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

Third Annual Report

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Arbor Research Collaborative for Health and L&M Policy Research

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NOTICE
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Table of Exhibits

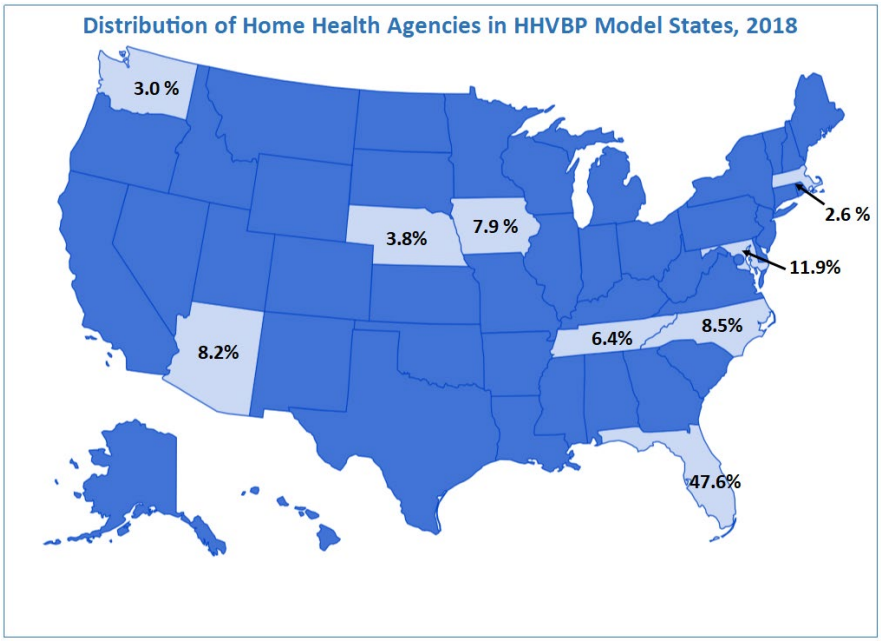
Acronym List

Acronym	Term
ACH	Acute Care Hospitalization
ACO	Accountable Care Organization
ADL	Activities of Daily Living
APM	Alternative Payment Models
BPCI	Bundled Payment for Care Improvement Initiative
CJR	Comprehensive Care for Joint Replacement
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
DRG	Diagnosis Related Group
ED	Emergency Department
FFS	Fee-for-Service
FY	Fiscal Year
HCC	Hierarchical Condition Category
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
HRRP	Hospital Readmissions Reduction Program
LUPA	Low-Utilization Payment Adjustment
MA	Medicare Advantage
MDC	Major Diagnostic Category
MS-DRG	Medicare Severity Diagnosis Related Group
MSSP	Medicare Shared Savings Program
OASIS	Outcome and Assessment Information Set
PAC	Post-acute Care
PDGM	Patient-Driven Groupings Model
PEP	Partial Episode Payment
QAPI	Quality Assurance and Performance Improvement
QoPC	Quality of Patient Care
RAP	Request for Anticipated Payment
RQ	Research Question
SNF	Skilled Nursing Facility
SOC	Start of Care
TPS	Total Performance Score
SHP	Strategic Healthcare Programs

Executive Summary

Background

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 randomly 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 all eligible agencies in the nine selected states are adjusted upward or downward using a budget neutral method 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 primary goals of this evaluation are to understand how the shift in financial incentives under the HHVBP Model may influence agency behavior and in turn quality of care, utilization of services, Medicare spending, and beneficiary experience. We report findings based on data available for both the baseline period prior to HHVBP implementation (2013-2015) and cumulatively through the latest performance years of the model. To achieve the goals of this evaluation, we employ a mixed methods research design that incorporates both qualitative and quantitative analytic approaches.

We use qualitative methods including interviews with both HHAs in HHVBP states and home health chain organizations that operate in HHVBP and non-HHVBP states. We use quantitative analyses to examine a range of outcomes of interest, including the performance measures that are used to calculate an agency's TPS score as well as measures of Medicare spending. To evaluate the effects of HHVBP, we use multivariate linear regression within a difference-in-differences (D-in-D) framework to compare the changes observed in the nine HHVBP states with those in the 41 comparison states.

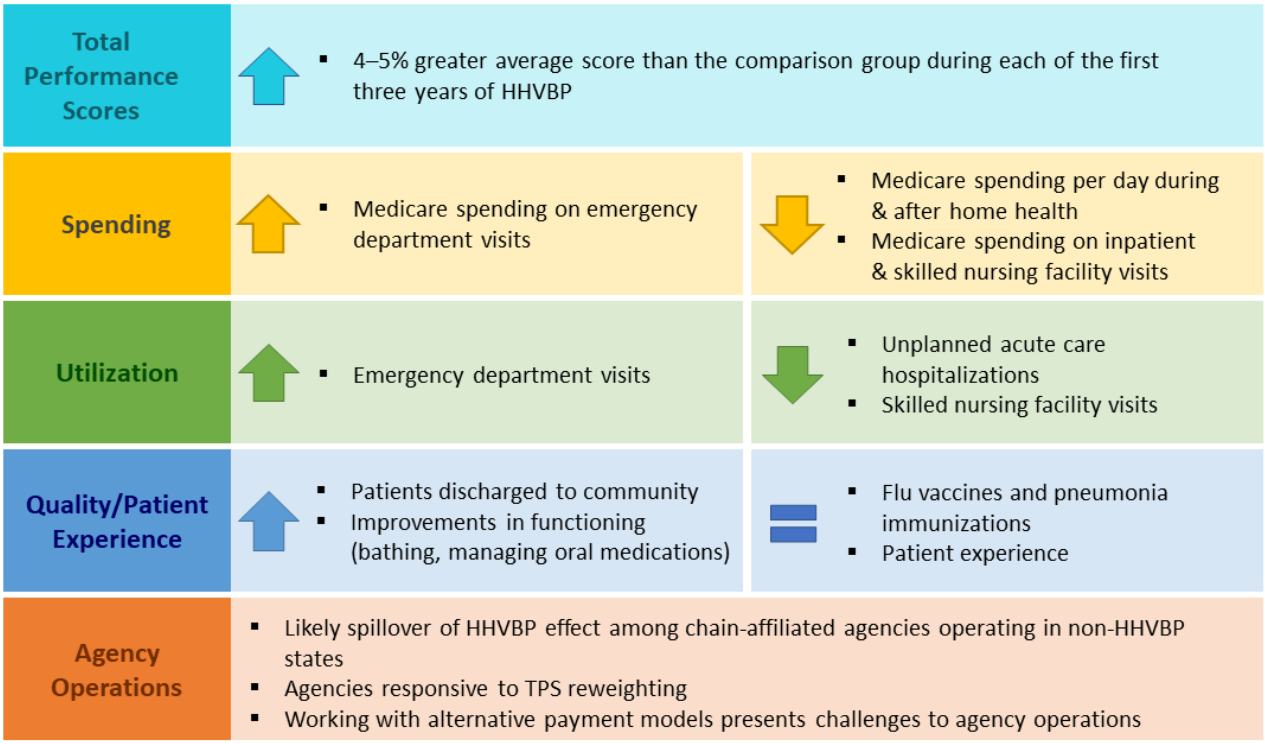
This Annual Report focuses on the experience of home health patients and agencies through 2018, the third performance year of the HHVBP Model, and the first year that agencies in the HHVBP states received a payment adjustment. The HHVBP Model payment adjustments are applied to Medicare payment amounts 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 were applied in calendar year CY 2018 based 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 beginning at 3% in CY 2018 and up to 8% planned for CY 2022.

