2017, the relatively higher TPS scores among agencies in the HHVBP states is almost entirely the result of higher scores for the OASIS-based outcome measures (see Exhibit C-8 on Page 90 in the Technical Appendix).

We used linear regression analysis to examine agency TPS scores while accounting for the observed differences in agency characteristics and patient sociodemographic factors between the HHVBP and

non-Model groups.[12] Model estimates indicated TPS scores that were 1.6 and 2.1 points higher among agencies in HHVBP states in 2016 and 2017, respectively (Exhibit 19). These effect sizes indicate TPS scores for HHVBP agencies that were 4.6% and 5.3% higher than those for non-HHVBP agencies in 2016 and 2017, respectively.

Exhibit 19. Regression Analysis of Agency TPS Scores in HHVBP versus Non-HHVBP States, 2016 and 2017

Year	Agencies in HHVBP States		Average TPS Score, Agencies in Non-HHVBP States	% Difference
	Coefficient	p-value		
2016	1.6	<0.001	34.9	4.6%
2017	2.1	<0.001	40.0	5.3%

We also consider these analyses of TPS scores under the Model in the context of pre-existing levels of agency performance on the same measures. Using a similar methodology, we calculated agency TPS scores for each year from 2013 – 2015. These simulated TPS scores reflect agency performance in each year relative to the previous year which is treated as the baseline period. For example, the simulated 2015 TPS scores reflect a combination of agency levels of quality achievement in 2015 relative to 2014 achievement thresholds and benchmarks and agency levels of quality improvement between 2014 and 2015.

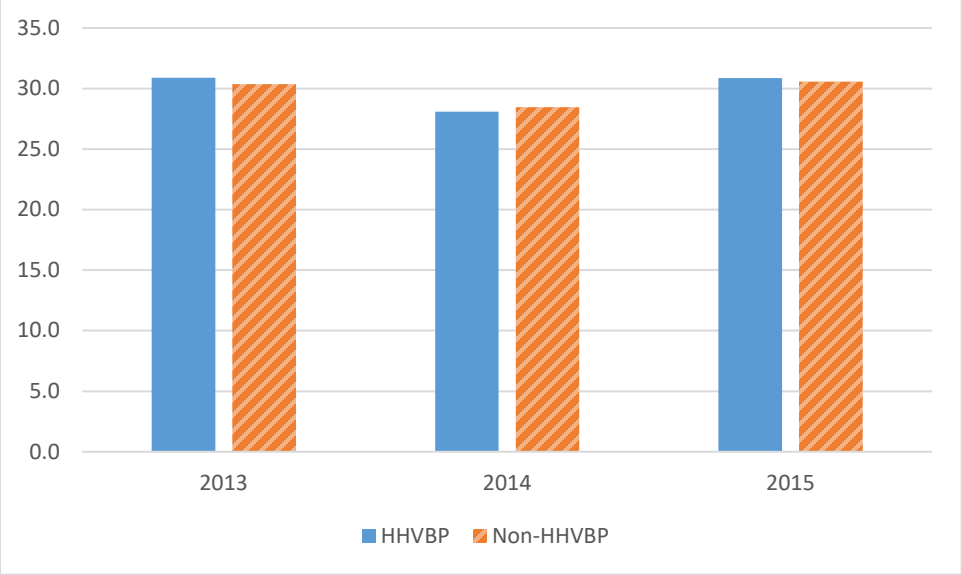
In assessing agency performance on the same measures during this earlier period before the start of the Model, we note that agency TPS scores were similar in HHVBP and non-HHVBP states in each year from 2013 – 2015 (Exhibit 20). These comparisons suggest initial balance in the overall performance of agencies in these two groups prior to the implementation of the HHVBP Model.[13]

The increase in agency TPS scores over time among both HHVBP and comparison agencies – which began in 2015 prior to the implementation of the HHVBP Model (Exhibit 20) – may be an indication that agencies were also responding to other quality of care initiatives, such as the introduction of the CMS Star Ratings program. Nevertheless, the higher TPS scores observed above among agencies in HHVBP states starting in 2016 is consistent with an impact of HHVBP on overall agency performance on the measures that comprise the TPS which appear to extend beyond any effects of pre-existing initiatives such as the Star Ratings program. As data for future performance years become available, we will continue to use TPS scores to compare the overall performance of agencies in HHVBP and non-Model states within each performance year. In doing so, we will also continue to consider the role of any differences in the individual measure scores that comprise the TPS, with an understanding that the relevant measures and their corresponding weights will change starting in the fourth performance year of the Model (2019).

[12] As discussed above, we do not use a D-in-D approach for these analyses since the TPS score already captures changes over time in performance. See Section 2.5 for additional detail.

[13] We note that we do not compare TPS scores during 2013 – 2015 with those observed during 2016 – 2017, since the TPS scores calculated for each performance year under the Model will reflect the use of 2015 as a fixed baseline period, and are therefore not directly comparable starting in 2017 (since the baseline period is no longer the previous year).

Exhibit 20. Average TPS Scores in HHVBP and Non-HHVBP States by Year, 2013 – 2015



3.2 Initial HHVBP Payment Adjustments

CMS used agency TPS scores for 2016 to determine the initial payment adjustments that are being applied for eligible HHAs in the nine HHVBP states starting in CY 2018. These HHVBP agency-specific payment adjustments had a maximum range between -3% and +3% (Exhibit 1). HHVBP agencies received notifications of their preliminary payment adjustments in August 2017. The payment adjustments were then finalized in November 2017, and are being applied to all Medicare FFS home health claims beginning January 1, 2018.

Among the 2,119 HHVBP agencies with at least one Medicare claims-based or OASIS-based home health episode in CY 2016, 1,622 (77%) were eligible to receive a payment adjustment to their FFS claims in CY 2018. The average payment adjustment across HHAs was -0.002%, and ranged from -2.579% to 3%.

For 66% of HHAs in HHVBP states, the payment adjustment ranged between -1% and 1% (Exhibit 21). Among the remaining HHAs, 18% received a payment adjustment lower than -1%, and 16% received a payment adjustment greater than 1%. Relative to other HHAs, the highest performing HHAs which received a 1% to 3% payment adjustment tended to have non-profit ownership, not be affiliated with a chain, and were smaller (Exhibit 21). The lowest performing HHAs which received a -3% to -1% payment adjustment also tended to be smaller than average, but tended to have for-profit ownership. Additional details regarding the distribution of the CY 2018 payment adjustments across HHA characteristics are provided in Exhibit C-9 on Page 91 of the Technical Appendix.

Exhibit 21. HHA Characteristics, by CY 2018 HHA Payment Adjustment Categories

Characteristics	CY 2018 Payment Adjustment Categories				Overall	p-value
	[-3%, -1%]	(-1%, 0%]	(0%, 1%]	(1%, 3%]		
Number of HHAs with a TPS	287	577	494	264	**1,622**	--
% of HHAs in each payment adjustment category	17.7%	35.6%	30.5%	16.3%	**100.0%**	--
Type						
Hospital-based	8.0%	6.7%	10.0%	10.1%	**8.4%**	<0.001
Freestanding	92.0%	93.3%	90.0%	89.9%	**91.6%**	
Ownership						
For profit	74.7%	69.2%	71.7%	65.4%	**70.3%**	<0.001
Nonprofit	20.6%	28.4%	26.2%	33.7%	**27.3%**	
Government owned	4.8%	2.4%	2.1%	0.9%	**2.4%**	
Chain affiliation						
Yes	52.5%	58.7%	66.2%	40.5%	**58.8%**	<0.001
No	46.4%	40.5%	33.7%	53.9%	**40.1%**	
Unknown	1.2%	0.8%	0.2%	5.7%	**1.1%**	
Size: Number of OASIS episodes						
1 – 59	1.2%	0.3%	0.3%	0.9%	**0.4%**	<0.001
60 – 249	8.9%	3.9%	3.9%	13.9%	**5.5%**	
250 – 499	11.8%	6.6%	7.3%	16.3%	**8.4%**	
500 – 999	21.9%	14.5%	14.4%	24.5%	**16.4%**	
≥1,000	56.3%	74.8%	74.1%	44.4%	**69.3%**	
HHA Age						
<4 years	4.7%	2.7%	2.8%	3.5%	**3.1%**	<0.001
4-10 years	24.1%	19.2%	19.4%	28.9%	**20.8%**	
>10 years	71.2%	78.1%	77.8%	67.6%	**76.4%**	

HHA characteristics from CY 2016.

4. Results: Impact of HHVBP on Medicare Utilization

This chapter examines the impact of HHVBP on measures of utilization. ***We found evidence of a statistically significant overall impact of the HHVBP Model for the claims-based utilization measures*** that apply to FFS beneficiaries receiving home health services. The D-in-D results indicate an overall tendency for relative declines in certain forms of utilization under HHVBP, including unplanned hospitalizations (i.e., both among first and all home health episodes in a sequence) and use of SNFs, of approximately 0.2 to 0.3 percentage points. However, we also observe a relative *increase* in ED utilization of a similar magnitude under HHVBP (0.2 percentage points), which reflects a convergence of slightly lower rates among beneficiaries in HHVBP states prior to implementation of HHVBP towards those observed in non-HHVBP states. We note these findings reflect behavior of HHAs that occurs during the first two years of the Model, but precedes the application of the initial payment adjustments, which began in CY 2018. These changes in utilization might contribute to our findings for Medicare spending measures (which are presented in the following chapter). We present detailed findings on the impact of HHVBP on the utilization measures below.

4.1 FFS Claims-Based Utilization Measure Rates, Pre- and Post- HHVBP Implementation

Before presenting our D-in-D findings, we present descriptive information on the FFS claims-based utilization measures (Exhibit 22) that both allow baseline comparisons between HHVBP and non-HHVBP states and can provide valuable context for interpreting model estimates of the relative changes occurring under HHVBP. The unadjusted pre-HHVBP (2013 – 2015) values are relatively similar between the HHVBP states and non-HHVBP states for most of the utilization measures, particularly for the HHVBP measures (italicized in Exhibit 22). At the start of HHVBP, ED utilization among HHVBP states was slightly lower compared to non-HHVBP states, but converged to rates similar to those of non-HHVBP states during 2016-2017.

In the context of our D-in-D approach, we also examined baseline trends in these claims-based measures to assess the validity of our assumption of parallel trends in HHVBP and non-HHVBP states. The results of these analyses suggest that trends in these claims-based measure rates between the two groups were parallel prior to the implementation of HHVBP such that the non-HHVBP population is a plausibly valid representation of the counterfactual for the evaluation. (Details are shown in Section A.1.4 on Page 12 of the Technical Appendix).

Exhibit 22. Baseline and Performance Period Means for FFS Claims-Based Health Care Utilization Measures, All HHVBP States and Non-HHVBP States

Measure	HHVBP States 2013-2015	Non-HHVBP States 2013-2015	HHVBP States 2016	Non-HHVBP States 2016	HHVBP States 2017	Non-HHVBP States 2017
*ED Use (no Hospitalization)/First FFS HH Episodes**	11.7%	12.3%	12.6%	12.7%	12.9%	13.0%
*Unplanned Acute Care Hospitalization/First FFS HH Episodes**	15.7%	16.3%	16.3%	16.5%	15.8%	15.8%
Unplanned Acute Care Hospitalization/All FFS HH Episodes	17.0%	15.9%	16.8%	15.6%	17.1%	15.9%
Unplanned Hospital Readmission in the First 30 Days of HH Care	13.0%	13.0%	13.0%	13.2%	12.2%	12.1%
ED Use Following Hospitalization (without Hospital Readmission) in the First 30 Days of HH Care	9.7%	10.0%	10.1%	10.4%	10.1%	10.5%
SNF Use /All FFS HH Episodes	4.9%	4.0%	5.0%	4.2%	5.0%	4.2%

** Key Impact Measure | HHVBP Measures indicated by italic text.*

See Exhibit 22n on Page 81 of the Technical Appendix for each measure's sample size.

4.2 Mixed Findings for HHVBP's Effect on FFS Claims-Based Utilization Measures

We examined potential effects of HHVBP on several claims-based measures of utilization associated with or following home health episodes. Most of these measures can be interpreted as indicators of the quality of home health care in that higher quality care may result in fewer hospitalizations, ED visits or subsequent admissions to SNF. The measures examined include both of the claims-based measures used in the calculation of the TPS: ED Use and Unplanned ACH Admissions among First Home Health Episodes. We also examined other measures of hospitalization, ED, and SNF use. Overall, we found the cumulative impact of the HHVBP Model over 2016 – 2017 to involve decreases in utilization for most of these measures but more mixed findings for the two measures of ED use (Exhibit 23).

For the two measures used in the TPS calculation, HHVBP led to a 0.22 percentage point increase in ED utilization and a 0.21 percentage point decrease in unplanned hospitalizations among FFS home health beneficiaries in HHVBP states relative to non-HHVBP states after the first two years of the Model (Exhibit 23). These cumulative effects translate to a 1.9% increase from the baseline average ED use of 11.7% and a 1.3% decrease from average unplanned hospitalizations in HHVBP states during the baseline period rate of 15.7% (Exhibit 23). The D-in-D estimate for ED utilization reflects the HHVBP states' lower ED utilization rates in the baseline period converging to those of non-HHVBP states post-HHVBP (Exhibit 22), a trend that we will continue to monitor in future years. We observed no change in the other publicly reported measure that examined ED use (i.e., ED Use following Hospitalization within the First 30 Days of Home Health Care). See Section A.2 on Page 28 of the Technical Appendix for additional detail on how the two measures of ED use differ.

We estimated a similar reduction for unplanned hospitalizations among all home health episodes (as opposed to only among first home health episodes). As with the hospitalization during first episode measure, estimates of the relative decline in this measure were similar in magnitude (-0.27 percentage points), corresponding to a 1.6% relative decrease from the average during the baseline period. We also found evidence of a decline for a related measure of hospitalization – unplanned hospital readmissions

within the first 30 days of home health care – which had a similar impact estimate (-0.29 percentage points). This estimate corresponds to a 2.2% relative reduction in the average unplanned hospital readmissions in HHVBP states during the baseline period of 13.0%. There was a similar relative decline in SNF use among home health FFS beneficiaries in HHVBP states of 0.21 percentage points compared to those in non-HHVBP states.

For these claims-based utilization measures, the separate D-in-D estimates for 2016 and 2017 were largely consistent with the cumulative results. The exception is unplanned hospitalization among first home health episodes and unplanned hospital readmission within the first 30 days of care. For these two measures, the yearly D-in-D estimates indicated reductions due to HHVBP in 2016 but no statistically significant changes in 2017 (e.g., the D-in-D estimates for unplanned hospitalization among first episodes were -0.30% in 2016 and -0.13% in 2017).

Exhibit 23. Impact of the HHVBP Model on FFS Claims-Based Utilization Measures

	Model Estimates				Average in HHVBP States, Baseline (2013 – 2015)	% Relative Change
	D-in-D	p-value	Lower 90% CI	Upper 90% CI		
ED Use (no Hospitalization)/First FFS HH Episodes						
2016	0.23%	0.001	0.12%	0.35%	11.7%	2.0%
2017	0.22%	0.01	0.09%	0.34%		1.8%
Cumulative	0.22%	<0.001	0.12%	0.33%		1.9%
Unplanned Acute Care Hospitalization/First FFS HH Episodes						
2016	-0.30%	0.001	-0.44%	-0.15%	15.7%	-1.9%
2017	-0.13%	0.16	-0.28%	0.02%		-0.8%
Cumulative	-0.21%	0.01	-0.33%	-0.08%		-1.3%
Unplanned Acute Care Hospitalization/All FFS HH Episodes						
2016	-0.28%	<0.001	-0.40%	-0.15%	17.0%	-1.6%
2017	-0.26%	0.002	-0.40%	-0.12%		-1.6%
Cumulative	-0.27%	<0.001	-0.38%	-0.15%		-1.6%
Unplanned Hospital Readmission in the First 30 days of HH Care						
2016	-0.46%	<0.001	-0.65%	-0.26%	13.0%	-3.5%
2017	-0.10%	0.44	-0.30%	0.11%		-0.7%
Cumulative	-0.29%	0.004	-0.45%	-0.12%		-2.2%
ED Use Following Hospitalization (without Hospital Readmission) in the First 30 Days of HH Care						
2016	0.10%	0.29	-0.06%	0.26%	9.7%	1.1%
2017	-0.03%	0.78	-0.20%	0.15%		-0.3%
Cumulative	0.04%	0.64	-0.10%	0.18%		0.4%
SNF Use/All FFS HH Episodes						
2016	-0.19%	<0.001	-0.24%	-0.13%	4.9%	-3.9%
2017	-0.22%	<0.001	-0.29%	-0.15%		-4.5%
Cumulative	-0.21%	<0.001	-0.26%	-0.15%		-4.2%

HHVBP Measures indicated by italic text. CI= Confidence Interval. Shading indicates significance at the p<0.05 level. See Exhibit 23n on Page 81 of the Technical Appendix for each measure's sample size.

4.2.1 Persisting Differences in Claims-Based Utilization Measures among Patient Subgroups

One of the goals of this evaluation is to assess whether there is heterogeneity in the effects of HHVBP. As one potential source of heterogeneity, some agencies may be better positioned to respond to the incentives under the Model, whether due to factors such as already ongoing activities, their staffing, or other organizational resources. As a result, there might be initial impacts of HHVBP that occur among a subset of agencies or beneficiaries rather than more broadly. Such heterogeneity could also lead to emerging or widening differences across agencies in quality of care.

A differential impact of HHVBP could also pose risks to vulnerable populations with regard to access to care or quality of care. For example, such an unintended consequence of the Model might arise if some providers perceive higher performance levels as being more difficult to achieve with some beneficiaries, who they consequently may seek to avoid. As a result, there is interest in evaluating trends for vulnerable patient populations and for patients receiving care from different types of agencies that may not have a uniform response to HHVBP.

As an initial approach for analysis, we identified subgroups of home health patients for whom there were differences in the two claims-based measures used in the TPS calculation prior to the implementation of HHVBP, and explored whether these differences are changing during the first two years following implementation. We plan to expand such analyses in future reports, once HHVBP has been in place for a longer period of time and we can observe any potential impacts of the payment adjustments that are in effect starting in 2018.

For this Annual Report, we describe trends in unplanned hospitalizations and ED utilization (both among first home health episodes only) for two types of beneficiary subgroups having differing measure rates during the baseline period: beneficiaries living in a rural versus urban area, and beneficiaries receiving care from smaller versus larger agencies. We determined a beneficiary's rural status based on whether they resided in a county that was designated as rural, as described in Section A.2.1 on Page 28 of the Technical Appendix.[14] To examine trends by agency size, we stratified patients into two subgroups according to whether they received care from agencies that provided fewer than 500 OASIS-based home health episodes, or 500 or more such episodes during the CY.

Based on data for FFS beneficiaries receiving home health care during 2013 – 2017, we found higher rates of unplanned hospitalizations among rural beneficiaries in both HHVBP and non-HHVBP states (Exhibit 24). These differences remained relatively similar both before and after implementation of HHVBP, ranging from 0.9 to 1.5 percentage points higher among rural beneficiaries in HHVBP states and from 0.3 to 0.8 percentage points higher among rural beneficiaries in non-HHVBP states. Trends in ED use by beneficiary rurality are similar (Exhibit 25). While ED use not resulting in a hospitalization increased over time for both rural and urban beneficiaries as well as across both HHVBP and non-HHVBP episodes, we found ED use remained approximately 2.0 to 2.7 percentage points higher for rural beneficiaries in comparison to urban beneficiaries. These results indicate differences in both unplanned hospitalizations and ED use between rural and urban beneficiaries prior to the implementation of the HHVBP Model that we observe persisting through the first two years post-implementation.

[14] We note that a beneficiary's rural status may not necessarily be consistent with their agency's rural status. For example, an agency located in an urban area can serve beneficiaries who reside in both urban and rural areas.

Exhibit 24. Unplanned Acute Care Hospitalization/First FFS HH Episodes, by FFS HH Beneficiary Rurality

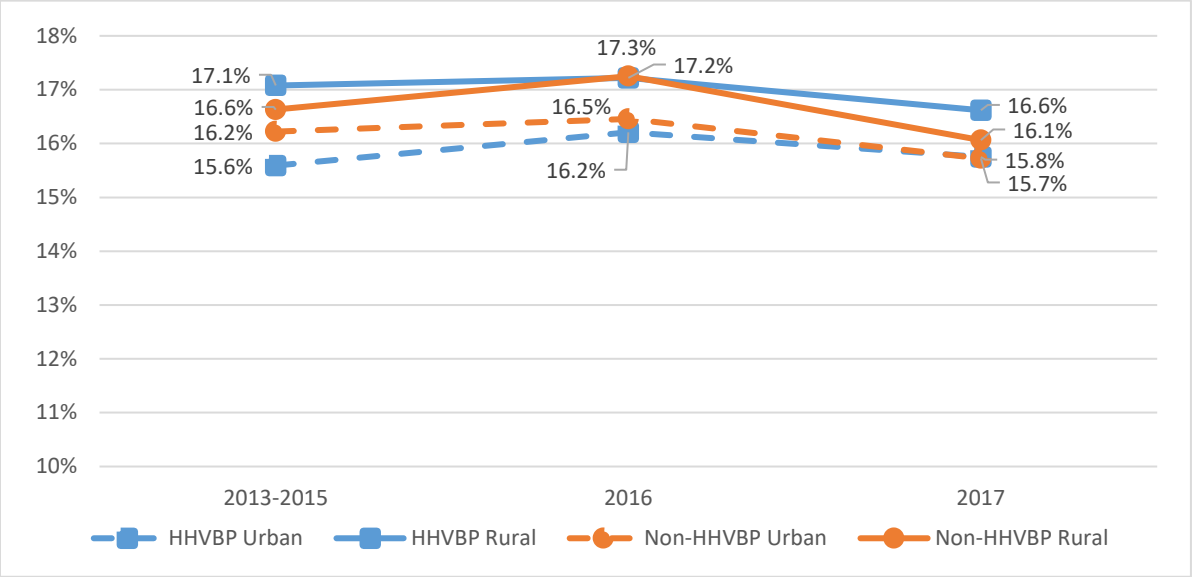
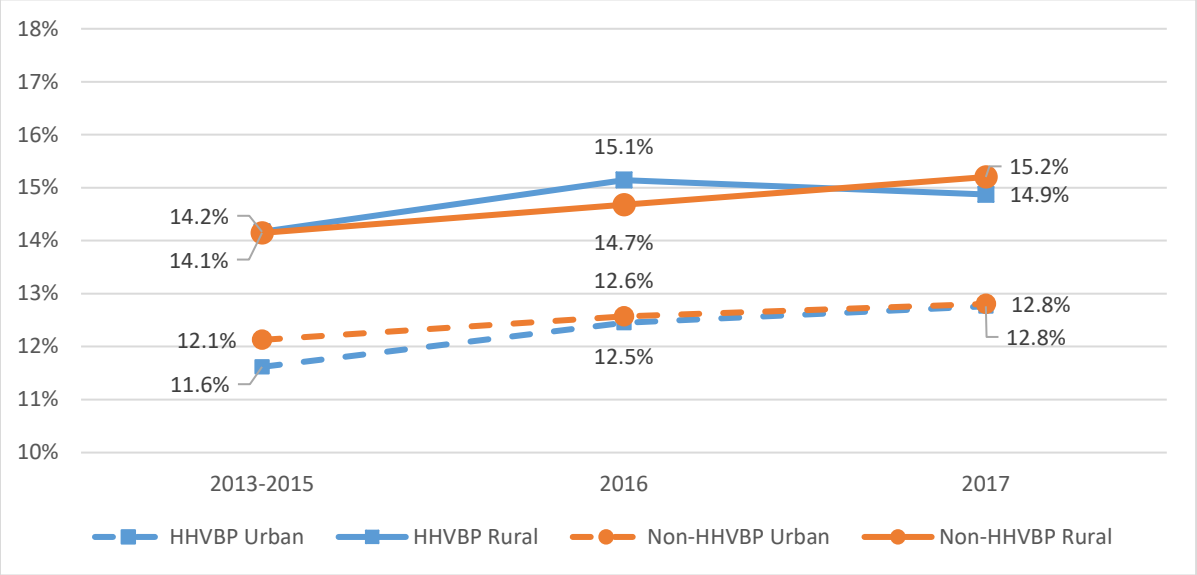


Exhibit 25. ED Use (no Hospitalization)/First FFS HH Episodes, by FFS HH Beneficiary Rurality



We also found baseline differences by agency size in both unplanned hospitalizations and ED use to persist over time (Exhibits 26 and 27). Over the baseline period and the first two years of HHVBP, unplanned hospitalizations among beneficiaries in agencies having 500 or more OASIS episodes in a year were 1.9 to 3.6 percentage points higher in HHVBP states and 3.0 to 3.1 percentage points higher in non-HHVBP states. Trends in ED use are similar, with higher ED use among beneficiaries receiving care from larger agencies persisting through the first two years post-implementation in both HHVBP and non-HHVBP states.

Exhibit 26. Unplanned Acute Care Hospitalization/First FFS HH Episodes, by Agency Size

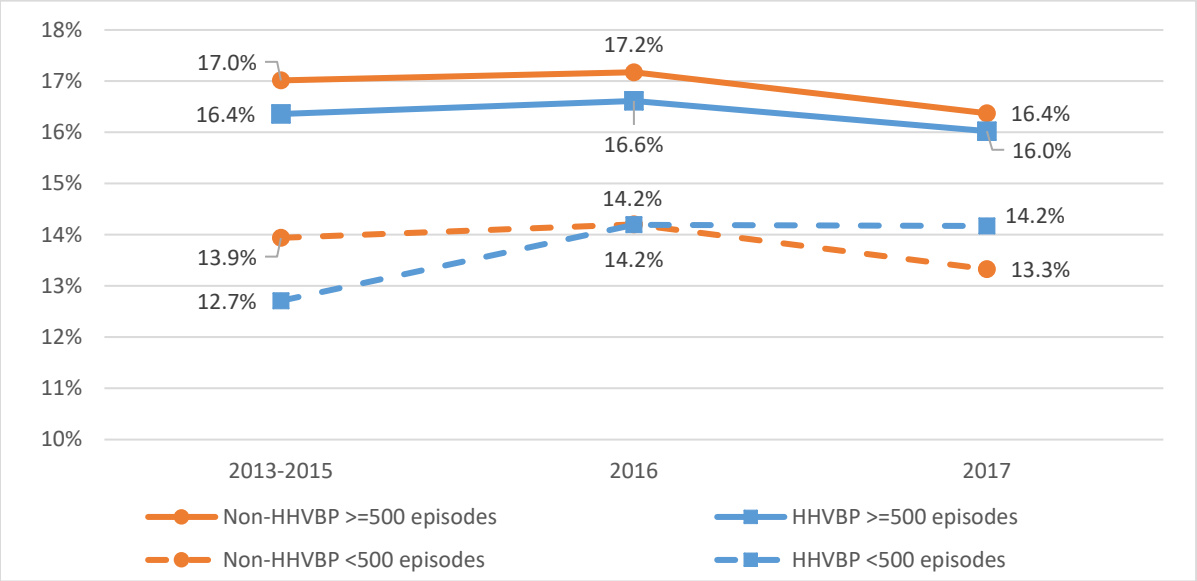
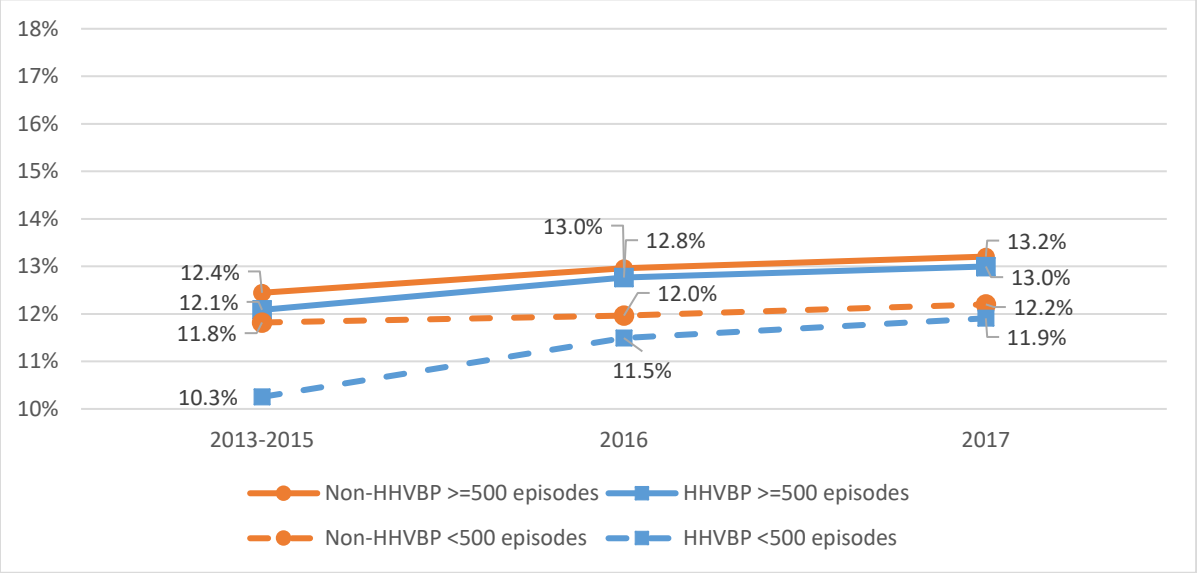


Exhibit 27. ED Use (no Hospitalization)/First FFS HH Episodes, by Agency Size



We used a similar approach to compare trends in unplanned hospitalizations and ED use based on other selected factors that included beneficiary age, race, and dual eligible status. Our findings tended to be similar, in that any differences by patient subgroup in the baseline period largely persisted through 2017 (not shown). In future reports, we will consider expanding our focus to include other impact measures as well as other beneficiary and agency subgroups of interest. The priorities for such analyses will likely be informed by other quantitative and qualitative findings.

5. Results: Impact of HHVBP on Medicare Spending

By design, the HHVBP Model aims to incentivize higher quality of care by HHAs, with an expectation that improvements in home health care have potential to reduce preventable hospital admissions and other forms of health care utilization associated with poor quality. At the same time, it is important to account for whether the Model may have inadvertently increased spending for other types of services. Accordingly, in this chapter we examine potential effects of HHVBP on several measures of Medicare spending to provide an early high-level view of whether the HHVBP Model is accomplishing one of its aims.

Overall, we found ***declines in Medicare spending for FFS beneficiaries receiving home health services*** through the first two years of the Model. We observed an approximately 1% decline in average Medicare expenditures per day for FFS beneficiaries receiving home health services in HHVBP states relative to Medicare expenditures pre-HHVBP (i.e., 2013 – 2015), for both measures of total Medicare spending during home health episodes and of total Medicare spending during and within 30 days following home health episodes. For these two spending measures, the negative D-in-D estimates reflect HHVBP effects that reduced the rate of growth in total Medicare spending. The average annual reduction in total Medicare spending during and within 30 days following home health episodes is $114 million.

Much of these declines may reflect savings related to hospitalization, as we found HHVBP to result in a 3.9% decline in average Medicare expenditures for unplanned hospitalizations among FFS beneficiaries receiving home health services in HHVBP states relative to average expenditures during 2013 – 2015, translating to an average annual reduction of $88 million during the first two years of the HHVBP Model. As discussed in the previous chapter, we observed modest declines in utilization for unplanned hospitalizations and SNF use that together might contribute to our findings for the spending measures. Given our other quantitative and qualitative findings, we also need to consider the potential sources of decreases in spending that could be attributable to HHVBP. To the extent HHVBP may be an extension or modifier of currently existing quality improvement efforts, we must consider how the Model may have achieved cost savings. At the same time, our D-in-D estimate for ED use suggests one potential offset to these decreases in expenditures. As the evaluation proceeds, it will be important to understand how the use of other types of services among home health beneficiaries and their associated costs to Medicare may have been influenced by the Model.

Below, we provide an overview of the spending measures analyzed in this report, followed by measure values over time and our D-in-D results.

5.1 Overview of Medicare Spending Measures

To assess effects of HHVBP on Medicare spending, we constructed three related measures of total Medicare spending for FFS beneficiaries receiving home health care. The first measure—**Average Medicare Spending per Day during FFS Home Health Episodes of Care—**reflects Medicare Part A and Part B expenditures occurring during or shortly after the time period in which Medicare FFS patients are under the active care of an HHA.[15] Although agencies are paid on a per-episode basis, not all home

[15] We define "during home health episodes of care" as the time period between home health claim start date through a) the last visit date reported on the FFS claim plus seven days, or b) the start of the next home heath episode. See Section A.2.2 on Page 35 of the Technical Appendix for more detail.

health episodes are of equal duration (e.g., a full 60-day home health episode has a two-fold longer time period to accumulate expenditures compared to that of a 30-day home health episode). To account for this variation in episode length, we calculated average Medicare spending per day to obtain comparable estimates. Because the measure includes expenditures seven days after the date of the last home visit, it includes expenditures for inpatient hospitalizations that occurred concurrently with the home health episode of care.

The second measure—**Average Medicare Spending per Day following FFS Home Health Episodes of Care**—reflects "downstream" Medicare Part A and Part B expenditures for up to 30 days following the time period in which Medicare FFS patients were considered to be under the active care of an HHA.[16] By extending the window by 30 days, this measure captures expenditures associated with any hospitalizations occurring shortly after a home health episode ends (as well as post-acute care expenditures that may following the hospitalization).

The final total spending measure—**Average Medicare Spending per Day during and following FFS Home Health Episodes of Care**—is calculated by combining the two previous measures. Among the home health episodes used to calculate Medicare spending during the home health episode, approximately 60% had no subsequent home health episode, such that we were able to also examine a second measure that reflects Medicare spending immediately following home health care. For the remaining approximately 40% of home health episodes, the beneficiary had died or lost FFS Part A eligibility, or there was a subsequent home health episode within seven days such that no post-home health spending could be examined for that episode. Accordingly, for these home health episodes, this combined measure reflects spending only during the home health episode.

Finally, we also defined a spending measure that corresponds to a key component of the overall cost to Medicare for FFS beneficiaries receiving home health care: unplanned hospitalizations. This measure reflects the costs associated with the unplanned hospitalizations among all FFS home health episodes which were examined above, and was calculated on a per-day basis to be comparable with the other spending measures.

5.2 FFS Claims-Based Medicare Spending, Pre- and Post- HHVBP Implementation

Exhibit 28 presents descriptive information on the FFS claims-based spending impact measures pre- and post-HHVBP to allow comparisons between HHVBP and non-HHVBP states. Average Medicare spending per day during the home health episode of care (which affects two of our spending measures) increased during the baseline period in both groups, but rose at a somewhat lower rate in HHVBP states relative to non-HHVBP states when adjusting for model covariates (see Exhibit A-6 on Page 17 of the Technical Appendix for a comparison of trends in spending between the two groups, and Exhibits C-1 and C-2 on Pages 77-80 in the Technical Appendix for unadjusted annual means for 2013-2017 for the two

[16] We define "following home health episodes of care" as the time period between the day that the beneficiary is no longer under the active care of a HHA through a) a 30-day lookout period, or b) a new home health episode begins. In the event that another episode starts before the full lookout period, the time window is truncated. See Section A.2.2 on Page 35 of the Technical Appendix for more detail.

groups).[17] Because results from our falsification tests suggest a lack of parallel trends between the HHVBP states and the non-HHVBP states during the baseline period, we incorporated state-specific linear time trends for both the HHVBP and comparison group states in our analyses for these measures (see Section A.1.4.3 on Page 14 of the Technical Appendix for additional detail). With this approach, the D-in-D estimator measures the difference in the deviation from the trend line between the HHVBP and comparison group in the post-HHVBP period.