Key Findings

The figure below provides an overview of key quantitative and qualitative findings (Exhibit ES-1). A summary discussion of our evaluation findings is provided below.

Exhibit ES-1. Overview of Key Findings in Third (2019) Annual Report



The impacts of HHVBP on quality, utilization, and Medicare spending in the first payment year are similar to the model impacts in previous years. Overall, our findings for the first year of HHVBP payment adjustments (2018) were similar to those for the two earlier years of the model (2016-2017), reflecting modest improvements in certain quality measures, modest declines in some but not all aspects of utilization, and an overall reduction in Medicare spending. There was no consistent evidence across quality, utilization, and spending measures of successively larger impacts of HHVBP due to the application of the payment adjustments in 2018. While the estimated impacts on Outcome and Assessment Information Set (OASIS)-based outcome measures in 2018 exceeded those for earlier years, the differences were less than 3 percent of the baseline average measure values in all cases.

HHVBP Snapshot, 2018

- **1,982** home health agencies in operation
- **1,399,939** home health episodes provided
- **815,891** Medicare FFS beneficiaries covered

In addition, trends in performance based on the initial 2016 TPS scores, which agencies learned about during 2017 and determined payment adjustment amounts during 2018, did not provide evidence that the application of the initial payment adjustments in 2018 had an impact above and beyond the overall effects of the model that we observed through the first two years of the model. For example, we hypothesized that the initial payment adjustments in 2018 may have been more likely to prompt a response from HHVBP agencies with lower overall performance (relative to their non-HHVBP counterparts), whose payments were being reduced the most per patient due to HHVBP. However, we did not find clear evidence during 2018 that the largest performance gains among HHVBP agencies (relative to their non-HHVBP counterparts) were occurring among those with lower initial TPS scores. Instead, there were indications of relative performance gains for both HHVBP agencies with lower and higher initial TPS scores.

Given the smaller magnitude of the payment adjustments (+/-1% for two-thirds of agencies) in 2018 relative to those in future model years, it will be important to determine whether the planned larger payment adjustments lead to relatively larger impacts of HHVBP.

***HHA Total Performance Scores are higher in each of the first three years of the model*.** TPS scores serve as broad indicators of HHA performance and are the basis for adjusting Medicare FFS payments to agencies in the nine model states. For each of the first three years of the model (2016-2018), TPS scores for agencies in HHVBP states were higher overall relative to the TPS scores calculated for agencies in the non-model states. We did not find evidence of a larger difference in TPS scores between HHVBP and comparison agencies emerging in 2018, as the initial HHVBP payment adjustments were being applied. Through the first three years, the differences in agency TPS scores largely reflected higher measure scores for the seven OASIS-based outcome measures.

Evidence of reductions in unplanned hospitalizations and use of skilled nursing facilities, but an increase in emergency department use. Through the first three years of HHVBP, we continued to find a modest impact of the model on the claims-based utilization measures that apply to FFS beneficiaries receiving home health services. This includes declines of 0.21-0.30 percentage points in unplanned hospitalization rates among first and all home health episodes, which corresponds to a 1.3%-1.8% decrease from average measure values pre-HHVBP implementation. We also found HHVBP to result in a 0.24 percentage point decline in the use of skilled nursing facilities (SNFs) among home health beneficiaries, which corresponds to a 4.9% decrease in average measure values relative to pre-HHVBP implementation. In contrast, we found that HHVBP resulted in faster growth (0.28 percentage point increase) in emergency department (ED) utilization not resulting in an inpatient hospital stay, corresponding to a 2.4% increase relative to average measure values prior to the HHVBP Model.

No early confirmation that specific HHA practices or patients with particular diagnoses explain the overall improvements in performance under HHVBP. During our previous interviews with HHAs in HHVBP states, some agencies mentioned scheduling more skilled nursing visits early in an episode of care (commonly termed *frontloading* visits by home health practitioners) as a quality improvement strategy. We found evidence of frontloading within the first four weeks of both HHVBP and non-HHVBP home health episodes in descriptive analyses. This suggests such practices were not different between

HHVBP and comparison states either before or during the HHVBP Model implementation and is unlikely an effect of the model.