Exhibit 28. Baseline and Performance Period Means for FFS-Claims Based Spending Measures, All HHVBP States and Non-HHVBP States

Measure	HHVBP States 2013-2015	Non-HHVBP States 2013-2015	HHVBP States 2016	Non-HHVBP States 2016	HHVBP States 2017	Non-HHVBP States 2017
Average Medicare Spending per Day for Unplanned Acute Care Hospitalization among all FFS HH Episodes*	$33.58	$32.15	$32.41	$31.10	$33.77	$32.29
Average Medicare Spending per Day during and following FFS HH Episodes of Care*	$138.33	$131.61	$143.18	$137.35	$146.09	$141.22
Average Medicare Spending per Day during FFS HH Episodes of Care*	$150.59	$135.33	$155.47	$142.16	$158.66	$146.88
Average Medicare Spending per Day following FFS HH Episodes of Care*	$106.01	$116.58	$110.69	$119.50	$113.14	$121.44

** Key Impact Measure | See Exhibit 28n on Page 82 of the Technical Appendix for each measure's sample size.*

5.3 Reductions in Medicare Spending

We find a statistically significant decline in average daily Medicare spending for unplanned hospitalizations among FFS beneficiaries receiving home health care in HHVBP states relative to non-HHVBP states, cumulatively as well as individually for 2016 and 2017. Our cumulative D-in-D estimate (which incorporates state-specific linear time trends) indicates a reduction in average Medicare spending per day for unplanned hospitalizations of $1.30 (Exhibit 29). Average daily Medicare spending for unplanned hospitalizations in HHVBP states was $33.58 at baseline, such that the D-in-D estimate translates to a 3.9% reduction in spending. Based on the D-in-D estimate of -$1.30 for total Medicare spending per day for unplanned acute care hospitalizations among FFS home health episodes, the estimated average annual savings among FFS beneficiaries receiving home health services were $88 million during 2016-17.

[17] Consistent with the downward trend in home health FFS episodes over time that we report in Exhibit 8 above, the number of FFS home health episodes that comprise each of these measures also has decreased throughout the baseline period 2013-2015) and the first two years of the Model (see Exhibit 28n on Page 81 of the Technical Appendix).

Exhibit 29. Impact of the HHVBP Model on FFS Claims-Based Spending Measures

Measure	Model Estimates				Average in HHVBP States, Baseline (2013 – 2015)	% Relative Change
	D-in-D	p-value	Lower 90% CI	Upper 90% CI		
Average Medicare Spending per Day for Unplanned Acute Care Hospitalizations among all FFS HH Episodes						
2016	-$1.30	<0.001	-$1.69	-$0.90	$33.58	-3.9%
2017	-$1.47	<0.001	-$2.06	-$0.87		-4.4%
Cumulative	-$1.30	<0.001	-$1.70	-$0.90		-3.9%
Average Medicare Spending per Day during and following FFS HH Episodes of Care						
2016	-$1.28	0.003	-$1.98	-$0.59	$138.33	-0.9%
2017	-$2.04	0.002	-$3.12	-$0.95		-1.5%
Cumulative	-$1.30	0.002	-$1.99	-$0.60		-0.9%
Average Medicare Spending per Day during FFS HH Episodes of Care						
2016	-$1.03	0.03	-$1.81	-$0.25	$150.59	-0.7%
2017	-$1.80	0.02	-$3.07	-$0.54		-1.2%
Cumulative	-$1.04	0.03	-$1.83	-$0.25		-0.7%
Average Medicare Spending per Day following FFS HH Episodes of Care						
2016	-$0.47	0.51	-$1.66	$0.71	$106.01	-0.4%
2017	-$0.01	0.99	-$1.70	$1.67		-0.0%
Cumulative	-$0.52	0.47	-$1.70	$0.67		-0.5%

CI= Confidence Interval. Shading indicates significance at the p<0.05 level.
These models include state-specific linear time trends (See Section A.1.4 on Page 12 of the Technical Appendix for more details). | See Exhibit 29n on Page 82 of the Technical Appendix for each measure's sample size.

We also found reductions in Medicare spending for two of the Medicare total spending measures (Exhibit 29). The cumulative D-in-D estimates suggest that HHVBP led to a $1.30 reduction in average daily Medicare spending during and following home health episodes among FFS beneficiaries in HHVBP states, relative to non-HHVBP states, which corresponds to a 0.9% decrease compared to HHVBP levels observed for 2013-15. This D-in-D estimate translates to an estimated average annual savings among FFS beneficiaries receiving home health services of $114 million during 2016-17. This estimate corresponds to savings to the Medicare program occurring from the beginning of the home health episode through up to 30 days after home health care (i.e., through 37 days following the date of the last home health visit).

The cumulative D-in-D results for average daily Medicare spending during the FFS home health episode were relatively similar in magnitude to those of the combined spending measure (e.g., -$1.04 vs. -$1.30, respectively), and corresponds to a 0.7% decline relative to pre-HHVBP levels (Exhibit 29). Based on the D-in-D estimate of -$1.04 for the measure of total Medicare spending per day during home health care, the estimated average annual savings among FFS beneficiaries receiving home health services were $65 million during 2016-17. This estimate corresponds to savings occurring from the beginning of the home health episode through up to seven days after the last home health visit. D-in-D estimates for average daily Medicare spending *following* home health episodes are smaller and not statistically significant.

Overall, the D-in-D estimates for the total spending measures suggest relatively slower growth in average spending per day in HHVBP states compared to non-HHVBP states occurring as a result of HHVBP. The separate D-in-D estimates for 2016 and 2017 were largely consistent with the cumulative results. For three of the four Medicare spending measures, the D-in-D estimates suggest somewhat larger reductions in spending due to HHVBP in 2017 than in 2016.

For additional context, we interpret these results for the spending measures in relation to our findings above for the claims-based quality measures. The observed effect of HHVBP in reducing the frequency of unplanned hospitalizations (as shown in Exhibit 23) would be expected to contribute to declines in both spending on unplanned hospitalizations and in total spending. Furthermore, the unplanned acute care hospitalization spending measure closely corresponds to the unplanned acute care hospitalization utilization measure for all FFS home health episodes. Similarly, the relative declines in SNF use among FFS home health beneficiaries in HHVBP states represent another possible source of overall cost savings for Medicare that would be reflected in the total Medicare spending measures. In contrast, the observed increases in ED use in HHVBP states would be unlikely to offset cost savings in areas such as those noted above due to the relatively small expenditures associated with ED use relative to hospitalizations.

6. Results: Impact of HHVBP on OASIS-Based Quality Measures

This chapter presents findings on the impact of HHVBP on 15 OASIS-based quality measures, including eight outcome measures and seven process measures. As we describe in further detail below, most but not all of these measures which are examined in this chapter were used as HHVBP performance measures. Our findings for most of the OASIS-based quality measures show a positive impact of HHVBP, reflecting a general tendency towards relative increases in the improvement and process measures in HHVBP states relative to non-HHVBP states of approximately one percentage point. These relative gains occurred in a context where average measure achievement rates tended to be close to 70% for the improvement measures and tended to exceed 90% for process measures prior to implementation of HHVBP. In particular, for the seven improvement measures examined, these relative gains occurred in the context of increases in measure rates that were already occurring in both groups prior to the launch of HHVBP and may in part reflect the response of agencies to other public reporting initiatives.

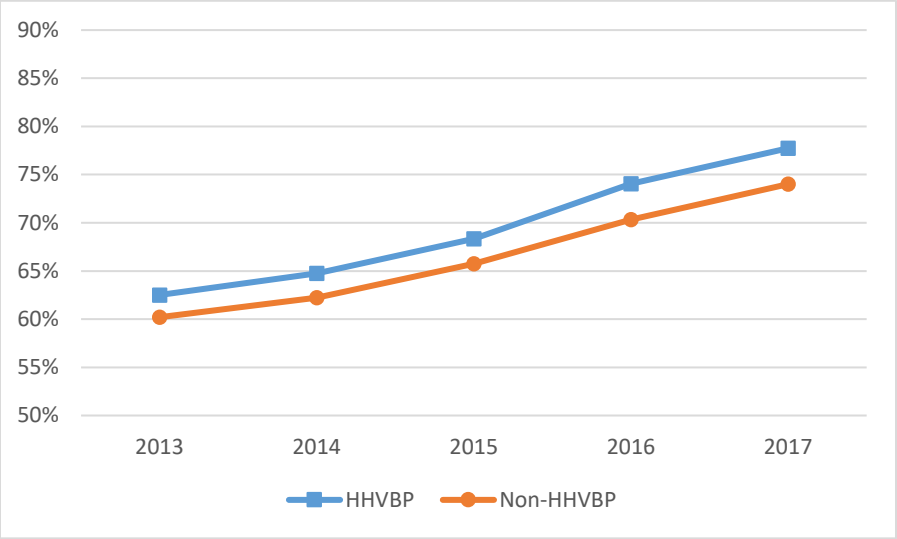
Additionally, our analyses of trends in patient status based on OASIS assessments indicate that the overall gains over time in improvement occurring in both HHVBP and non-HHVBP states at least partly reflect lower scoring of reported patient status at admission rather than attainment of higher functioning levels over time among patients at discharge over time. These findings may reflect the increased attention of agencies on OASIS reporting and documentation, as mentioned during our interviews with HHA representatives in 2017 and in 2018. In both years, nearly all HHAs mentioned quality improvement efforts for OASIS assessment. For each OASIS-based improvement measure that we examined, our D-in-D analyses capture the relative improvement occurring among patients in HHVBP states while accounting for changes over time in the corresponding levels of functioning reported by HHAs at the time of their initial assessment for each patient. Together, the results of our D-in-D analyses of OASIS-based impact measures and agency interviews suggest a modest effect of HHVBP on the care being provided to home health patients.

Below, we present trends in measure values over time – including the underlying patient status reported by agencies at the start of the home health episode, which is used to calculate the measure rates – followed by our D-in-D findings.

6.1 OASIS-Based Quality Measures, Pre- and Post- HHVBP Implementation

Among the seven OASIS-based measures of improvements in patient status that we examine, we have seen a general trend towards increasing rates of improvement over time in both HHVBP and non-HHVBP states that began before HHVBP was implemented in 2016. This is illustrated for the measure of improvement in ambulation measure in Exhibit 30, where measure rates for the two groups increased during both the baseline period and after implementation of HHVBP.

Exhibit 30. Improvement in Ambulation-Locomotion, 2013 – 2017



Trends for the other five OASIS-based outcome improvement measures that are used in the TPS generally follow a similar pattern (Exhibit 31). For most of these measures, there is also a tendency for increases in measure rates to accelerate starting in 2015, for both the HHVBP and non-HHVBP groups. For the remaining OASIS-based outcome measure that is not used as an HHVBP performance measure (Improvement in Status of Surgical Wound), there have been smaller increases over time for both groups. Increases for this measure were likely constrained by the relatively high baseline measure rates that were already approaching or above 90% for the two groups (Exhibit 31). Similar to the OASIS-based outcome measures, Exhibit 31 also shows that performance rates increased for the OASIS-based process measures in both HHVBP and non-HHVBP states through the second year of the HHVBP Model implementation.

Exhibit 31. Baseline and Performance Period Means for OASIS-Based Impact Measures, All HHVBP States and Non-HHVBP States

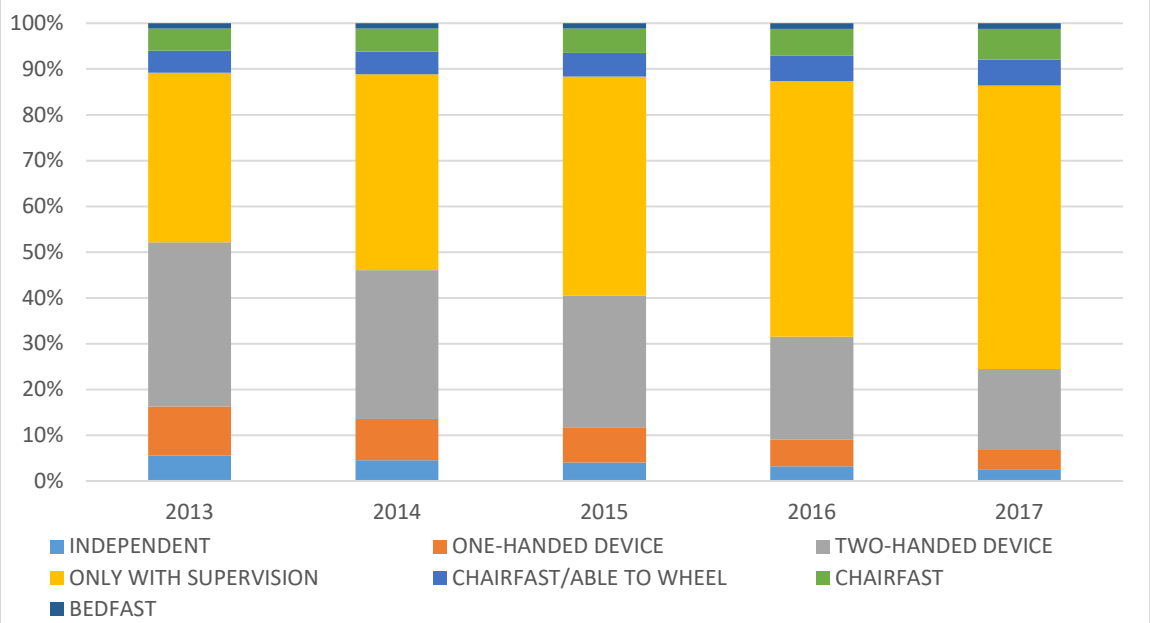
Measure	HHVBP States 2013-2015	Non-HHVBP States 2013-2015	HHVBP States 2016	Non-HHVBP States 2016	HHVBP States 2017	Non-HHVBP States 2017
OASIS-Based Outcome Quality Measures						
*Discharged to Community**	72.8%	70.1%	72.9%	71.0%	72.8%	71.3%
*Improvement in Ambulation-Locomotion**	65.2%	62.8%	74.0%	70.3%	77.7%	74.0%
Improvement in Bathing	70.5%	68.0%	76.5%	73.6%	79.6%	76.6%
Improvement in Bed Transferring	61.1%	58.4%	71.8%	67.0%	77.6%	72.4%
Improvement in Dyspnea	66.7%	66.1%	74.9%	72.2%	79.5%	76.2%
Improvement in Management of Oral Medications	51.5%	53.9%	61.6%	60.8%	67.5%	65.3%
Improvement in Pain Interfering with Activity	70.7%	67.7%	76.7%	73.6%	80.3%	77.1%
Improvement in Status of Surgical Wounds	90.3%	89.2%	91.4%	90.3%	92.2%	90.7%
OASIS-Based Process Quality Measures						
Drug Education on Medications Provided to Patient/Caregiver during Episodes of Care	91.9%	92.2%	95.4%	94.8%	96.2%	95.7%
Influenza Immunization Received for Current Flu Season	61.8%	64.9%	64.9%	64.1%	67.6%	66.8%
Pneumococcal Polysaccharide Vaccine Ever Received	66.1%	68.2%	72.9%	72.6%	74.2%	74.3%
Depression Assessment Conducted	95.8%	95.2%	96.1%	95.7%	95.9%	95.3%
Diabetic Foot Care and Patient / Caregiver Education Implemented during All Episodes of Care	92.5%	94.1%	94.7%	95.6%	95.6%	96.0%
Multifactor Fall Risk Assessment Conducted for All Patients who Can Ambulate	98.3%	98.4%	99.0%	98.9%	99.0%	99.0%
Timely Initiation of Care	92.6%	89.8%	93.4%	91.0%	93.9%	91.5%

** Key Impact Measure | HHVBP Measures indicated by italic text. | See Exhibit 31n on Page 83 of the Technical Appendix for each measure's sample size.*

6.1.1 Trends in Functional Status on Initial OASIS Assessments

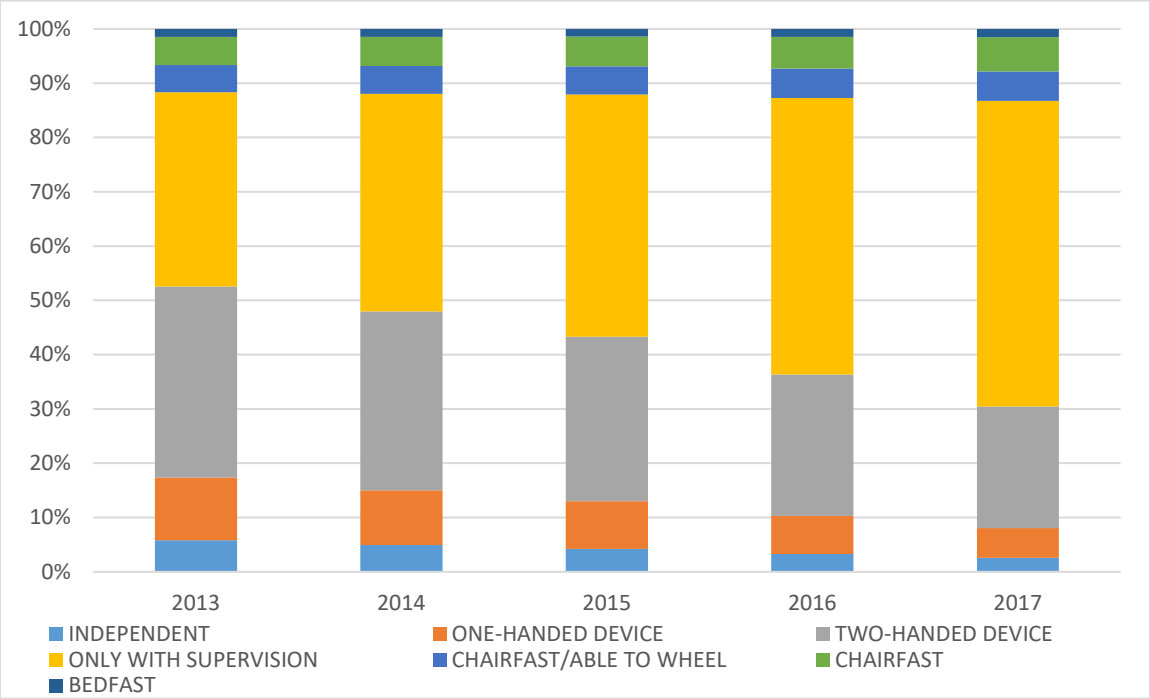
Given the underlying trends in OASIS outcome measures that began prior to implementation of HHVBP (Exhibit 31), we also examined patient functional status at the initial and final OASIS assessments for select OASIS measures over the same time period. We found that, on average, functional status at the initial OASIS assessment for several measures declined between 2013 and 2017, and that the trend started prior to the implementation of HHVBP. This change over time for the OASIS ambulation measure is illustrated in Exhibit 32, but we observed similar trends for other OASIS outcome measures where the magnitude of the shifts over time depends on the number of categories for the OASIS item.