We also found no evidence from descriptive trends that HHVBP has reduced hospitalizations for home health patients with any particular primary diagnoses when they are hospitalized. Rather, the findings suggest that the HHVBP impacts on hospitalizations do not affect which primary diagnoses are most prevalent for the hospitalizations. Further analysis will be needed to ascertain what specific actions by agencies, encouraged by HHVBP, explains the overall impacts on hospitalization rates that we have observed through the first three years of the model.

Declines in overall Medicare spending for FFS beneficiaries receiving home health services appear largely to be explained by reduced spending for inpatient and SNF services. Through the first three years of the model, we detected a 1.2% decline in average Medicare expenditures per day among FFS beneficiaries in HHVBP relative to the comparison group *during and within 30 days following* home health episodes. This overall decline can be explained by the observed slower rate of growth in HHVBP states relative to the non-HHVBP states in spending during home health episodes (rather than in the subsequent 30 days). The average annual reduction in total Medicare spending during and within 30 days following home health episodes for FFS beneficiaries receiving home health care in the model is $141 million. We did not find evidence that the application of the quality based payment adjustments in 2018 resulted in larger reductions in Medicare spending than the reductions we observed in 2016-2017 under the model.

Based on an examination of changes over time in the major components of Medicare spending, we found that the estimated savings due to HHVBP were due largely because of the reductions in spending for inpatient and SNF services. The results of our D-in-D analyses point to a 2.0% decline in average Medicare spending per day for inpatient services and a 4.0% decline in average spending for SNF services, which translates to estimated annual savings of $81 million and $39 million, respectively. In contrast, we found HHVBP resulted in an estimated 5.9% increase in average outpatient ED spending, which translates to increased annual spending of $11 million. This increase in ED spending represents a relatively small offset to the observed savings in inpatient and SNF spending due to the relatively small contribution of ED spending to overall Medicare spending for home health patients (approximately 1.6% in the baseline period). To date, we have found no overall effect of HHVBP on Medicare spending for home health services, which along with inpatient services represents one of the two largest components of Medicare spending for FFS beneficiaries receiving home health care.

Modest gains in quality of care include greater improvements in functional outcomes. There is a strong pattern through the first three years of the model of relatively small positive effects of HHVBP on many of the OASIS-based outcome measures used to calculate TPS scores. This includes a measure of discharge to the community and several measures of improvement in functional status. Our findings for these OASIS-based outcome measures show somewhat larger improvements in HHVBP states for six of the seven OASIS-based outcome measures used to calculate TPS scores, with cumulative impacts ranging from 0.7 to 1.3 percentage points over the first three years of the model. These relative gains occurred in a context where average measure rates exceeded 65% prior to implementation of HHVBP. We found no strong pattern in the effect of HHVBP during the first three years of the model for the OASIS-based process measures.

The greater improvements in functional outcomes during home health care under HHVBP occurred for FFS Medicare beneficiaries with lower functional status at the start of care. Although the lower ratings of severity at admission may partly reflect the increased attention of agencies to OASIS reporting and documentation as we reported in previous years, we also found evidence of growing overall case-mix severity among home health patients based on claims data for FFS beneficiaries. This finding may have implications for agency quality improvement activities.

No changes in patient experience with care. We continue to find no evidence of an HHVBP impact on measures of patient experience through the first three performance years of the model. Performance scores for the five patient experience measures derived from the Home Health Care Consumer Assessment of Healthcare Providers and Systems (HHCAHPS) survey (e.g., whether a patient would recommend the agency) remained relatively stable over time in both HHVBP states and non-HHVBP states. We also did not find evidence of substantially poorer levels of patient experience at small agencies in HHVBP states which may have resulted from the exemption of small agencies from HHCAHPS and in turn from the HHVBP performance incentives for HHCAHPS measures. Based on a separate survey data collection in 2018-2019 for a sample of beneficiaries at small agencies, we found no differences between small agencies in HHVBP and non-HHVBP states for two of the five HHCAHPS measures and relatively small differences for other HHCAHPS measures that suggest slightly better patient experience within small agencies in non-HHVBP states compared to HHVBP states.

No early evidence that HHVBP has led to changes in the overall use of home health services among FFS Medicare beneficiaries or materially affected the case-mix of home health patients. As part of our evaluation, we explored 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). Based on trends through the third performance year of the model, we did not find HHVBP to have an effect on either the percentage of FFS beneficiaries receiving home health care or on FFS home health episode rates. Further, while we observed a pattern of increasing clinical severity over time among home health patients for multiple case-mix measures, these trends were generally similar in HHVBP and non-HHVBP states. For one of three broad measures of case-mix, we found evidence of modestly lower growth in severity among patients receiving care from HHVBP agencies relative to agencies in non-HHVBP states in the post-implementation period. It will be important to continue to examine whether HHVBP encourages agency practices of admitting patients based on their case-mix, especially as the payment adjustments grow larger over time.

HHVBP agencies with consistently lower performance through the early stages of model implementation are not systematically more likely to care for beneficiaries with social risk factors. A potential unintended consequence of value-based purchasing initiatives such as HHVBP is that they may disadvantage providers caring for more vulnerable patients for whom it is more difficult to achieve higher performance levels and consequently lead providers to limit services to these types of patients. We found that 59% of agencies in HHVBP states with TPS scores in the lowest quartile of their state in one year continued to remain in this lowest quartile the following year. However, we did not find HHVBP agencies within the lowest TPS score quartile in each of the most recent two years of the model (2017-2018) to be more likely than other HHVBP agencies to care for home health populations having greater social risk factors. Nor did we find a pattern where HHVBP agencies with lower TPS scores were caring for patients with social risk factors in greater proportions than similar agencies in non-HHVBP states

over the same period. These early stage results provide no evidence that HHVBP created additional problems for populations with greater social risk factors to access care from HHVBP HHAs. Further analysis is needed to evaluate whether HHVBP has had a differential impact on certain types of agencies based on their patient mix or on certain patient subgroups.

Initial trends in agency entries and exits do not point to an impact of HHVBP on the overall availability of HHAs, and there is early evidence of greater improvements in access to higher-quality agencies in HHVBP states. We examined agency entry/exit because it may affect patient access to home health care. We did not observe changes in agency entry/exit rates during the post-HHVBP period, and rates of agency entries and exits remained similar for agencies in HHVBP states relative to those in non-HHVBP states. The current trends reflect only the first six months of HHVBP payment adjustments in 2018. We found evidence of improved access to higher-quality agencies across all states, with a larger increase occurring in HHVBP states compared to non-HHVBP states. The national trend reflects increasing size among higher quality agencies as opposed to growth in the number of higher quality HHAs. The benefits of access to high quality agencies do not accrue uniformly across beneficiaries and disparities for some beneficiary subgroups, such as Hispanics, Medicaid enrollees and rural residents, remain.

Interviews with home health chain organizations suggest there may be an HHVBP spillover effect through chain-affiliated agencies also operating in non-HHVBP states. Our interviews with representatives from home health chain organizations found that their approach to quality improvement did not vary by an agency's location in an HHVBP versus non-HHVBP state. To the extent that chain organizations engage in operational changes in response to HHVBP, this suggests some spillover of HHVBP activities in chain-affiliated agencies in non-HHVBP states. The diffusion of quality improvements due to HHVBP is a positive for the beneficiaries affected, although such diffusion weakens the estimate of the model's effects when comparing HHVBP and non-HHVBP states.

Many agencies are responding to technical adjustments to measures used to calculate the TPS score. Many of the HHVBP agencies interviewed during 2019 reported reinforcing existing strategies, initiating new practices, or planning future changes in response to the revised TPS score calculation formula that increases the weights for the unplanned hospitalization and ED use measures. Agencies drew upon a common set of strategies to reduce these forms of utilization, including patient education, scheduling more frequent skilled nursing visits earlier in a home health episode, educating and adding staff, improving care coordination, and communicating with patients via telephone. Most agencies perceived that the TPS weighting change will negatively impact them due, in part, to their patient case-mix.

***Other CMS payment initiatives pose challenges to home health agency operations*.** Agencies interviewed in both HHVBP and non-HHVBP states reported that working with CMS initiatives, including accountable care organizations (ACOs), and managed care plans presented challenges to their operations and care delivery, including restrictions on the number of visits and time-consuming authorization and appeals processes. In turn, agencies reported that these factors negatively impacted agency performance scores and often resulted in reduced patient satisfaction. Despite these challenges, agencies continue to work with managed care plans and ACOs to maintain good relationships with referrers and stay competitive in their respective markets.

State-level impacts vary across measures. We analyzed measures in each HHVBP state separately to understand how the model impacts vary among diverse regions with differing agency and beneficiary characteristics. For example, the regional groups from which Arizona, Florida, Nebraska, North Carolina

and Tennessee were selected for HHVBP had most episodes provided by for-profit HHAs during the 2013-2015 baseline period, whereas most episodes in the regional groups that include Iowa, Massachusetts, and Maryland were provided by non-profit HHAs. Meanwhile, the episodes from the regional group for Washington were almost evenly split between for-profit and non-profit HHAs.

Given the diversity in some agency and home health beneficiary characteristics across HHVBP states, our state-level D-in-D analyses reflect varying impacts of HHVBP across the heterogeneous regional groups. Five out of the nine HHVBP states—Arizona, Maryland, North Carolina, Tennessee, and Washington—drove quality improvements in the HHVBP group through higher agency TPS scores relative to their regional comparison groups. Three states—Arizona, Maryland, and Tennessee—showed the most consistent positive impacts on OASIS outcome measures, which represent 7 of the original 17 measures used to calculate agency TPS scores. Five states—Florida, Iowa, Massachusetts, Nebraska, and Tennessee—drove the aggregate results for claims-based spending and utilization measures.

The declines in overall Medicare spending observed across all HHVBP states combined was greatly influenced by Florida, which accounts for 40.5% of all home health episodes for Medicare FFS beneficiaries across the nine HHVBP states. In Florida, we found consistently strong evidence of intended impacts on unplanned hospitalizations among first home health episodes (-4.2% relative to Florida's baseline level) and unplanned hospital readmissions in the first 30 days of home health care (-5.6% relative to Florida's baseline level), with an offsetting unintended impact on ED use without hospitalization (4.8% relative to the state baseline level). Consistent with the reductions in unplanned hospitalizations and hospital readmissions in Florida, we found an increased percentage of episodes being discharged to the community in Florida relative to its comparison group. We also found evidence that the HHVBP incentives contributed to intended impacts in Tennessee on unplanned hospitalizations among all home health episodes (-3.6% relative to Tennessee's baseline level) and for SNF use (-11% relative to the state's baseline). The findings suggest that HHVBP's positive impact on HHA performance on the OASIS outcome measures in Tennessee may be associated with the intended HHVBP impact on hospitalizations and SNF use in that state. We did not find strong or consistent patterns at the state level for the OASIS-based process measures or the HHCAHPS measures.

Exhibit ES-2. Summary of Select D-in-D Findings Examined in Third (2019) Annual Report