Exhibit 32. Initial OASIS Assessment for Ambulation in HHVBP States, 2013 – 2017



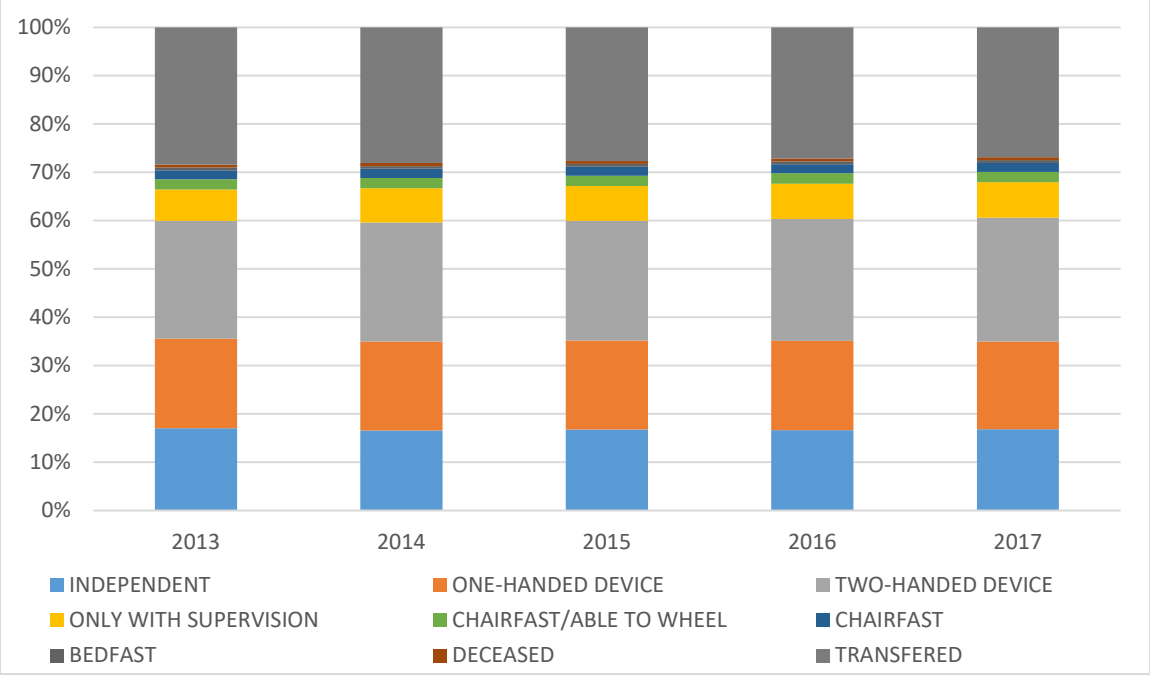
We found that this pattern of declining ambulation status at the initial OASIS assessment was also present among home health episodes in non-HHVBP states between 2013 and 2017 (Exhibit 33). We observed similar trends for other measures of initial patient status, such as bed transferring, bathing, and management of oral medications (See Exhibit C-10 on Page 92 of the Technical Appendix). These OASIS assessment measures also showed declines in the lowest levels of needed assistance and increases in the higher levels of needed assistance.

Exhibit 33. Initial OASIS Assessment for Ambulation in Non-HHVBP States, 2013 – 2017



Unlike initial OASIS assessments, final OASIS assessments for ambulation demonstrate stability over the same period, for episodes in HHVBP states, as shown in Exhibit 34, and non-HHVBP states (not shown).

Exhibit 34. Final OASIS Assessment for Ambulation in HHVBP States, 2013 – 2017



Based on these results, it appears that overall improvements in some of the OASIS measures over time may be largely a function of patients' lower functioning at the initial assessment rather than higher functioning at the end of care. This may be a reflection of actual changes in patient mix or a change in coding practice at the start of care. Given the presence of the trend prior to HHVBP and in non-HHVBP states, evidence suggests that these changes are not solely a function of the HHVBP Model. Lower patient status at initial assessment could be explained by patients being sicker upon home health admission or changes in coding practices at initial assessment.

6.2 Modest Improvements for OASIS-Based Outcome Impact Measures

In using a D-in-D approach to assess effects of HHVBP on the OASIS-based outcome improvement measures, we considered these underlying trends in initial patient status. We found that lower levels of functioning reported on the initial assessment were associated with higher rates of improvement in functioning over time, reflecting a greater opportunity for improvement.

In the context of both underlying trends in initial status which pre-dated HHVBP and also its association with rates of improvement over time, we developed D-in-D models for the outcome improvement measures that include initial status as a covariate. We also included an interaction term between the outcome-specific Start of Care (SOC) variables and treatment indicator to account for variation in coding of the SOC between HHVBP and non-HHVBP states. Based on findings from falsification tests that indicated non-parallel trends for some of these measures (see Section A.1.4.3 on Page 14 of the Technical Appendix), we also included state-specific linear time trends in the model. The D-in-D results for the OASIS outcome improvement measures presented below therefore control for any differential changes over time in initial functioning levels reported in HHVBP and non-HHVBP states. We also discuss this issue as part of our rationale for covariate adjustment in Section A.1.3.2 on Page 6 of the Technical Appendix.

Our findings for the eight OASIS-based outcome measures for the first two years following the implementation of the HHVBP Model are presented in Exhibit 35. We observed relative gains over the first two years of the HHVBP Model in the percentage of patients discharged to the community, one of the seven OASIS-based outcome measures used to calculate the TPS (Exhibit 35). In each of the first two years of HHVBP, our D-in-D analysis indicated an increase in HHVBP states relative to non-HHVBP states under the Model of approximately 0.5 percentage points.

Among the improvement measures used to calculate the TPS, we found cumulative D-in-D effects to be statistically significant and consistently positive for all six measures. The magnitude of the estimated increase in the percentage of patients showing improvement ranged from 0.77 percentage points for ambulation-locomotion to 1.9 percentage points for management of oral medications for those in HHVBP states compared to non-HHVBP states. For all of the measures, these relative changes were leading to a larger gap between the two groups, with higher levels of improvement being observed among patients in HHVBP states following implementation of HHVBP. In addition, we note that the relative increases observed in HHVBP states based on the D-in-D estimates occurred in a context where there were relatively large increases in these measure rates over time for both groups. For example, the percentage of patients reported to be improving in management of oral medications in HHVBP states increased by 16 percentage points between the baseline period and 2017 (i.e., from 51.5% to 67.5% of patients; Exhibit 31).

Exhibit 35. Impact of the HHVBP Model on OASIS Outcome Impact Measures

Measure	Model Estimates				Average in HHVBP States, Baseline (2013 – 2015)	% Relative Change
	D-in-D	p-value	Lower 90% CI	Upper 90% CI		
Discharged to Community						
2016	0.51%	0.003	0.23%	0.78%	72.8%	0.7%
2017	0.55%	0.04	0.12%	0.99%		0.8%
Cumulative	0.51%	0.002	0.24%	0.79%		0.7%
Improvement in Ambulation-Locomotion						
2016	0.75%	0.03	0.19%	1.31%	65.2%	1.2%
2017	0.75%	0.12	-0.05%	1.55%		1.2%
Cumulative	0.77%	0.02	0.21%	1.34%		1.2%
Improvement in Bathing						
2016	0.84%	0.02	0.23%	1.45%	70.5%	1.2%
2017	1.36%	0.008	0.53%	2.20%		1.9%
Cumulative	0.86%	0.02	0.24%	1.47%		1.2%
Improvement in Bed Transferring						
2016	1.10%	0.001	0.53%	1.66%	61.1%	1.8%
2017	1.31%	0.01	0.45%	2.17%		2.1%
Cumulative	1.13%	0.001	0.56%	1.70%		1.8%
Improvement in Dyspnea						
2016	0.79%	0.05	0.12%	1.46%	66.7%	1.2%
2017	0.73%	0.26	-0.34%	1.80%		1.1%
Cumulative	0.83%	0.04	0.17%	1.50%		1.2%
Improvement in Management of Oral Medications						
2016	1.98%	<0.001	1.07%	2.88%	51.5%	3.8%
2017	3.22%	<0.001	1.86%	4.59%		6.3%
Cumulative	1.88%	<0.001	0.99%	2.77%		3.7%
Improvement in Pain Interfering with Activity						
2016	1.18%	0.001	0.58%	1.78%	70.7%	1.7%
2017	1.72%	0.002	0.80%	2.65%		2.4%
Cumulative	1.21%	<0.001	0.61%	1.80%		1.7%
Improvement in Status of Surgical Wounds						
2016	0.22%	0.42	-0.23%	0.68%	90.3%	0.2%
2017	0.69%	0.12	-0.03%	1.40%		0.8%
Cumulative	0.24%	0.38	-0.21%	0.69%		0.3%

HHVBP Measures indicated by italic text. | CI= Confidence Interval. Shading indicates significance at the p<0.05 level. These models include state-specific linear time trends (See Section A.1.4 on Page 12 of the Technical Appendix for more details) | See Exhibit 35n on Page 84 of the Technical Appendix for each measure's sample size.

6.3 Modest Improvements for Some OASIS-Based Process Impact Measures

Similar to the OASIS-based outcome measures, we included state-specific linear time trends in our D-in-D analyses of the OASIS-based process measures to account for non-parallel trends between the HHVBP and comparison groups during the baseline period (see Section A.1.4.3 on Page 14 of the Technical Appendix for details). The results of our D-in-D analyses indicate larger improvements in the first two years of the HHVBP Model for HHVBP states relative to non-HHVBP states for three of the OASIS-based process measures, including two of the process measures used in the TPS calculation (Exhibit 36).

Results for these HHVBP process measures include a cumulative increase of 1.3 percentage points in HHVBP states relative to non-HHVBP states for the Pneumococcal Polysaccharide Vaccine measure and a cumulative increase of 0.52 percentage points for the Drug Education measure. We did not find a statistically significant impact of HHVBP on the Influenza Immunization measure.[18]

For the remaining four process measures in Exhibit 36 that we examined which are not used in the TPS calculation – depression assessment; diabetic foot care and education; assessment of risk of fall; and timely initiation of care – we note that performance rates on these measures were already high prior to implementation of HHVBP, exceeding 92% for all four measures. The D-in-D estimates for these process measures tend to be smaller, and are not statistically significant for three of these four measures with the exception of timely initiation of care) which may reflect limited opportunities for improvement given the already high levels of baseline performance. Accordingly, any effects of HHVBP in improving agency performance on these measures are likely to be small.

We also conducted sensitivity analyses that adjusted for clinical characteristics of patients. Our primary analytic approach for the process measures does not include adjustment for such factors, which corresponds to the approach used for risk adjustment of these performance measures under both HHVBP and for public reporting purposes: the fulfillment of process of care standards that are seen as being consistent with high quality care is expected regardless of the clinical status of patients. However, we acknowledge there may be differences in patient case-mix severity between HHVBP and non-HHVBP states that could either potentially facilitate higher agency performance on process measures (e.g., based on the need for more frequent interactions with providers) or hinder their performance on these measures (e.g., if the care of severe conditions crowds out less urgent forms of care). We therefore tested models that also include the core clinical covariates used in our analysis of the OASIS episode-level measures (as detailed in Section A.1.3 on Page 3 of the Technical Appendix). Overall, the D-in-D estimates for the process measures shown in Exhibit 36 were relatively similar when including adjustments for these clinical factors, leading to no change in broad inferences about effects of HHVBP.

[18] We note that CMS dropped the Influenza Immunization and Pneumococcal Polysaccharide Vaccine measures as HHVBP performance measures starting in the fourth performance year of the Model (HHS, 2018), while the Drug Education measure was dropped as an HHVBP performance measure starting in the third performance year (HHS, 2017).

Exhibit 36. Impact of the HHVBP Model on OASIS Process Impact Measures

Measure	Model Estimates				Average in HHVBP States, Baseline (2013 – 2015)	% Relative Change
	D-in-D	p-value	Lower 90% CI	Upper 90% CI		
Drug Education on Medications Provided to Patient/Caregiver during Episodes of Care						
2016	0.53%	0.08	0.04%	1.03%	91.9%	0.6%
2017	0.23%	0.60	-0.50%	0.96%		0.3%
Cumulative	0.52%	0.08	0.03%	1.02%		0.6%
Influenza Immunization Received for Current Flu Season						
2016	0.49%	0.42	-0.52%	1.50%	61.7%	0.8%
2017	-1.18%	0.21	-2.71%	0.35%		-1.9%
Cumulative	0.59%	0.34	-0.43%	1.60%		1.0%
Pneumococcal Polysaccharide Vaccine Ever Received						
2016	1.16%	0.05	0.17%	2.16%	66.1%	1.8%
2017	0.32%	0.73	-1.22%	1.87%		0.5%
Cumulative	1.27%	0.04	0.27%	2.28%		1.9%
Depression Assessment Conducted						
2016	0.19%	0.46	-0.23%	0.62%	95.8%	0.2%
2017	0.41%	0.31	-0.25%	1.08%		0.4%
Cumulative	0.18%	0.48	-0.24%	0.61%		0.2%
Diabetic Foot Care and Patient/Caregiver Education Implemented during All Episodes of Care						
2016	0.06%	0.87	-0.52%	0.63%	92.5%	0.06%
2017	0.36%	0.48	-0.48%	1.20%		0.4%
Cumulative	0.06%	0.86	-0.52%	0.64%		0.06%
Multifactor Fall Risk Assessment Conducted for All Patients who Can Ambulate						
2016	-0.10%	0.44	-0.32%	0.12%	98.3%	-0.1%
2017	-0.37%	0.06	-0.70%	-0.05%		-0.4%
Cumulative	-0.10%	0.47	-0.32%	0.12%		-0.1%
Timely Initiation of Care						
2016	0.61%	0.014	0.20%	1.02%	92.6%	0.7%
2017	1.04%	0.003	0.46%	1.62%		1.1%
Cumulative	0.64%	0.01	0.24%	1.05%		0.7%

HHVBP Measures indicated by italic text. | CI= Confidence Interval. Shading indicates significance at the p<0.05 level. These models include state-specific linear time trends (See Section A.1.4 on Page 12 of the Technical Appendix for more details) | See Exhibit 36n on Page 84 of the Technical Appendix or each measure's sample size.

7. Results: Impact of HHVBP on Patient Experience

This chapter examines the impact of HHVBP on the five patient experience measures derived from the HHCAHPS survey and used to calculate the TPS.

7.1 Patient Experience Measures, Pre- and Post- HHVBP Implementation

Performance scores for the five HHCAHPS-based measures remained relatively stable over time in both HHVBP states and non-HHVBP states, with values for both groups ranging from 77.6% to 88.8% (Exhibit 37). The unadjusted pre-HHVBP (2013 – 2015) values for these measures are similar between the HHVBP states and non-HHVBP states, satisfying the parallel trends assumption of our D-in-D model (details are shown in Section A.1.4 on Page 12 of the Technical Appendix).

Exhibit 37. Baseline and Performance Period Means for HHCAHPS-Based Patient Experience Impact Measures, All HHVBP States and Non-HHVBP States

HHCAHPS-Based Patient Experience Impact Measures	HHVBP States 2013-2015	Non-HHVBP States 2013-2015	HHVBP States 2016	Non-HHVBP States 2016	HHVBP States 2017	Non-HHVBP States 2017
How often the home health team gave care in a professional way	88.8%	88.2%	88.5%	88.0%	88.4%	87.9%
How well did the home health team communicate with patients	85.9%	85.3%	85.5%	85.1%	85.5%	85.1%
Did the home health team discuss medicines, pain, and home safety with patients	82.9%	83.8%	82.3%	83.6%	82.6%	83.4%
How do patients rate the overall care from the home health agency	84.4%	83.7%	84.3%	83.7%	84.1%	83.5%
Would patients recommend the home health agency to friends and family	79.6%	78.4%	79.2%	78.1%	78.9%	77.6%

HHVBP Measures indicated by italic text. | See Exhibit 37n on Page 84 of the Technical Appendix for each measure's sample size.

7.2 No Effects on Patient Experience with Care

None of the five HHCAHPS-based measures included in HHVBP showed changes over time among all HHVBP states relative to the non-HHVBP states during the first two years of the HHVBP Model (Exhibit 38). We also did not observe meaningful changes over time in HHVBP states relative to non-HHVBP states between 2016 and 2017. Underlying the D-in-D findings, performance rates for the five patient experience measures remained relatively stable over the entire period from 2013 to 2017, in both the HHVBP and non-HHVBP states (See Exhibits C-1 and C-2 on Pages 77-80 of the Technical Appendix). Together, our D-in-D findings and underlying trends in the HHCAHPS measures suggest no effects on patient experience with home health care in the first two performance years of the HHVBP Model. This is consistent with our HHA survey results, which also found no difference between HHAs in HHVBP and non-HHVBP states in their quality improvement activities related to the HHCAHPS measures (see Section 8.1 below).

Exhibit 38. Impact of the HHVBP Model on HHCAHPS-Based Impact Measures

Measure	Model Estimates				Average in HHVBP States, Baseline (2013 – 2015)	% Relative Change
	D-in-D	p-value	Lower 90% CI	Upper 90% CI		
How often the home health team gave care in a professional way						
2016	-0.10%	0.47	-0.33%	0.13%	88.8%	-0.1%
2017	0.04%	0.82	-0.22%	0.29%		0.05%
Cumulative	-0.03%	0.78	-0.24%	0.17%		-0.03%
How well did the home health team communicate with patients						
2016	-0.21%	0.19	-0.48%	0.05%	85.9%	-0.2%
2017	-0.03%	0.86	-0.32%	0.26%		-0.03%
Cumulative	-0.13%	0.38	-0.36%	0.11%		-0.2%
Did the home health team discuss medicines, pain, and home safety with patients						
2016	-0.34%	0.07	-0.65%	-0.04%	82.9%	-0.4%
2017	0.26%	0.18	-0.06%	0.58%		0.3%
Cumulative	-0.04%	0.79	-0.31%	0.22%		-0.05%
How do patients rate the overall care from the home health agency						
2016	-0.10%	0.67	-0.48%	0.29%	84.4%	-0.1%
2017	0.04%	0.85	-0.35%	0.44%		0.05%
Cumulative	-0.03%	0.88	-0.35%	0.29%		-0.04%
Would patients recommend the home health agency to friends and family						
2016	0.01%	0.97	-0.44%	0.46%	79.6%	0.01%
2017	0.31%	0.26	-0.15%	0.77%		0.4%
Cumulative	0.16%	0.49	-0.22%	0.53%		0.2%

HHVBP Measures indicated by italic text. | CI= Confidence Interval.

See Exhibit 38n on Page 85 of the Technical Appendix for each measure's sample size.

8. Results: Operational Changes and Agency Self-Reported Activities

This chapter presents four analyses that examine how agencies are responding to the HHVBP Model. We first discuss results from a survey we fielded to 4,800 HHAs across HHVBP and non-HHVBP states, followed by findings from 49 interviews we conducted with staff from HHAs across the nine Model states. We then discuss use of HHVBP Connect by HHVBP HHAs and conclude with a discussion of agencies' reporting rates of the three HHVBP measures via the Secure Web Portal.

8.1 HHA Survey Results

As described above, we conducted a survey of HHVBP and non-HHVBP agencies in 2018, the third performance year of the Model. Results from our survey of HHAs in both HHVBP and non-HHVBP states found few differences between the groups in their quality improvement activities, and activities that HHAs reported were more likely to differ based on factors irrespective of whether they were located in an HHVBP state (e.g., HHA chains are implementing changes in HHVBP and non-HHVBP states). Over 86% of agencies reported the use of multiple quality improvement activities targeting indicators of quality based on OASIS, HHCAHPS, and Medicare claims data, with few differences in types of quality improvement activities between HHVBP and non-HHVBP states. The incentive structure of the HHVBP Model was reported to be of lesser importance than those of other quality programs in incentivizing agency attention and activities even in HHVBP states. Over half (57%) of HHA respondents from HHVBP states indicated that the HHVBP Model was a very important quality improvement driver. In contrast, Star Ratings, Quality Assurance and Performance Improvement (QAPI) requirements in COPs, and HHCAHPS were identified as being the most important drivers of quality improvement activities by over 70% of HHAs in both HHVBP and non-HHVBP states.

Agency perceptions of broader home health industry challenges, such as responding to HHA COPs, recruiting and retaining staff, obtaining high HHCAHPS and Quality of Patient Care Star Ratings, and implementing quality improvement activities, were relatively similar between HHVBP and non-HHVBP states. The majority of HHAs in HHVBP states did not rate HHVBP-related challenges, such as understanding HHVBP and HHVBP performance scoring, training staff in quality improvement, and obtaining technical assistance, as very important. When asked whether they were likely to make operational changes, such as adding new patient care staff or adding data analytic staff in the next 12 months, the proportion of HHAs indicating that they were likely to undertake each change was slightly higher in non-HHVBP states, possibly due to agencies in HHVBP states making these changes earlier than agencies in non-HHVBP states. However, the agency's ordering of what types of activities were likely to be prioritized was generally the same between the two groups regardless of HHVBP participation. The most cited anticipated activities were efforts targeted on increasing efficiency/reducing cost, targeting different performance measures for improvement than they had previously focused on, and adding patient care. With regards to changes in working with referral sources in the past two years, non-HHVBP agencies that responded to the survey were substantially more likely to have made changes in the frequency of outreach/communication to referral sources, sharing of performance data with referral sources, and efforts to join payer or provider networks than HHVBP agencies. We are unsure of the reason for this finding but broadly, our findings suggest HHAs in HHVBP and non-HHVBP states perceive operational priorities in similar ways and that the HHVBP Model has not had a major impact on agencies' activities.

Below we present the agency survey findings in detail, focusing on comparisons between HHAs in HHVBP versus non-HHVBP states. Because these results exhibit many overall similarities between HHVBP and non-HHVBP HHAs, we also compared other subgroups of HHAs to assess whether there was a greater degree of variation in agency activities based on other agency characteristics (e.g., ownership) rather than based on whether they were located in an HHVBP state. Our findings point to key differences among certain other subgroups of HHAs. For example, a subgroup of large, for-profit agencies affiliated with a chain tended to identify different activities as priorities than other agency subgroups (e.g., based on given strategies or activities that agencies indicated were very important). We tended to find such differences across agency subgroups in both HHVBP and non-HHVBP states, providing evidence of other agency characteristics that may be more relevant to their activities than participation in the HHVBP Model at its current stage of implementation.

8.1.1 Survey Respondent Characteristics in HHVBP and Non-HHVBP States

Underlying agency characteristics were comparable among the 759 HHVBP HHAs and 1,569 non-HHVBP HHAs that responded to the HHA survey (Exhibit 39). Relatively small differences can be seen in the share of Medicaid-only patients, which is higher in the sample drawn from the HHVBP states (13.1% vs. 8.3%). The median percentage (not shown) is the same in both groups, which indicates that a small number of HHVBP agencies have a high proportion of Medicaid patients. While the proportion of chain-affiliated agency respondents is similar in HHVBP and non-HHVBP states (37.7% vs. 36.4%, respectively), 72.5% of chain-affiliated HHVBP agencies were part of chains that operate in both HHVBP and non-HHVBP states, and 60.4% of chain-affiliated non-HHVBP agencies were part of chains that operate in both HHVBP and non-HHVBP states. These established patterns in agency ownership that cross state lines as well as HHVBP and non-HHVBP groups may contribute to the similarities in our findings among agencies in HHVBP and non-HHVBP states. More broadly, this ownership structure is one indication of the importance of the context in which the HHVBP Model is implemented which reflects the effects of other factors and initiatives. Other differences between the respondents in the HHVBP and non-HHVBP groups related to their perceptions of their markets. A slightly higher percentage of agency respondents in non-HHVBP states reported an increase in their market share from the prior year (25.3% vs. 21.4%). HHAs in non-HHVBP states were more likely to report “a lot” of market entrants as well as market competition that “increased a lot” from the prior year.

Exhibit 39. HHA Characteristics: Comparison of Respondents in HHVBP and Non-HHVBP States

HHA Characteristic	HHVBP States (N=759 HHAs)	Non-HHVBP States (N=1,569 HHAs)
Ownership (% of Total HHAs)		
For-profit	67.7	69.3
Not-for-profit	28.4	28.3
Government owned	3.9	2.4
Chain Status (% of Total HHAs)		
Yes[†]	37.7	36.4
No	62.3	63.6
Setting (% of Total HHAs)		
Freestanding	75.4	75.1
Hospital-based	24.6	24.9
Mean years in operation	16.6	17.8
Payer Mix (Mean % of Episodes)		
FFS Medicare	60.1	62.4*
Medicaid	13.1	8.3*
Commercial	8.7	10*
Medicare Advantage	15.3	17.2*
Admission Source (Mean % of Episodes)		
Hospital (inpatient/ED)	44.1	46.6*
Post-acute setting	25.0	24.6
Direct from community	29.9	28.6
Change in patient complexity from prior year (% reporting 'much higher')	36.3	36.7
Market Share, Compared to other Agencies (% of Total HHAs)		
Near top	33.1	34.5
Middle	54.1	53.3
Near bottom	12.7	12.2
Change in market share from prior year (% HHAs increased)	21.4	25.3*
% HHAs Reporting 'Lots of Activity'		
Market entrance	11.5	15.1*
Market exit	16.2	13.7
Mergers/acquisitions	23.9	23.3
Change in competition from prior year (% HHAs 'increased a lot')	21.4	26.4*

*Source: 2018 HHA Survey | * Denotes statistical significance ($p < 0.05$)*

[†] Among chain-affiliated agencies that responded to the survey in HHVBP states, 72.5% were part of a chain that had agencies in HHVBP and non-HHVBP states. Among chain-affiliated agencies that responded to the survey in non-HHVBP states, 60.4% were part of a chain that had agencies in HHVBP and non-HHVBP states.

8.1.2 Agency Quality Improvement Activities: Specific Approaches Related to OASIS, HHCAHPS, and Claims-Based Measures

Overall, surveyed agencies reported implementing quality improvement activities targeting OASIS, HHCAHPS, and claims-based measures, with few differences in perceived importance or type of activity between agencies in HHVBP and non-HHVBP states.

Between 86% and 95% of agencies across HHVBP and non-HHVBP states indicated that they have current quality improvement activities targeting performance improvement on OASIS, HHCAHPS, and claims-based measures (not shown). Fewer agencies—62% of HHVBP agencies and 68% of non-HHVBP agencies—reported activities related to flu vaccines for agency personnel. Of HHVBP agencies with quality improvement activities in these areas, 60% or more said that HHVBP was "very important" in their implementation of the activity, and a similar proportion of agencies in non-HHVBP states said that the activity started prior to 2016.

The importance that agencies place on specific approaches to improving performance on the HHVBP OASIS-based and HHCAHPS-based measures was comparable across HHVBP and non-HHVBP states (Exhibit 40). For the two HHVBP claims-based measures, non-HHVBP agencies were slightly more likely than HHVBP agencies to rate the approaches as 'very important.'

Exhibit 40. Most Highly Rated Approaches to Quality Improvement: Percent of Agencies in HHVBP and Non-HHVBP States Rating Approach as "Very Important" in Their Overall Strategies to Improving Scores on these Measures

Specific Approach to Quality Improvement	Agencies Rating as "Very Important" (%)	
	HHVBP States	Non-HHVBP States
Efforts Associated with Improving Performance on the HHVBP OASIS-Based Measures		
Staff training to better understand the OASIS assessment process	85.5	84.1
Increased review of completed OASIS assessments by clinical staff	72.8	72.1
Initiating Start Of Care assessment more promptly	71.4	75.3*
Use of software to improve OASIS accuracy, e.g., data prompts or data validation for assessments	67.9	71.0
Efforts Associated with Improving Performance on the HHVBP HHCAHPS-Based Measures		
Enhanced staff training on communication with patients about medications, including review of medications, when to take medications, and potential side effects	81.1	82.7
Enhanced staff training on interaction with patients, for example, treating patients gently, with courtesy and respect, and providing up-to-date information on available treatments	75.0	74.7
Enhanced staff training on communication with patients about other issues, for example, care and services to be provided, how to listen carefully, how to explain things clearly	74.0	73.6
Efforts Associated with Improving Performance on the HHVBP Claims-Based Measures		
Patient education about self-management of specific conditions or improving health behaviors	74.0	78.8*
Patient education about when to use the ED	72.0	75.4
Changes to how interdisciplinary team works together in coordinating care	62.4	67.4*
Shifting or adding visits earlier in an episode to increase post-discharge follow-up (frontloading)	60.8	66.2*

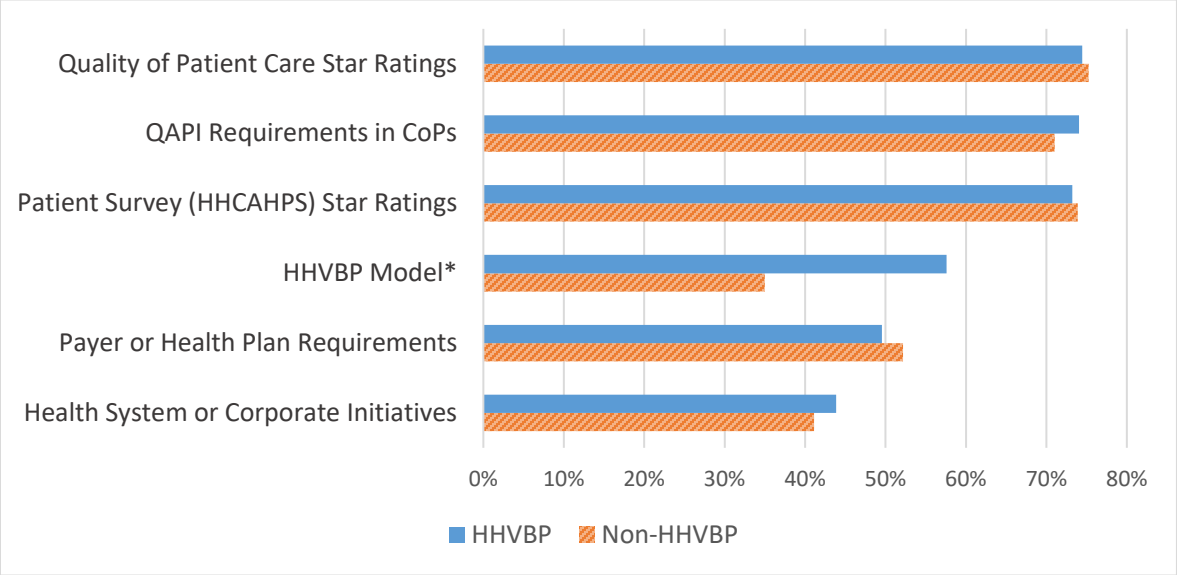
*Source: 2018 HHA Survey | * Denotes statistical significance ($p < 0.05$).*
This table presents the subgroup of approaches that were most highly rated by agencies.

In terms of reviewing agency-level quality/performance data, the vast majority of agencies reported having made changes in the past few years, since implementation of HHVBP or approximately 2016, with about 70% of agencies across the board reviewing data more frequently (not shown). Agencies in non-HHVBP states are somewhat more likely to have added more levels of review (55.2% vs. 46.3%) or to have added more staff or staff positions to the review process (39.4% vs. 29.5%); these differences are statistically significant at $p<0.05$.

8.1.3 Agency Performance Improvement Activities: Important Drivers

The initiatives that drove quality improvement efforts were rated similarly by HHAs in HHVBP and non-HHVBP states (Exhibit 41). Approximately 70-75% of all agencies in both groups rated Quality of Patient Care Star ratings, HHCAHPS, and QAPI requirements in COPs as "very important," and these three initiatives were the highest reported motivators of quality improvement efforts.

Exhibit 41. Initiatives Identified as being "Very Important" at Driving HHA Quality Improvement Activities, HHVBP and Non-HHVBP States



*Source: 2018 HHA Survey | * Denotes statistical significance ($p < 0.05$).*

The HHVBP Model was a less important driver of quality improvement activities; it was reported as "very important" by only 57% of HHAs in HHVBP states, lower than the initiatives mentioned above. Among HHAs in non-HHVBP states, 34% reported the HHVBP Model as "very important," indicating some attentiveness to the Model outside of Model states. This is consistent with other survey findings from HHAs in non-HHVBP states, which found these agencies to be aware of HHVBP even though they state that it is generally not driving quality improvement activities or planning: 79% of the agencies were somewhat or very familiar with the Model, 25-30% reported "extended attention/discussion" about it, but fewer than 10% reported there had been any formal planning related to the Model.

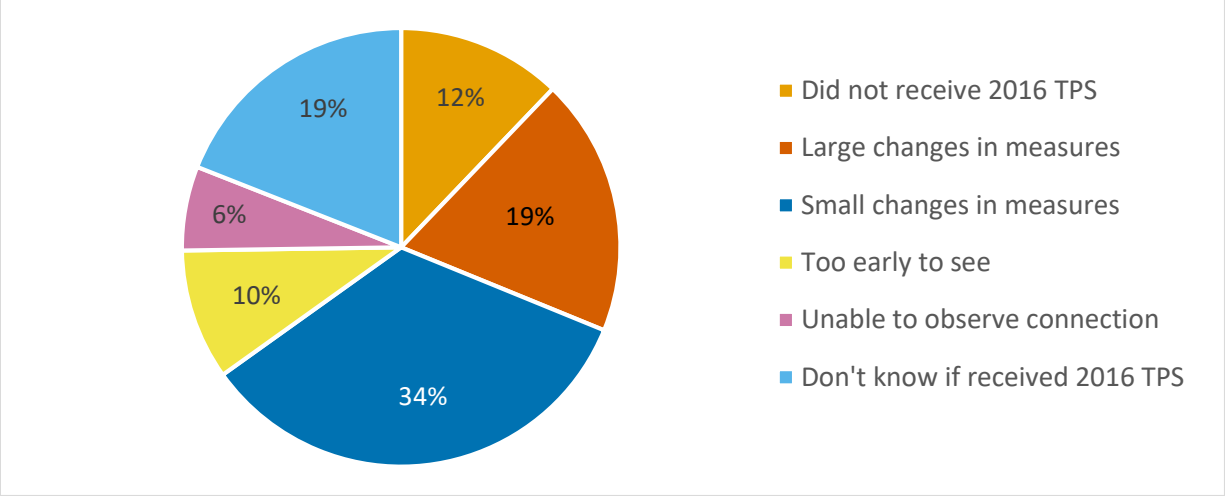
8.1.4 Agencies in HHVBP States: Understanding of and Reponses to TPS Scores and Payment Adjustment Report

At the time the survey was fielded in 2018, agencies in HHVBP states should have received their first TPS score. This score was based on their 2016 performance and resulted in a 0-3% payment adjustment for

CY 2018.[19] Among all of the responding HHVBP agencies, only 15 had not received a TPS score at the time of the survey according to CMS data. However, approximately 12% reported in the survey that they had not received a TPS score and approximately the same proportion did not know whether the agency had received a TPS score (Exhibit 42).