Measure Domain	Impact Measure	HHVBP Model Effect (Cumulative)	D-in-D Estimate	Relative Change (%) with reference to 2013-2015 Average in HHVBP States
Utilization	*Unplanned Hospitalization among First FFS HH Episodes*	↓ **Decrease**	-0.21%	-1.3%
	Unplanned Hospitalization among All FFS HH Episodes	↓ **Decrease**	-0.30%	-1.8%
	ED Use (no Hospitalization) among First FFS HH Episodes	↑ **Increase**	0.28%	2.4%
	SNF Use among All FFS HH Episodes	↓ **Decrease**	-0.24%	-4.9%
Medicare Spending	Average Medicare Spending per Day among FFS HH Beneficiaries during and following HH Episodes of Care	↓ **Decrease**	-$1.62	-1.2%
	Average Medicare Spending per Day among FFS HH Beneficiaries during HH Episodes of Care	↓ **Decrease**	-$1.40	-0.9%
	Average Medicare Spending per Day among FFS HH Beneficiaries following HH Episodes of Care	**N.S.**	$0.13	0.1%
	Average Medicare Spending per Day among FFS HH Beneficiaries during and following HH Episodes of Care for Inpatient Services	↓ **Decrease**	-$0.93	-2.0%
Quality Measures	*Discharged to Community*	↑ **Increase**	0.65%	0.9%
	Improvement in Ambulation-Locomotion	↑ **Increase**	0.79%	1.2%
	Improvement in Bathing	↑ **Increase**	1.28%	1.8%
	Improvement in Bed Transferring	↑ **Increase**	1.30%	2.1%
	Improvement in Pain Interfering with Activity	↑ **Increase**	1.61%	2.3%
	Improvement in Dyspnea	**N.S**	0.46%	0.7%
	Improvement in Management of Oral Medications	↑ **Increase**	2.86%	5.6%
	Influenza Vaccination Coverage for Home Health Care Personnel	**N.S.**	-1.19%	-1.9%
	Pneumococcal Polysaccharide Vaccine Ever Received	**N.S.**	0.44%	0.7%
Patient Experience	*How often the HH team gave care in a professional way*	**N.S.**	-0.04%	-0.05%
	How well did the HH team communicate with patients	**N.S.**	-0.18%	-0.2%
	Did the HH team discuss medicines, pain, and home safety with patients	**N.S.**	-0.10%	-0.1%
	How do patients rate the overall care from the HH agency	**N.S.**	0.07%	0.1%
	Would patients recommend the HH agency to friends and family	**N.S.**	0.24%	0.3%

Notes: HHVBP performance measures for CY 2018 are in italics. N.S. = not significant. Statistical significance identified with p-values ≤ 0.10.

Conclusions

As we observed in the initial two performance years of HHVBP, there continued to be evidence of reduced rates of growth in Medicare spending for FFS beneficiaries receiving home health care as well as larger improvements in many measures of quality of care under the model, relative to non-HHVBP states. These effects include declines in the utilization of unplanned hospitalizations and SNF use that appear to be important drivers of the favorable impact on overall Medicare spending, more than offsetting spending impacts associated with observed increases in ED visits. Through the end of the first year in which the TPS scores, as measures of overall quality performance, were used to adjust Medicare payments to home health agencies, there is no clear evidence that these payment adjustments led to a more pronounced impact of the model on quality of care, utilization, or Medicare spending. Increases in the magnitude of adjustments in future years may change this finding.

For each of the first three years of the model, we have found somewhat higher TPS scores among agencies in HHVBP states. As an important contributor to these changes in overall performance, many of the OASIS-based measures show modestly greater improvement over time among beneficiaries served in HHVBP states. We continued to find no evidence of HHVBP effects on beneficiary responses about experience with care as the HHVBP payment adjustments were introduced.

Findings from our interviews with home health chain organizations suggest a "spillover" effect of HHVBP in chain-affiliated agencies operating in the 41 non-HHVBP states that may influence the measured effect of HHVBP. Based on interviews with HHAs, we found that agencies are responding to CMS' changes to the TPS by focusing their efforts on reducing unplanned hospitalization and ED use, as intended by these measures' increased weight in the TPS calculation. Agencies in both HHVBP and non-HHVBP states reported operational challenges in working with managed care plans and with CMS payment or care delivery initiatives with perceived negative effects on their performance scores.

The observed effects of the quality based payment adjustments in HHVBP in the initial year were relatively small. The initial adjustments could reach a maximum of +/-3%, yet approximately one-third of agencies received adjustments exceeding +/-1% during 2018. Given that the model is designed for the adjustments to become progressively larger, reaching +/-8% in 2022, analyses of HHVBP in future years will be instrumental in forming final conclusions about the impact of the model in an environment where HHA median profit margins are over 15%. With the financial incentives for quality improvement becoming substantially stronger over time, there is potential for additional intended and unintended effects of the model to emerge that may occur either overall or for specific subgroups of agencies or beneficiaries. These will be important areas for future evaluation as the model continues to evolve.

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 used as reporting years to set the rates used later 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 had a maximum range between -5% and 5%; in CY 2020, the payment adjustment range increases to -6% to 6%. These adjustments modify the otherwise applicable payment rates for HHAs under the Medicare home health prospective payment system (HH PPS). The first HHVBP payment adjustments occurred during CY 2018 were based on HHA quality performance levels achieved during CY 2016. Similarly, the payment adjustments occurring during CY 2019 were 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%

CMS contracted with Arbor Research Collaborative for Health (Arbor Research), in collaboration with 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.

We begin with a 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.

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

In 2017, Medicare paid a total of $17.7 billion for home health care under the HH PPS, a slight decrease from the previous year's spending of $18.1 billion, but over an 85% increase in spending since 2002 (MedPAC, 2019). 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, 2019). That is, unlike skilled nursing facility (SNF) services, Medicare does not require a preceding hospitalization for home health coverage, but 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).

Since 2001, 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, geographic variation in wages, as well as other factors to account for episodes associated with especially low or high resource use overall.[1] On January 1, 2020, CMS implemented the Patient-Driven Groupings Model (PDGM), a new method for determining the per fee-for-service (FFS) episode reimbursement amount for HHAs. Among the changes to this new case-mix adjustment methodology 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 eliminating the use of counts of therapy services to determine case-mix adjusted payments (HHS, 2019). The PDGM uses patient characteristics (e.g., diagnosis, functional status, and comorbid conditions), timing of episode, and admission source to categorize home health episodes into 432 case-mix groups, or home health resource groups (HHRGs) to distinguish relatively uncomplicated patients from those who have more severe medical conditions or

[1] For example, the HH PPS has an outlier policy to adjust payment for short-stay and high-cost outliers, including a low-utilization payment adjustment (LUPA) and partial episode payment (PEP) adjustment (HHS, 2017).

functional limitations. Each of the 432 HHRGs has a relative weight designed to reflect the average costliness of patients in that group relative to the average Medicare home health patient.