Just over half of HHVBP agencies reported that their quality improvement efforts had resulted in changes to their performance measures and a higher TPS score than they would have otherwise received. Among all surveyed agencies, 36% said they experienced small TPS changes and 20% said the TPS changes were large. 10% of agencies indicated that it was too early observe any change and 7% said they were unable to connect the changes they had made in performance activities with their TPS score.

Exhibit 42. For HHAs in HHVBP States: Does the 2016 Annual TPS Score Reflect Quality Changes Implemented?



Source: 2018 HHA Survey.

Of the HHVBP agencies that were aware of receiving their TPS in 2016, approximately half indicated that both their TPS scores and payment adjustments were "about what they expected" (not shown). About 30% of agencies said they had done worse than expected; only a small proportion performed better than they had anticipated—15% on the TPS score and 13% on data in the annual payment adjustment report (that includes HHVBP measure values, and improvement and achievement scores). In terms of how well agencies believe that the TPS score guides their quality improvement activities, over half of HHVBP agencies said that the TPS score helped them to understand how to better focus future activities. About one-fifth of agencies said that the TPS score confirmed that they are "doing what they should be doing." 10% said it does not provide information the agency needs to help them better focus their activities and 4% said they know what to do but are "unable to make the needed changes."

[19] Agencies in HHVBP states received a TPS score in August 2017 that was based on 2016 performance and resulted in a payment adjustment for 2018.

8.1.5 Additional Changes in HHA Operations: Use of Technology and Interactions with Referral Sources

Agencies were also asked about their uses of technology for patient care and data analysis as well as relationships and interactions with referral sources.

Use of technology by HHVBP and non-HHVBP agencies was almost identical, ranging from a low of about one-quarter using technology for telemonitoring to a high of almost 90% using technology to analyze performance data to guide quality improvement activities (not shown). Across all agencies, roughly comparable proportions of HHAs indicated either that HHVBP was "very important" in their adoption of the technology (i.e., HHAs in HHVBP states) or that introduction of the technology happened prior to 2016 (i.e., HHAs in non-HHVBP states).

With respect to changes in working with referral sources in the past two years, non-HHVBP agencies were substantially more likely to have made changes in the frequency of outreach/communication to referral sources, sharing of performance data with referral sources, and efforts to join payer or provider networks (Exhibit 43). We are unsure about the reason for this difference, but speculate that it could reflect unmeasured differences between the markets of HHVBP and non-HHVBP respondents, or in the behaviors of other providers in those markets.

Exhibit 43. Changes in Working with Referral Sources in the Past Two Years

Changes in HHA Referral Source	Proportion that Made Changes	
	HHVBP States	Non-HHVBP States
Frequency of outreach/communication to referral sources	51%*	75%*
Sharing of performance data with referral sources	55%*	65.4%*
Efforts to join payer network	43.6%	66.2%
Efforts to join provider network	55.5%*	75.3%*
Efforts to join alternative payment models	45.2%	48.5%

Source: 2018 HHA Survey | Denotes statistical significance between HHVBP and non-HHVBP States (p< 0.05)*

8.1.6 Challenges to Operations and Future Changes

Agencies were asked about the relative importance of a variety of possible challenges to usual operations (i.e., not specific to the HHVBP Model). None of the potential issues were rated as a "big challenge" by more than 40% of agencies in HHVBP or non-HHVBP states (Exhibit 44). While the top challenges differed between the two groups of agencies, the differences are not large.

Of interest, 'implementing quality improvement activities' was rated as a "very important" challenge by the smallest proportion of agencies in both groups (19.0% and 18.9% in HHVBP and non-HHVBP agencies, respectively). Also of note is that fewer than a third of HHVBP agencies found HHVBP-related activities, such as understanding HHVBP and HHVBP performance scoring, training staff in quality improvement, and obtaining technical assistance, to be a "big challenge" (Exhibit 45), suggesting that HHVBP has had a minimal burden on agencies.

Exhibit 44. Challenges Rated as a "Big Challenge" to Current Operations, HHVBP and Non-HHVBP States

Challenges	HHVBP States (%)	Non-HHVBP States (%)
Understanding how to respond to new COPs	38.6*	30.7*
Recruiting and retaining staff, including minimizing turnover	36.7	38.0
Predicting impact of COPs on this agency	36.2*	31.2*
Reimbursement for Medicaid patients	33.8	37.7
Achieving and maintaining high HHCAHPS Patient Survey Star Ratings	32.2*	26.9*
Reimbursement for Medicare Advantage patients	30.7*	36.4*
Achieving and maintaining high Quality of Patient Care Star Ratings	29.7	29.1
Obtaining high ratings on Home Health Compare	28.9	27.9
Reimbursement for traditional Medicare home health patients	26.6*	22.4*
Implementing quality improvement activities	19.0	18.9

*Source: 2018 HHA Survey | COPs = Conditions of Participation | * Denotes statistical significance ($p < 0.05$)*

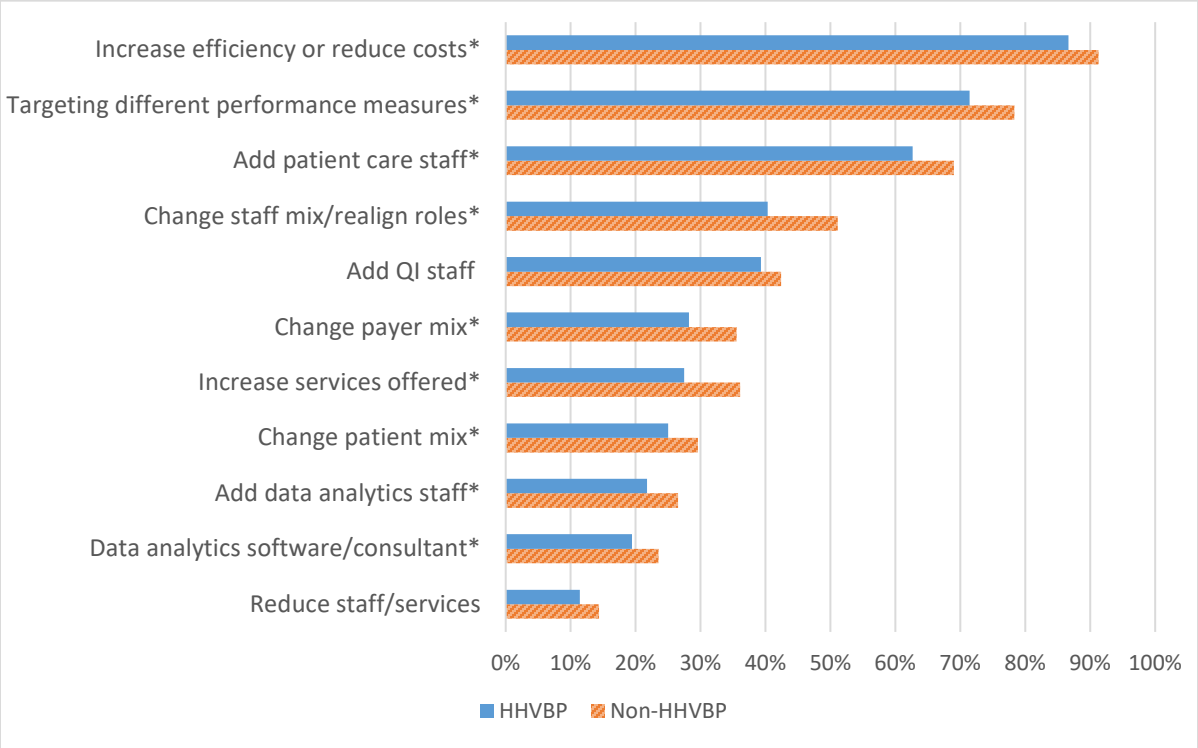
Exhibit 45. HHVBP-Specific Activities Rated as a "Big Challenge" by HHVBP Agencies

Challenges	HHVBP States (%)
Obtaining financial resources to support agency efforts	32.4
Training staff in quality improvement	27.1
Improving the accuracy of OASIS measurements	24.2
Understanding HHVBP performance scoring and its related payment changes	23.2
Understanding HHVBP and its potential impacts	20.0
Identifying appropriate staff to respond to HHVBP	18.2
Obtaining information or technical assistance to support agency efforts	18.0
Identifying changes needed to improve quality scores	14.5
Identifying/selecting HHVBP performance measures to target for improvement	12.1

Source: 2018 HHA Survey

When asked about changes that they were likely to make in the next 12 months, agencies in HHVBP and non-HHVBP states rated increasing efficiency/reducing cost, targeting different performance measures for improvement, and adding patient care staff as most important (Exhibit 46). In general, the proportion of agencies indicating a likely change was slightly higher in non-HHVBP states than HHVBP states, though the ordering was generally the same for both groups of agencies.

Exhibit 46. Likely Changes to Operations in Next 12 Months: Agencies in HHVBP and Non-HHVBP States



*Source: 2018 HHA Survey | * Denotes statistical significance ($p < 0.05$). | QI = Quality Improvement*

8.2 HHA Interviews

In 2018, we interviewed agencies in each HHVBP state that had high and low TPS scores for 2016 to better understand (1) changes in 2016 operations that may have contributed to their performance and (2) responses of the two groups of agencies to 2018 payment changes made on the basis of the 2016 TPS results. In August 2017, 1,622 agencies in the nine HHVBP states received a TPS score (based on 2016 performance). To select agencies to interview from this group, we ranked HHAs in each HHVBP state by their 2016 TPS and randomly selected interview candidates from the highest and lowest quartiles in each state, excluding agencies we interviewed in 2017 to minimize burden. Interviews were allocated across states as shown in Exhibit 47, with relatively more interviews allocated to Florida and fewer to Maryland, Nebraska, and Washington to reflect the relative allocation of agencies across the HHVBP states.

Exhibit 47. Count of Agency Interviews by HHVBP State and 2016 TPS

State	High 2016 TPS	Low 2016 TPS	Total
Arizona	2	3	5
Florida	4	4	8
Iowa	3	3	6
Maryland	2	2	4
Massachusetts	3	3	6
North Carolina	3	3	6
Nebraska	2	2	4
Tennessee	2	3	5
Washington	3	2	5
Total	**24**	**25**	**49**

Using a semi-structured interview protocol, we asked HHA representatives to discuss: 1) general background information regarding the HHA and the population they serve; 2) performance improvement activities since the start of HHVBP, including any activities related to OASIS, HHCAHPS, or claims-based measures; 3) HHA awareness and use of the TPS scores; and 4) the impact of the first year of HHVBP-related payment adjustments on agency operations. In summary, we found that most of the 49 agencies interviewed in 2018 reported conducting quality and performance improvement activities prior to the implementation of HHVBP and were largely an extension of ongoing activities; these results are similar to findings from the interviews we conducted with agencies in 2017. Broadly, we found:

- Agencies focused on quality and performance improvement prior to and as part of HHVBP.
- Agencies use internal data to prioritize and design improvement activities.
- TPS reports are used to understand HHVBP scores, but are not commonly used to identify and monitor improvement.
- Payment adjustments have resulted in a few low-performing agencies changing operations.
- Most HHAs focus on improving OASIS documentation and performance.
- HHCAHPS measures and hospitalization and ED outcomes measures were an area of focus among half of interviewed HHAs.

The remainder of this section presents detailed findings based on interviews conducted with the HHVBP HHAs. While we interviewed agencies that achieved high and low TPS scores in 2016, we did not stratify most of our findings by TPS score category, as we found little difference between the agencies in their activities. See Chapter 3 for results from our TPS analyses.

8.2.1 Agencies' Approach to Quality and Performance Improvement

Similar to what HHAs shared during interviews in 2017 (Arbor Research, 2018a), most of the HHAs interviewed in 2018 mentioned that they had been conducting quality and performance improvement activities prior to the implementation of HHVBP. Efforts undertaken by agencies were often self-reported as a continuation of or a renewed focus on prior activities. However, the existence of quality improvement efforts were broadly seen as part of the underlying activities occurring at agencies as part of how they conduct business. As one respondent from a high-performing agency noted,

> *"We have had a quality improvement team for many, many years, so Value-Based Purchasing was just another add-on to that."*
> *- High-performing HHA*

Another agency's interviewee also noted they had made small adjustments to existing efforts that were in place before HHVBP rather than taking on wholly new activities:

> *"Being a part of a larger system, we have had a pretty robust quality and PI [Performance Improvement] department long before HHVBP. What we did maybe change a little bit was we created reports and dashboards specific to those measures included in HHVBP and then, essentially, tried to double-down our effort on those pieces."*
> *- High-performing HHA*

Regardless of performance on the 2016 TPS, nearly all agencies interviewed in 2018 discussed implementing or intensifying some training and education activities for clinical staff after the HHVBP Model was implemented to address HHVBP-specific measures.

Similar to the HHAs interviewed in 2017, most agencies interviewed in 2018 focused on OASIS training and improvement in documentation when HHVBP was initially implemented. About half of the agencies also mentioned focusing on implementing activities to increase their HHCAHPS and claims-based measures. Improving intra-staff communication as well as communication with patients and caregivers was a theme regardless of the specific measures the agencies focused on with their performance and quality improvement efforts.

Additionally, some agencies felt that their relatively smaller size or limited resources put them at a disadvantage in implementing quality and performance improvement efforts, compared to larger agencies or chains that have dedicated staff and quality improvement departments. A respondent from a low-performing agency said,

> *"Generally, our census is around 180. And you realize that for Value-Based Purchasing, we are competing with mega-agencies who have a census of 10,000, who have a QA [Quality Assurance] department, who have an OASIS department, and they have patients in all of the eastern part of the state or all of [our region]. That's not what we have but that's what we are compared to."*
> *- Low-performing HHA*

8.2.2 Prioritizing and Designing Improvement Activities

Many of the HHAs mentioned reviewing their own internal data—and some also discussed working with consultants in conjunction with their data reviews—to identify areas requiring improvement and to help inform educational activities. More specifically, some interviewees discussed reviewing clinician scorecards and internal quality reports, while others created dashboards or graphics displaying overall agency performance on key measures to help prioritize improvement efforts. For some of the agencies that were part of larger chains, interviewees noted that corporate offices identified priority areas and/or provided resources/support materials, encouraging local branches/agencies to focus on those measures or improvement areas most likely to result in improved scores. For example, an interviewee from a high-performing agency that is part of a chain said,

> *"Our quality department has done some process mapping to [identify] the best performer[s] across our system. And so, we have done some of that work, just modeling out each of our top performers in each of the measures as kind of a best practice play book."*
> *- High-performing, chain HHA*

Ultimately, most agencies discussed selecting areas and measures to focus on where they could have an impact and/or where their scores were the lowest. Regardless of how agencies identified areas for improvement, most agencies mentioned focusing their training and performance improvement efforts on two or three measures.

A number of agencies also mentioned using internal data to conduct root cause analyses to customize and design improvement activities. For example, one agency discussed reviewing all patients who fell and considering how to prevent future falls. Another agency reviewed cases of infection to figure out the "what and why" associated with the infection. Other agencies conducted case reviews for all patients who were hospitalized or for patients who were identified as particularly complex. In each instance, agencies sought to understand the problem and design programmatic changes to decrease negative events.

8.2.3 Agencies' Use of TPS Reports

Agencies in the HHVBP states receive reports on their TPS results with information on their achievement and improvement scores, the extent to which they reported data needed for the TPS calculation, and their payment adjustment. Most agencies reported being familiar with and reviewing the TPS reports primarily to understand their HHVBP scores. Interviewees said that the TPS reports are generally consistent with other quality reports they review, either for general quality and performance improvement activities or for other programs, such as Medicare's Home Health Compare Star Ratings. Several agencies reported finding the TPS reports to be confusing and one low-performing agency indicated the TPS reports "do not reflect the quality of care that is actually provided." A small subset of agencies did not make a connection between their performance and payment adjustments, and while aware of their scores, were not aware of the positive or negative impact on payment.

Many agencies we interviewed reported that they did not use the TPS reports to identify and monitor quality and performance improvement activities, since the TPS data are generally months behind the internal data available within their information systems, which were often cited as being more useful in

determining future activities than TPS data. Some agencies noted frustration with the fact that data used for TPS rankings are lagged in time and thus do not reflect the impact of more recent improvements in processes and performance. Additionally, a few agencies felt that the methodology used to calculate the TPS unfairly penalizes them since it does not take into consideration the demographics of their patient populations. As a result, they stated that the TPS reports did not help them identify areas in which they can realistically improve.

Payment adjustments have resulted in a few low-performing agencies changing operations.

Interviewees generally attributed the motivation for their changes in quality improvement activities to receiving poor scores on specific indicators. The decrease or increase in payment received in 2018 associated with their performance in 2016 was not typically mentioned as the reason for implementing changes. A few agencies reported that the possible payment change in the first payment year (up to 2% adjustment up or down) was not large enough to fund or warrant making changes. One interviewee from a low-performing agency noted:

> *"[The low TPS is] a yellow alarm. It was certainly something where we said, okay, right now it is up to minus 2%[20], but it may change up to plus/minus 8% in the next few years, and that's something which will impact operations of our agency significantly. [The low score] motivates us, not necessarily drives us, to change our performance."*
> *- Low-performing HHA*

No high-performing agencies specifically attributed changes in performance improvement practices or agency operations to be motivated by receiving information on the first year's HHVBP payment adjustments.

However, a few low-performing agencies described making changes to their operations in 2018 as a result of payment reductions received in 2018 but reflecting 2016 performance. Changes ranged from reductions in staffing, specifically in clinical staff, and a few agencies became more selective in the types of patients they admitted. One agency took fewer patients that needed daily visits (e.g., wound care patients) and decreased the number of Medicaid patients they admitted. Another agency also became more selective about which referrals were accepted. For example, if the agency could not begin caring for the beneficiary within 48 hours of the referral, the patient was diverted to a competitor.

Additionally, a few of the low-performing agencies expect to have greater difficulty in hiring staff moving forward due to tighter budgets, while other agencies reported taking more proactive steps, such as adding performance improvement focused staff or hiring more physical therapists, to help improve OASIS scores. A few interviewees at low-performing agencies specifically mentioned holding clinicians and managers more accountable for OASIS outcomes after seeing performance results and the payment changes.

Finally, a few low-performing agencies anticipate more changes if further reductions in payments occur. One agency that reported already operating at a loss suggested that, should payments continue to

[20] Note that while the respondent referenced a 2% adjustment, the maximum payment adjustment in 2018 was +/- 3%.

decline, the agency would discontinue its home health operations (this agency also provided hospice services). Another agency suggested that they will have to look at their operations and structure after they understand what the impact and implications of the soon-to-be released OASIS (OASIS-D) will be on their agency. A respondent from a low-performing agency was concerned about potential future payment reductions because the agency is also experiencing inadequate reimbursements from Medicaid and Medicare Advantage. This interviewee said that,

> *"Anything that cuts out our bottom line, which [HHVBP] does, could mean we will disappear… every place I turn, it's we are getting paid less. So, how long we can survive this way is a real question."*
> *- Low-performing HHA*

8.2.4 OASIS Documentation and Performance

When asked about quality and performance improvement activities performed since early 2016, the majority of the interviewees mentioned activities specifically related to improving their scores for OASIS measures. The only low-performing agency interviewee that did not mention OASIS documentation as a priority area was an agency with few Medicare FFS patients (under 10%). Some agencies also focused on improving scores on specific measures—most frequently medication-related, outcome-related, pain management and vaccination-related measures—through staff training and changes in care processes.

Training is a key activity to try to improve OASIS documentation.

As in the 2017 HHA interviews, many HHAs noted the need for accurate initial and final OASIS documentation to demonstrate patient improvements, which are key to scoring well on the HHVBP measures. Several interviewees indicated the information at admission and discharge can be incongruent because one clinician completes the SOC and another completes the documentation at discharge. A number of agencies mentioned increasing collaboration between disciplines (e.g., physical therapy and nursing) when documenting patient status.

A majority of agencies interviewed in 2018 discussed conducting ongoing or increased levels of training to improve overall accuracy in OASIS reporting, as did those interviewed in 2017. Agencies have taken a variety of approaches to ensuring accurate and consistent OASIS documentation such as developing a reconciliation process overseen by quality improvement department staff; using software programs to improve consistency; and increasing supervisory oversight/collaboration on OASIS documentation. One agency, for instance, described reviewing all the discharge documentation prior to submission to make sure the information is complete. If a quality improvement staff member determines revisions are necessary, the original clinician must approve the revisions; if the original clinician does not approve of the suggested revisions, the clinician must provide a reason before submitting the OASIS documentation. Another agency worked with a consultant to develop a training program that included creating "shadow" sets of OASIS documents—meaning the clinician and supervisor independently complete documentation for a patient, so they could compare and discuss their approach—to train clinicians on improving the accuracy and completeness of their documentation.

Improving Performance on Specific HHVBP OASIS Measures: Medication-related measures mentioned most frequently

Unlike OASIS documentation training efforts, HHAs described varying degrees of focus on efforts to improve specific OASIS measures following the introduction of HHVBP. Some agencies shared having a high level of focus on targeting improvements on specific OASIS measures, while a few reported dedicating only a limited amount of attention to this. Those agencies that reported focusing limited attention on specific measures—primarily high-performing agencies—are relying on their belief that existing training activities and accurate documentation will continue to lead to good results on their OASIS measures.

Many agencies that undertook specific OASIS-related improvement activities mentioned trying to improve measures related to medications (improvement in management of oral medications and/or drug education). Some of these agencies gave examples of working with staff and patients to better understand and communicate how and why the patient is using certain medications. One agency, for instance, started using a medication folder and reviewed the folder with the patient at each visit. The HHA discontinued this process because it was expensive to maintain, but found patients were not doing as well so the program was re-instated. Other agencies described educating all clinicians on medication reconciliation concerns and encouraging non-nursing staff to photograph new medications and send pictures of them to the director of nursing for clarification.

Other specific OASIS measures commonly discussed by interviewees as a focus of improvement activities include:

- **Functional and movement-related measures.** Activities focused on improving performance on functional and movement-related measures including an increased focus on encouraging ambulation and assessing fall risks, as well as increased therapist attention on transferring and bathing in their sessions. Interestingly, ambulation was also frequently mentioned by agencies trying to ensure congruence between SOC and discharge assessments in their efforts to improve documentation.
- **Pain management.** Some agencies discussed focusing on trying to improve pain management from the SOC through discharge. For example, one agency reported that, to improve performance on the “pain interfering with activity measure,” a pain management program was developed teaching patients and caregivers pain reducing strategies that do not rely on pharmaceuticals. The interviewee noted this approach has the added benefit of being in line with local physicians’ efforts to reduce reliance on opioids for pain management.
- **Vaccines.** Quite a few low-performing agencies noted dissatisfaction with the flu vaccine measures included in the TPS score due to what they perceived as beneficiaries’ negative perceptions of vaccines and the challenges associated with determining and documenting when vaccinations were administered by other providers. Upon investigation, one agency found that some of their home health clinicians simply marked "unknown" or "no" without even trying to figure out if the patient had indeed been vaccinated or offering to vaccinate the patient. Some of the agencies focusing on vaccines mentioned trying to increase communication and education with patients to combat the negative impressions of the vaccines, as well as trying to improve workflows to support the receipt of flu documentation from other providers.

8.2.5 HHCAHPS Measures

More than half of the HHAs interviewed—across both low and high performers—mentioned making changes to processes in an effort to improve HHCAHPS scores. A respondent from a high-performing agency indicated that there is almost always room for improvement within HHCAHPS scores:

> *"The patient experience, even for our five-star agencies, often bubbles up as an area where we can achieve more points for our Value-Based Purchasing TPS."*
> *- High-performing HHA*

Through training, some HHAs focus on improving communications about HHCAHPS.

The most common method discussed to increase HHCAHPS scores was increasing survey-related staff training, which focused on improving beneficiary communications and awareness, and helping staff understand the importance of the survey responses to agency performance metrics. Some agencies reported training clinicians to communicate with beneficiaries using similar language to that contained in the HHCAHPS survey. These HHAs are training clinicians to closely mimic the HHCAHPS survey language, for example, "let's now talk about your medications," so beneficiaries can more recall the discussion and more easily tie activities performed in the home back to a specific question on the survey. One high-performing agency's interviewee emphasized the importance of communication with the patient in training their staff:

> *"Patient satisfaction is not just about a patient liking you, it's about very specific questions and using key words in the training and having clinicians convey that. Getting clinicians to understand [specific questions and language] is important. We tell them they have to use certain words when discussing medication side effects for example so that they know how to ask questions. So, we've developed key word documents for them."*
> *- High-performing HHA*

A few agencies implemented programs in which clinical staff are trained on patient engagement and ways to improve the patients' care experience. One agency described reviewing one HHCAHPS survey question each week during staff meetings and discussing how clinicians can best explain questions to beneficiaries; this agency also used an HHCAHPS tip sheet called "Patient Experience of Care" to help guide HHCAHPS discussions with clinicians. A number of interviewees also noted using staff education to help clinicians encourage beneficiaries to complete the HHCAHPS survey.

Some agencies increase follow-up activities with patients to improve response rates.

In a few agencies, interviewees discussed struggling to know how to interpret HHCAHPS scores because of low response rates, and one patient with a negative experience can drastically impact the results for the entire agency. In order to try to increase the total number of survey completions, several agencies reported reaching out to beneficiaries more often and letting them know they will be sent a survey and the types of questions to expect. A couple of agencies are considering, or have already hired, survey vendors to conduct follow-up calls and/or additional mailings to beneficiaries to try to increase survey response rates.

8.2.6 Hospitalization and ED Measures

A little more than half of all interviewed HHAs mentioned focusing on activities designed to improve their claims-based outcomes (i.e., ED use without hospitalization, unplanned acute care hospitalization). To address these outcomes, they focused on reducing readmissions/rehospitalization rates, acute care hospitalization rates, and ED use. The activities to address these measures varied but generally fell into three categories: changes in how and when care is provided, how data analysis is conducted, and improvements to systems of communication.

Some agencies change how and when care is provided.

Similar to last year's findings, interviewees most commonly discussed trying to "frontload" visits—scheduling more visits early in an episode of care—in order to impact some of the claims-based measures. The goal of frontloading visits is to provide more care early on, when the beneficiary may have the highest risk of an unplanned ED visit, hospitalization, or hospital readmission.

A few agencies mentioned including caregivers in visits done early in the episode of care so that the clinicians can train both the beneficiary and the caregiver(s) on issues such as ambulation and fall prevention, thereby reducing the risk of avoidable hospitalizations. Another agency sought to reduce unnecessary ED visits by working with physicians' offices to obtain advance orders for common issues experienced in beneficiaries' homes. This HHA explained that an advance order can be used to give clinicians direction on steps to take in case of an event rather than sending the beneficiary to the ED. Reportedly, this practice has met with resistance by some community physicians. Still, other agencies mentioned the importance of educating patients and physicians on when to call the HHA or the treating physician before considering going to the ED.

One agency discussed its focus on improving readmission and rehospitalization rates in response to the HHVBP Model. The HHA first identified that heart failure and Chronic Obstructive Pulmonary Disease (COPD) patients accounted for most of the agency's readmissions and rehospitalizations. In order to try to address these issues, the agency designed standard "bundles of care" for all heart failure and COPD patients to ensure everyone starts with the same level of care (adjustments can be made to account for different levels of illness). To combat the need to go to the hospital, the bundles of care include consistent monitoring by requiring a standard number of nurse and therapist visits early in a patient's episode, as well as remote patient monitoring.

Utilization data and risk scores help in targeting potential interventions.

Some HHAs described analyzing data to identify beneficiaries at greater risk of readmission, hospitalization and/or ED use. A few of these agencies described using their OASIS data-scrubbing software to generate a list of patients who are at particular risk for hospitalization or readmission, or using risk scores to prioritize potential interventions. Other agencies reported routinely conducting root cause analyses or retrospective reviews of all their hospitalizations to determine if something could have been done differently to avoid a hospitalization. One agency analyzed which beneficiaries go to the ED and at what time of day, finding that patients are generally going to the ED after-hours to have medications filled (often for opioids). The agency developed a program to work with beneficiaries and their physicians, reminding the patient to call the agency for after-hours assistance rather than going to the ED. Although several agencies reported trying to combat unnecessary ED use by encouraging both patients and community physicians to call the HHA about an issue rather than defaulting to going to the

ED, several agencies in rural areas noted challenges associated with the lack of alternatives for after-hours care other than the ED.

8.3 HHVBP Connect

As part of our quantitative analyses, we examined the use of HHVBP Connect by HHAs in HHVBP states during the second performance year of the Model (2017). HHVBP Connect is an interactive web-based platform for HHAs in HHVBP states that is designed to facilitate learning and collaboration on topics related to the HHVBP Model. The focus and use of HHVBP Connect resources shifted from 2016 to 2017 from introductory information to more quality improvement resources, reflecting the Model's progression. In 2017, the introductory information was rarely used, but use of updates and quality improvement resources remained high, especially those related to OASIS measures, TPS, and payment adjustments. The types of resources most frequently used in 2017 were downloading resource files (7,473 total downloads of 115 different resources that were downloaded) and attending live webinars (2,398 cumulative participants across all 15 webinars). This was consistent with patterns in agency use of HHVBP Connect resources during 2016. However, total downloads and webinar participation were both lower in 2017. HHA characteristics associated with higher HHVBP Connect webinar participation during 2017 included non-profit status, hospital-based, larger size, and having a smaller CY 2019 payment adjustment. We provide further details of our analyses of HHVBP Connect in Section C-7 (Page 95) of the Technical Appendix.

8.4 HHVBP Self-Reported Measures

As part of our quantitative analyses through the second performance year of the HHVBP Model, we examined the reporting rates of the three HHVBP measures among HHAs in the HHVBP states via the Secure Web Portal:

- Influenza Vaccination Coverage for Home Health Care Personnel;
- Herpes Zoster (Shingles) Vaccination for Patient; and
- Advance Care Plan.[21]

In 2017, 90.9% of all agencies in HHVBP states reported both herpes zoster vaccination status of patients and whether an advance care plan was present, and 83.4% reported the influenza vaccination status of HHA personnel. All agencies that reported on influenza vaccination also reported the other two measures. As such, the agency reporting rate for influenza vaccination is the same as the rate at which agencies reported all three measures (83.4%). Only 9.1% of agencies reported none of the measures. These 2017 reporting rates are slightly higher than 2016, when 73.6% of HHAs reported all three measures and 17.3% reported none of the measures. As we found in 2016, reporting rates tended to be lower among small, freestanding, for-profit, newer, and non-chain agencies. Low TPS scores and negative payment adjustments were also associated with lower reporting rates (see Exhibit C-11 on Page 94 in the Technical Appendix).

[21] The "Advance Care Plan" measure reflects the "Percentage of patients aged 65 years and older who have an advance care plan or surrogate decision maker documented in the medical record or documentation in the medical record that an advance care plan was discussed but the patient did not wish or was not able to name a surrogate decision maker or provide an advance care plan." (HHVBP Connect, 2016).

9. Results: Impact of HHVBP on Referrers

This chapter presents findings on the impact of HHVBP from a series of interviews we conducted with providers who may refer patients to a home health agency for treatment. Discharge planners, physicians, and physician office staff (collectively "referrers") are well-positioned to observe changes in beneficiary selection of and access to home health care that have occurred since the implementation of HHVBP. To capture the perspective of a variety of referral sources, interviews with referrers included a mix of different provider types, including acute care hospitals, SNFs, rehabilitation facilities, critical access hospitals, and community providers. While the majority of home health episodes are initiated as a referral from the community (66% of home health episodes),[22] most of the interviews we conducted were with discharge planners at hospitals and SNFs because of challenges associated with contacting and interviewing physicians. In addition, discharge planners or social workers in inpatient facilities handle larger volumes of home health referrals than staff at any individual physicians' office, which generally refers to home health less frequently, so they could speak about a larger volume of referrals. However, their experiences referring patients from inpatient settings may not reflect experiences of those referring to home health from the community.

The interview guide used for this effort included questions about: 1) the professional background of the interviewee; 2) the background of the referring hospital/SNF/practice, including the population served; 3) and experiences referring patients to HHAs. In our 58 interviews with referrers in HHVBP states, we found that almost all referrers across all nine HHVBP states said that they continue to have no difficulties referring Medicare FFS patients to home health services—noting that these patients are very desirable for HHAs and generally have the most agencies to choose from. Overwhelmingly, interviewees stated that a prior relationship or favorable experience with an HHA (either on the part of the patient, their family, or friends) is the most common patient consideration when choosing an HHA. HHA quality data was not commonly reported as a major consideration in the referral process. Few referrers reported experiencing changes to their working relationships with HHAs since HHVBP was implemented. About half of the referrers interviewed noted they experienced some form of increased marketing and outreach by HHAs since January 2016, but this was not attributed to HHVBP. The remainder of this section presents detailed findings based on interviews conducted with referrers during the third performance year of the HHVBP Model (2018).

Broadly, access to home health services for Medicare FFS beneficiaries has not been affected by HHVBP and appears to remain adequate, based on interviews with referral sources in the HHVBP states. The themes that emerged from this data collection effort include:

- Traditional FFS Medicare beneficiaries continue to have easy access to home health care.
- Various factors influence the referral process and patients' selection of HHAs.
- Few referrers have experienced changes to their working relationships with HHAs, but they have observed changes in agency supply and increasing specialization of care.
- Interviews revealed mixed findings on changes in HHA marketing strategies.

[22] MedPAC (Medicare Payment Advisory Commission). (2016) Report to the Congress: Medicare Payment Policy, Chapter 8: Home Health Care Services Accessed from here.

- Most referrers view pay-for-performance as a positive trend.

Below, we present findings on each of these themes.

9.1 Referrers' Views on Beneficiary Access to Home Health Care

Interviewers asked referrers to describe any changes they have seen in terms of access to home health services for both Medicare enrollees and beneficiaries with Medicaid or commercial insurance. While the majority of referrers stated that they have not seen any changes in access to home health care for either their Medicare patients or non-Medicare patients since the start of the HHVBP Model, almost all referrers described significant and ongoing differences in home health care access between Medicare FFS enrollees and patients with other types of insurance. Almost all referrers across all nine states said that they have had no difficulties referring Medicare FFS patients to home health services—noting that these patients are very desirable for HHAs and generally have the most agencies to choose from. According to one referrer in Arizona,

> *"Straight Medicare [FFS] is easy. We love straight Medicare [FFS] because it's never difficult to get them services."*

Nonetheless, some interviewees mentioned that they have experienced some difficulty obtaining services for any patients with behavioral health or psychiatric needs, patients who live in remote or rural areas, or patients who need physical therapy, regardless of the payer. However, most referrers attributed these issues to persistent staffing shortages in their market and did not think that access for these patients has worsened since January 2016.