Under the PDGM, CMS generates the HHRGs weights using Medicare home health claims as well as data obtained from Outcome and Assessment Information Set (OASIS), an instrument used to conduct a comprehensive assessment of adult home care patients.[2] HHAs are required to complete and submit OASIS assessments for all of their served Medicare beneficiaries. As discussed in the next section, these data sources are also integral to home health quality measurement, including Home Health Compare (HHC), the Star Ratings program that allows consumers to more easily assess agency quality, and for measuring agency performance in the HHVBP Model.

1.2 HHVBP Performance Measures and Scores

1.2.1 HHVBP Performance Measures and Data Sources

As noted earlier, the payment adjustments for eligible HHAs under HHVBP are based on their TPS. For the first two performance years (2016-2017), an HHA's TPS was derived from its performance on 20 HHVBP Model performance measures (see Exhibit 2 below). In performance year 2018, CMS made changes to the TPS involving the three process measures derived from OASIS. 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.

With the exception of three self-reported measures, the measures included in the HHVBP measure set 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 on Home Health Compare and were included in the CMS Star Ratings prior to the start of the model.

[2] 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 1-3 (CY 2016-2018)

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[3]	Outcome	OASIS	HHC, Used in Star Ratings
Drug Education on Medications Provided to Patient/Caregiver during Episodes of Care[4]	Process	OASIS	N/A
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: (HHS, 2016), (CMS, 2018a), (HHS, 2019). 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]Agencies will be required to submit data for this measure through CY 2020, but it will be dropped from public reporting in April 2020 (HHS, 2019).

[4]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, 2018b) We do not include this measure in our analyses below.

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 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 [MA]), 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 MA) and Medicaid patients who are 18 years and older and receiving skilled services.[2]

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 home health 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 rely on key data elements reported by other health care providers (i.e., hospitals) and patients, respectively.

1.2.2 Agency 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 would affect payment rates in CY 2018 and CY 2019 respectively. The third performance year (2018) is the first year in which agencies both 1) were incentivized to achieve high TPS scores through adjustments to future payments under the Medicare HH PPS (i.e., their 2018 performance will affect payment rates in CY 2020) and 2) received payment adjustments that were determined by previous performance years (i.e., payment adjustments of up to ±3% were based on their CY 2016 performance. 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 (and 16 HHVBP performance measures that contribute to agency TPS scores for payment year 2020),[3] HHAs receive points based either on their achievement level relative to baseline threshold values or improvement relative to their baseline performance, which are calculated separately for each measure in each model state.[4] 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

[3] See Exhibit 2 above.
[4] 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.

least five measures in both the baseline and performance periods with 20 or more episodes of care (for OASIS- and claims-based measures) and/or at least 40 completed HHCAHPS surveys (for 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 (which determines the payment adjustment in 2018), 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. 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.

1.3 Scope of this Annual Report

This Third Annual Report examines the HHVBP Model after the first three years of implementation. This includes data and supporting analyses for CY 2018, the first year that positive and negative payment adjustments up to 3% are made to HHAs in the HHVBP states. We use data available from CYs 2013-2018, which includes a baseline period (2013-2015) and the three performance years of the HHVBP Model (2016-2018).

In addition to addressing the impact of HHVBP on cost, quality and utilization as in past reports, this report adds analyses of possible agency responses to the HHVBP model incentives such as changes in use of timely initiation of care and frequent visits early in the episode of care (practices commonly termed *frontloading* by home health practitioners) as it relates to reducing hospital readmissions/emergency department (ED) use and respective spending. Additionally, we examine OASIS measures at the start of care that may contribute to variations in agency performance. In parallel to these agency activities, we also seek to understand how the model affects home health patients, including beneficiaries receiving care at small HHAs, and their ability to access care and the quality of this care (both nationally and regionally). Furthermore, we seek to understand how other CMS Alternative Payment Models (APM) might impact HHA operations and beneficiaries' use of home health services.

In 2019, we conducted 53 interviews with staff from home health agencies in HHVBP states to learn about their response to the increased weighting in the TPS of the two HHVBP claims-based measures. We also interviewed staff at 30 agencies that operated in areas with a high concentration of managed care and APMs to examine the role of APMs and their associated influence on provision of home health care and agency operations. We expanded the scope of qualitative inquiry from previous years to include interviews with 25 home health chain organizations to better understand the potential for spillover effects of HHVBP into non-HHVBP states. Finally, we also fielded the HHCAHPS survey to beneficiaries who received care at small HHAs in 2018 in both HHVBP states and non-HHVBP states to examine any potential unintended consequences related to the exclusion of HHCAHPS measures from performance incentives for small HHAs that are not available from the publicly available HHCAHPS data.

As the HHVBP Model continues, future Annual Reports will examine in greater detail differences across HHVBP state-specific impacts, HHA activities in response to the HHVBP incentives that contribute to impacts, interactions with other CMS initiatives or policy changes, such as Advanced Alternative Payment Models, and possible changes in impacts due to the increasing maximum payment adjustments. We provide more details about these future analyses in Section 10 of this report.

2. Evaluation Approach

This section summarizes our approach for the evaluation. We provide an overview of our evaluation design for the HHVBP Model, including quantitative analyses of claims and OASIS data, selection of a comparison group for both individual and aggregated HHVBP states, analysis of agency TPS scores, and analysis of surveys about patient experience. We also review our approach to collecting and analyzing interview data from home health chain organizations and agencies. We provide additional details regarding our analytic approach in the Technical Appendix.

2.1 Overview of the HHVBP Evaluation Design

The evaluation of the model will span an eight-year period that covers the model's entire period of operation. We employ a mixed methods research design that incorporates both quantitative and qualitative analytic approaches. This evaluation examines how impact measures of interest, related to Medicare spending and the quality of home health care, change over time in the HHVBP Model states in comparison to the changes for a comparison population that reflect what would have been observed in the absence of the HHVBP Model. The primary research questions addressed over the course of this evaluation are:

- What is the impact of the HHVBP Model on the performance measures of quality, utilization, and patient experience used in the HHVBP Model for payment adjustments? (RQ1)
- What is the impact of HHVBP on home health utilization, and other home health quality, Medicare home health costs and payments, and home health beneficiary experience measures other than the model's performance measures? (RQ2)
- How does HHVBP impact HHA operations, characteristics of HHAs in operation, and fiscal solvency? (RQ3)
- Are there unintended consequences of HHVBP? (RQ4)
- Do other CMS initiatives, external initiatives, or other policies have implications for the effects of HHVBP? (RQ5)
- What is the impact of HHVBP on Medicare more broadly? (RQ6)
- 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? (RQ7)

This evaluation analyzes secondary data (e.g., Medicare FFS claims and OASIS data) and collects primary data to provide information about the behavior of providers under the model and its potential impact on beneficiaries. We analyze interviews with agencies in HHVBP states to understand the impact of the model on agency operations. The interviews that we conducted during 2019 focus on the response of agencies to the modifications that were made to the TPS quality measures and the effects of alternative payment models (APM) on the provision of home health care. We conducted interviews with home health chain organizations to investigate potential for spillover of HHVBP related effects into non-HHVBP states. We report findings from the Home Health Consumer Assessment of Healthcare Providers and Systems (HHCAHPS) survey for 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). Analysis of these data highlight issues for further investigation and provide context for interpreting our quantitative analytic results.

2.2 Quantitative Analytic Approach

We designed our quantitative analysis to address the question: What was the impact of the HHVBP Model on the quality of health care, health care utilization, health outcomes, and health care costs? Our analyses examine whether the HHVBP Model is achieving its overarching goal—to improve the quality of home health services and efficiency of care—and examines potential unintended consequences (see Section A.1.3 [Page 9] in the Technical Appendix for details of the evaluation's conceptual framework). To address the research questions of interest for this evaluation, we examined a range of impact measures (Exhibit 3).

To evaluate the impact of HHVBP, we used a difference-in-differences (D-in-D) framework to compare changes in impact measures observed over time in the HHVBP states to those in the 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. The D-in-D design enables us to control both for common changes to all beneficiaries over time, as well as for unmeasured differences between model and comparison states that do not change over time. Positive (or negative) D-in-D estimates can be interpreted to mean the HHVBP group has higher (or lower) measure values than estimated in the absence 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.

We established a common comparison group approach for use across all of the quantitative analyses to ease interpretation of findings across impact measures. 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 providers 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). Claims-based measures correspond to Medicare FFS beneficiaries who receive home health care, while other measures such as OASIS-based 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 outcome measures of improvement in functioning). There is considerable variation in the proportion of OASIS episodes that contribute to several impact measures of interest (See Exhibit C-6 [Page 123] in the Technical Appendix). Further, certain impact measures, such as agency TPS scores, are only defined at the agency level.

To avoid unbiased and imprecise impact estimates, we aimed to define a comparison population with characteristics that were as similar as possible to the HHVBP population during the baseline period. The randomized selection of nine HHVBP states and mandatory participation of all HHAs in these selected states helps to guard our analysis against selection bias, which would occur if HHAs with greater ability to improve the quality and efficiency of services were more likely to participate in the HHVBP Model. Such selection bias, if not accounted for, would result in attribution of more favorable effects to the model than its true effects. The results of our descriptive analyses (Section C.1 [Page 113] in the Technical Appendix) show similarity in most beneficiary and HHA characteristics associated with the impact measures of interest between HHVBP and non-HHVBP states, providing assurance that the randomization of states for the intervention was effective for many characteristics.

Given the diversity in beneficiary and HHA characteristics, and treatment patterns across states, randomization at the state level alone was not able to achieve similarity on all factors between the

HHVBP and comparison states during the three-year baseline period or avoid differential yearly trends in all factors during this period. We therefore used statistical methods to control for imbalances observed between the treatment and the comparison populations in the baseline period for a few factors, including beneficiary race, agency chain affiliation and agency size. We also controlled for unmeasured differences between states' markets and beneficiary populations that do not change over time on average (see Sections A.1.4 [Page 12] and A.1.5 [Page 21] in the Technical Appendix for more details). For FFS claims-based Medicare spending measures and the OASIS-based measure sets in particular, we found evidence of a lack of parallel trends during the baseline period and incorporated state-specific linear time trends for both the HHVBP and comparison populations to control for these differences. Details regarding the approaches we used to test the parallel trends assumption of our D-in-D approach and steps taken to mitigate non-parallel trends in cases that do not satisfy tests to support this assumption are provided in the Technical Appendix (see Section A.1.5.2 [Page 24]).

A potential confounder for our evaluation of the HHVBP Model involves other CMS initiatives and APMs that may affect HHA operations, beneficiary use of home health services, and outcomes for beneficiaries using home health services. Some of these other models either were introduced or expanded during the time period for our evaluation. We therefore adjusted for the impact of beneficiary alignment to Innovation Center APMs on HHVBP outcomes of interest. We ascertained whether FFS beneficiaries were aligned to three ACO-based APMs at any time during a home health episode: the Medicare Shared Savings Program (MSSP), the Pioneer ACO model, and the Next Generation ACO model. We also determined beneficiary alignment to Models 2 and 3 of the BPCI initiative, as well as the BPCI Advanced model, which succeeded BPCI at the end of 2018. Given observed differences in APM penetration between HHVBP and non-HHVBP states during the time period of our evaluation (see Section 5.6 of this report), potential changes in APMs that may occur in future years of the HHVBP Model, and their potential impact on our claims-based impact measures of interest, we incorporated an adjustment for individual APMs in our D-in-D regression models for FFS beneficiaries receiving home health care. We provide further details regarding the covariates selected for regression adjustment in Section A.1.4.2 (Page 14) in the Technical Appendix.