Interviewees in seven out of the nine HHVBP states reported that they have experienced issues finding HHAs that will accept Medicare Advantage enrollees. Referrers described that some agencies limit the number of Medicare Advantage patients that they accept or will only accept patients with certain Medicare Advantage plans. In most states, however, referrers indicated that this trend began many years before the initiation of HHVBP. Interviewees in Florida and Tennessee, however, believed that since early 2016, agencies have become stricter about the number of Medicare Advantage beneficiaries that they will accept and that Medicare Advantage plans are increasingly stringent about the authorization process for home health. It was unclear if this change was related to HHVBP or was due to other factors in the home health market.

Referrers in most HHVBP states generally face more challenges referring patients with Medicaid or commercial insurance to home health care. They consistently report challenges in finding HHAs that will accept these patients due to low reimbursement or complex referral processes. According to some referrers, in certain areas, only one agency may accept Medicaid or commercial insurance. Some referrers stated that it can be almost impossible to find an agency that will accept certain Medicaid patients (e.g. patients with multiple continuing antibiotics, who need vacuum-assisted closure for wounds, or have significant behavioral health needs). While most referrers stated that limited access for Medicaid patients and patients with commercial insurance has not changed in recent years, some referrers, particularly in Arizona and Tennessee, thought that access to home health services has diminished for their Medicaid patients since January 2016. Nonetheless, it is unclear to what extent, if any, this change is related to HHVBP or is due to other factors occurring in the markets, such as

increased regulation and restrictions on the part of Medicaid managed care plans and commercial insurers when referring to post-acute care.

9.2 Factors that Influence the Referral Process

To better understand the relationship between HHAs and their referral sources, we asked referrers to describe the major factors that influence decisions related to selecting a HHA. In addition to providing insight on how beneficiaries (and their referrers) select HHAs, the responses to this question provided important context on market-level referral patterns and relationships between providers.

The vast majority of referrers stated that they provide patients with a list of HHAs from which to choose. Interviewees working in hospitals also typically emphasized that they are careful not to make recommendations but instead identify options for patients since recommending specific agencies would violate hospital conditions of participation. Some referrers provide a list of all HHAs within an area while others provide a more curated list based on the referrer's preferred agencies or based on the patients' insurance. These lists may include quality data or information about any specialized programs that the agencies offer. When asked how many different agencies they refer to, most referrers stated that they provide patients with a list of five to ten agencies. About 20% of interviewees, however, indicated that they have working relationships with three or fewer agencies, while another 20% of interviewees provide referrals to 15 agencies or more.

While interviewees described a variety of factors that inform the referral process and the information that they provide to patients, overwhelmingly, interviewees stated that a prior relationship or favorable experience with an HHA (either on the part of the patient, their family, or friends) is the most common patient consideration. Though less common, other considerations that referrers mentioned as factors in patients' selection of home health providers include:

Insurer networks restrict patient choices. About a third of interviewees mentioned restrictions based on insurance coverage as a determining factor in patients' choice of agency; the majority of referrers in North Carolina and Florida noted that this in an important factor when selecting an agency. Referrers emphasized that they never or rarely have issues referring patients with FFS Medicare to home health services as almost all HHAs will accept these patients and they do not require pre-authorization; however, for patients that have Medicare Advantage plans, commercial insurance, or Medicaid, referrers reported that restrictions based on the insurance plans that HHAs will accept often affects patients' choices. Some referrers added that they tell the patients with Medicare Advantage plans, commercial insurance, or Medicaid which HHAs accept their insurance.

Partnerships or provider affiliations are a factor for some referrers in health systems or Accountable Care Organizations (ACOs). Particularly if the patient does not have a preference, referrers that are part of a health system or an ACO which also includes an HHA said they may refer patients to their affiliated HHA. While this was mentioned by about a quarter of interviewees and was discussed by referrers in almost all states, referrers in Arizona and Florida cited this as a consideration most frequently.

Location is considered by some patients and referrers. Approximately a quarter of interviewees stated that the location of HHAs and their service areas is a factor that they and their patients consider when selecting an agency. Particularly for referrers in rural areas, or referrers that serve a large geographic region, the number of HHAs that serve the area where a given patient lives may limit their choice.

Specialized programs are increasingly common and influence patients' choices. About a quarter of interviewees reported that patients will consider the presence of specialized services or programs for specific diagnoses when choosing an agency. Several interviewees mentioned that these programs have become increasingly common over the last few years and attributed this trend to HHA efforts to differentiate themselves from the competition through specializing in specific diagnoses. (COPD, Parkinson's, diabetes, and congestive heart failure were all mentioned as common diagnoses for which HHAs offer specialized services).

Quality data are not a major consideration in the referral process. The majority of interviewees did not specifically cite formal quality data, such as that available through the Home Health Compare website, as a factor they consider or encourage patients to consider when providing patients with information on HHAs. As noted above, referrers have found that patients instead primarily assess quality by relying on their own previous experience with an agency or using anecdotal experiences from family or friends about specific agencies. Many interviewees were unaware of Medicare's Home Health Compare website, even if they were aware of quality data on other "Compare" sites, such as Nursing Home Compare. However, some interviewees, particularly in Nebraska and Florida, mentioned that they either directed patients to Home Health Compare or provided quality data as part of the list of agencies that they provided to their patients.

The majority of referrers reported that there are not any HHAs to which they avoid making referrals altogether. Many noted that they have no reason not to refer to an agency or that they do not think it is their role to provide guidance on which agency a patient should or should not select. About a third of referrers, however, did indicate that there are some agencies in their area that they typically do not include on lists of HHAs provided to patients. The most common reason that referrers cited is a lack of relationship or evidence of a pattern of unfavorable patient experiences with an HHA, particularly, delays in the initiation of care. While some referrers mentioned that they would narrow down the list of agencies to a few that they believed would be a good fit for a patient based on their insurance, geographic location, or diagnosis, few referrers indicated that they consistently exclude particular agencies based on previous negative experiences or other evidence of poor quality of care.

9.3 Referrers' Working Relationships with HHAs

To understand whether HHAs have changed the way they work with referral sources or select patients since the advent of HHVBP, we asked referrers if they have observed changes to their working relationships with HHAs since January of 2016. Most referrers were unfamiliar with the HHVBP Model. Among those that knew about HHVBP, few attributed any changes in their working relationships with HHAs to the introduction of HHVBP.

Interviewees described a variety of market-level changes since January 2016. Across states, referrers described that agencies are increasingly implementing specialized programs for specific diagnoses. Additionally, several interviewees in Massachusetts and North Carolina mentioned that they have seen an increase in the number of agencies in their market or an increase in the number of agencies that they are providing referrals to; one referrer in Massachusetts described that the market has become "oversaturated with home health agencies." Conversely, a few referrers in Tennessee stated that their market has experienced significant consolidation in the number of agencies that are available.

When asked to describe changes in working relationships with HHAs since January of 2016, about half of the referrers believed that agencies' marketing strategies have shifted over the last few years, with several referrers remarking that many agencies have become more aggressive and are offering more "personalized" marketing to each referral source. Many HHAs employ sales representatives or liaisons who market directly to referrers or may meet with patients prior to discharge to discuss home health care; several referrers reported that these liaisons have increased the frequency of their visits over the past few years. According to one referrer in Maryland,

> *"Usually you would only see [the sales representatives] on a special occasion or when they were promoting something and wanted to drop it off. Now, I see them all the time."*

According to interviewees, these liaisons regularly show up unannounced and are pushing new programs aimed at preventing rehospitalizations or designed for patients with specific diagnoses.

In addition to conducting more drop-in visits, some referrers observed other trends among HHAs in their markets. Some HHAs have rebranded or renamed themselves completely. (Interviewees mentioned this particularly in reference to agencies with a poor reputation among referral sources.) Referrers also mentioned that some high-performing agencies use their star ratings on Home Health Compare as a way to differentiate themselves from other HHAs.

While interviewees in all states discussed agencies' marketing tactics, not all referrers indicated that they experienced a change since January 2016. A few referrers noted that their hospital system or facility prohibits marketing in the hospital or requires that an HHA have a referral before they can enter the building. Other referrers stated that they frequently interact with HHA sales liaisons or marketing staff but did not believe that marketing has changed in recent years.

9.4 Referrers' Views on Pay-for-Performance

Although the vast majority of interviewees were not familiar with the HHVBP Model or had a very limited understanding of it, we asked them to speculate on the potential impact or any unintended consequences associated with paying HHAs based on their performance on quality measures.

While most referrers believed that value-based purchasing has the potential to be a positive trend for home health care, several referrers voiced their concerns that agency closures related to reduced payment could have adverse impacts on their patients, including delayed initiation of care and reduced patient choice, particularly in areas that already have a limited number of HHAs. Another common concern that referrers mentioned was that reduced reimbursement (or the threat of reduced reimbursement) could lead to agencies being more selective about the patients that they admit. Despite these concerns, most interviewees believed that value-based purchasing will lead to an increased emphasis on quality and will reward high-performing agencies while "weeding out" agencies with lower scores. Several referrers also believed that HHVBP and an increased emphasis on quality would facilitate patients making more informed choices about home health care.

10. Conclusion

As described in the sections above, this Second Annual Report presents findings of our evaluation for the first two performance years of the HHVBP Model. Moving forward, we will continue to address the goals and research questions identified for this evaluation (see Section 1). At the same time, our future evaluation activities will continue to build on our findings from these first two years. Below, we provide a brief summary of some of the study's limitations and conclude with a discussion of further analyses and activities that we are planning as part of this evaluation.

10.1 Limitations

We note certain limitations to consider when interpreting the results presented in this report. Our empirical approach for this report reflects the adoption of a unified, regression-based comparison group approach that adjusts for a core set of model covariates across a range of impact measures. This approach facilitated the interpretation of results across impact measures while also allowing for some flexibility where supported by theory and empirical evidence. While this avoided the complexity of the comparison group methodology employed in our previous report, it also limited our ability to tailor the analytic approach and set of covariates for adjustment list based on factors that are most relevant to individual impact measures.

More broadly, we examined the effect of HHVBP for more than 25 impact measures. These multiple comparisons increase the likelihood of a Type I error—that is, finding a result by chance. Therefore, rather than examining the D-in-D results in isolation, we recommend taking a broader view of all of the findings together, including the relationship between measures (e.g., the frequency of unplanned hospitalizations and Medicare spending), the early stage of implementation of the Model (e.g., before HHVBP HHAs have received any payment adjustments), and results from our primary data collection efforts (i.e., agency and referrer interviews as well as the surveys fielded to agencies in HHVBP and non-HHVBP states).

Consistent with our findings based on the first performance year of the HHVBP Model, we note characteristics of certain impact measures and their corresponding data sources that may affect the interpretation of results. For example, OASIS-based measures of improvement in patient outcomes are based on data elements reported by HHAs that are inherently more subjective than claims-based outcomes (e.g., an unplanned hospitalization). As such, consistency of reporting—both across agencies (cross-sectional) and within agencies (longitudinal)—is more variable with many of the OASIS-based measures than for the claims-based measures. As a result, our findings for the OASIS-based outcome improvement measures may be a reflection of changes over time in how HHVBP agencies record and assess patient status, rather than of improvements in the quality of care. Additionally, changes in the OASIS assessment instrument itself (Exhibit 11) may be a source of inconsistency in risk adjustment of the OASIS measures over time.

10.2 Future Activities

Motivated in part by our findings presented in this report, we discuss several research priorities that will guide our analyses in the upcoming year of the evaluation.

Examine the effect of payment adjustments on quality, utilization, and Medicare spending. To date, our analysis of secondary data has focused on the impact of HHVBP prior to incentive payments taking

effect. For future analyses that use data for CY 2018 and later years, it will be of interest to consider whether larger changes in quality of care, utilization, and Medicare spending are observed once the Medicare payments to HHVBP agencies under the HH PPS are adjusted for quality of care. For example, we will examine whether agency payment adjustments affect trends in home health utilization, beneficiary case-mix, and Medicare spending among the populations they serve. For future reports that use data for multiple payment years (i.e., CY 2019 – 2022), we will assess whether effects of HHVBP intensify as the payment adjustment range increases over time.

Evaluate potential changes in the case-mix of beneficiaries receiving home health services. In addition to having a potential impact on the utilization of home health services and of potential substitutes for home health among FFS beneficiaries, HHVBP payment adjustments may affect the case-mix of beneficiaries receiving home health services. In future reports, we will examine potential changes over time in home health patient case-mix, which may help inform conclusions regarding the effects of the HHVBP Model on utilization of services and access to care. Our examination of case-mix may also be informed by preliminary findings using the PDGM—CMS' recently enacted refinement to the HH PPS that will become effective in CY 2020—which was developed to address vulnerabilities in the current system (HHS, 2018).

***Continue to incorporate more recent agency perspectives and quantitative data*.** As with the analyses in this report, future analyses will benefit from the additional experience of HHAs and home health beneficiaries under HHVBP. Ongoing yearly interviews with agency staff will allow us to examine whether initial trends in agency operations evolve, both as payment adjustments are applied and to the extent that HHAs may increasingly gain insights about how to modify practices to improve performance on quality measures. In continuing to incorporate more recent quantitative data, we will be able to examine whether initial trends observed in this report continue after the initial payment adjustments take effect.

Expand our analyses of vulnerable populations. For this year's report, we examined trends in the two HHVBP claims-based measures for two groups of potentially vulnerable beneficiaries: beneficiaries living in a rural versus urban area, and beneficiaries receiving care from smaller versus larger agencies. We will expand these initial analyses to other beneficiary subgroups who may be vulnerable (e.g., high health needs) as well as additional measures of quality. In addition, next year's report will include findings from the HHCAHPS survey that we fielded to beneficiaries who receive care at small HHAs in 2018 to assess the impact of the Model on patient experience among these potentially vulnerable patients.

Relatedly, as HHVBP payment adjustments are applied to home health FFS episodes provided by agencies in the HHVBP states, we will be able to assess potential risks to vulnerable populations for whom there may be unintended consequences of the Model for beneficiary access to care and quality of care. This might occur, for example, if providers perceive they are disadvantaged under HHVBP for treating vulnerable beneficiaries for whom it often is more difficult to achieve high quality/improved performance levels and seek to limit services to these types of patients. We will also assess changes in case-mix, agency staffing, and quality measure performance among HHAs with payment reductions, as well as changes in market entry/exit that could have implications for beneficiary access to care in certain geographic areas (e.g., for rural populations).

Explore heterogeneity of HHVBP states. While a primary goal of the evaluation is to examine the impact of the HHVBP Model across all nine Model states, there may be heterogeneity across states that is important to consider. In particular, individual HHVBP states may differ with regard to underlying patterns and trends in the provision of home health care that could have implications for examining effects of the Model. For example, we observed that Florida contributes disproportionately to the declining home health utilization that we observed among all HHVBP states combined both before and after implementation of HHVBP. There are similar indications among individual states in our comparison group (e.g., Texas). Other factors, including payer sources and patient characteristics (and their resulting influence), may also vary from state to state. For example, effects among states with subpopulations of interest (e.g., Iowa and Nebraska have relatively large rural populations) may not be evident from the analysis of all HHVBP states combined. We will continue to examine such heterogeneity and its potential implications for estimates of the HHVBP Model's impact.

***Explore heterogeneity of HHAs*.** Findings from our interviews with HHAs suggest differences in how well-positioned agencies are to respond to the incentives and payment adjustments under HHVBP. As part of these interviews, certain agencies also noted changes in operations due to their payment reductions, which may be an early indication of a growing impact as the payment adjustments take effect and increase from 3% to 8% over the course of the Model (Exhibit 1). We will explore sources of variation in agency performance under HHVBP, which could have implications for patterns in HHA market entry and exit and potential disparities in beneficiary access to and quality of care. Using data starting in CY 2018 when the payment adjustments have taken effect, we will conduct separate analyses to assess the impact of HHVBP on the types of HHAs in operation and on the patient populations they serve.

Continue to examine agency Total Performance Scores as HHVBP evolves. Agency TPS scores serve as broad indicators of HHA performance and, importantly, serve as the basis for adjusting Medicare payments to agencies in the nine HHVBP states. As data for future performance years become available, we will continue to use TPS scores to compare the overall performance of agencies in HHVBP and non-Model states within each performance year. In doing so, we will continue to consider the role of any differences in the individual measure scores that comprise the TPS as well as any changes to the TPS methodology. For example, CMS changed the way in which the TPS is calculated for CY 2019, the fourth performance year. Instead of weighting OASIS-based, claims-based and HHCAHPS measures equally as was done in the first three performance years, the new methodology weights OASIS-based and claims-based measure categories at 35% and the HHCAHPS measure category at 30% (HHS, 2018).

Extend our analyses of patterns and trends in total Medicare spending and utilization. As an addition to this year's report, we examined three related measures of total Medicare spending for FFS beneficiaries receiving home health care to ascertain whether there is a broader impact of the Model on the costs to Medicare. We will continue to examine potential effects of the Model on overall Medicare spending for FFS home health beneficiaries in future performance years when the HHVBP payment adjustments are being applied and explore changes in the utilization of specific types of services that may be contributing to any broader cost savings.

Assess other CMS initiatives that may affect Model impact. There are several ongoing CMS policy changes and initiatives that may impact HHA operations and beneficiaries' use of home health services. For example, CMS recently announced it will implement the PDGM, effective January 1, 2020 (HHS,

2018). The PDGM will change the unit of payment for a home health episode from 60 days to 30 days and eliminate the use of therapy service thresholds that are currently used to case-mix adjust HH PPS payments. Similarly, there is continued growth of ACOs (CMS, 2018b) and other CMS initiatives that incentivize episode-based payment and care coordination (e.g., the Bundled Payments for Care Improvement Initiative). We will examine how these initiatives may affect inferences about the impact of the HHVBP Model, and where feasible, account for such external factors in our analyses.

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