We are unable to use a D-in-D approach for the three new HHVBP performance measures since these data are only available for HHAs in the HHVBP states. We focus on reporting rates among HHAs in the nine HHVBP states for these measures. Finally, we use an alternative analytic approach for examining agency TPS scores, as described in Section 2.3 of this report. For additional information regarding the D-in-D approach and the methods used to control for differences between the HHVBP and comparison populations, please see Section A.1.5 (Page 21) in the Technical Appendix.

Exhibit 3. 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 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
Average Medicare Spending per Day for Unplanned Acute Care Hospitalizations Among all FFS HH Episodes*	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 Episodes of Care	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. | *Denotes key measure used to determine covariates selected for regression adjustment of all impact estimates. | **As discussed in Section 2.3, 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. | ***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. | 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.*

2.2.1 Comparison Groups for State-Level Analyses

In addition to analyzing measures at the national level, we also evaluated the impact of HHVBP among the individual states included in the model. In establishing what would have happened to home health patients in each HHVBP state if the HHVBP Model had not been implemented, we aimed to define comparison groups with characteristics that were as similar as possible to the HHVBP state during the baseline period. We examined the regional group from which the HHVBP states were randomly selected (Exhibit 4). As specified in the CMS CY 2016 Final Rule (HHS, 2015), each regional grouping included states identified as having similar utilization, demographics, and clinical characteristics while being in relatively close geographic proximity to one another. The states in regional groups were already determined to more closely resemble each other, lending support to the parallel trends assumption for a D-in-D approach. And since collectively these groups included all 41 states not selected for inclusion in the model, a comparison group approach based on these regional groupings helps to reconcile findings at the national level with those at the state level.

For each HHVBP state and its respective regional grouping (Exhibit 4), we used the same statistical adjustment approach as for the national-level analyses to account for the minority of factors for which the comparison group differed significantly on average from the HHVBP states. As shown in the Technical Appendix (see Exhibits C-35 through C-40 [Pages 152-175), most of the observed factors and impact measures were similar between the treatment and the comparison groups. The factors that demonstrated less similarity at the state level also showed less similarity at the national level (e.g., beneficiary race/ ethnicity, agency for-profit, non-profit, or government ownership, hospital or freestanding setting, chain status, and agency size).

Exhibit 4. HHVBP States and their Regional Groupings

HHVBP State	States in Regional Grouping
Arizona	New Mexico, California, Nevada, Utah, Colorado
Florida	Texas, Oklahoma, Louisiana, Mississippi
Iowa	North Dakota, South Dakota, Montana, Wisconsin, Minnesota
Massachusetts	Vermont, Maine, Connecticut, Rhode Island, New Hampshire
Maryland	Delaware, New Jersey, Pennsylvania, New York
North Carolina	Alabama, Georgia, South Carolina, Virginia
Nebraska	Ohio, West Virginia, Indiana, Missouri, Kansas
Tennessee	Illinois, Kentucky, Arkansas, Michigan
Washington	Oregon, Alaska, Hawaii, Wyoming, Idaho

Additionally, to assess the validity of this comparison group approach at the state level, we also tested the assumption of parallel baseline trends in impact measures between the HHVBP states and their respective regional comparison groups. These tests helps to identify any relevant trends that preceded implementation of HHVBP and ascertain how well a particular choice of comparison group and model selection satisfied the parallel trends assumption. Using the same approach that we used at the national level, we concluded that using these regional groupings (Exhibit 4) as the comparison group for each of the nine HHVBP states helped to achieve a pattern of similar baseline trends for many of the impact measures of interest for this evaluation. As we did at the national level for impact measures exhibiting a lack of parallel trends during the baseline period, we incorporated state-specific linear time trends for measure sets where this was relevant at the state level. At the state level, these measure sets were FFS

claims-based utilization measures, FFS claims-based Medicare spending measures and the OASIS-based measures. Further details are included in the Sections A.1.6 (Page 30), C.11.1 (Page 151), and C.11.2 (Page 176) in the Technical Appendix regarding our analysis of similarity between the HHVBP states and their respective regional groupings in beneficiary and agency characteristics, aspects of home health care, and the relative trends in impact measures during the baseline period.

2.2.2 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. To evaluate the impact of the HHVBP Model on overall agency performance, we therefore compared 2016-2018 TPS scores in model states with those in non-model states using multivariate linear regression with adjustments for agency size, chain status, ownership type, age, and freestanding versus hospital-based, as well as indicators of patient demographic characteristics and insurance.

A D-in-D approach to examining TPS scores is not optimal over the duration of this evaluation. The methodology for computing TPS scores is changing over time. This includes changes to the HHVBP measure set during performance years 2018 (HHS, 2017) and 2019 (HHS, 2018) as well as increased weighting of the claims-based measures in 2019 (HHS, 2018). As a result, 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 changes in agency performance.

The TPS score already captures changes over time in performance. Agency TPS scores are calculated by summing the applicable measure scores. For each measure, the performance of individual HHAs is measured based on the higher of: (a) their achievement score, which reflects levels of achievement on the measure relative to their state cohort's performance during the baseline period; and (b) their improvement score, which reflects improvement over time relative to their own previous performance levels. 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. The TPS calculation therefore inherently captures changes over time in performance (see Section C.3 [Page 128] in the Technical Appendix for results from supporting analyses). For these reasons, we employed a cross-sectional regression analysis, as opposed to a D-in-D approach, for examining agency TPS scores. Further details regarding our rationale for using this analytic approach are provided in Section A.1.7 (Page 38) in the Technical Appendix.

2.2.3 Interpreting the Findings

Adhering to best practices for evaluation research (Wasserstein, 2019), the HHVBP evaluation team considered the evidence presented in this report holistically to identify patterns of concordance in results across multiple analyses. We carefully weighed the strength of the evidence in terms of magnitude of point estimates, consistency with prior hypotheses about impacts, consistency of impact findings over multiple time periods and HHVBP states analyzed, statistical significance at the $p<0.10$ level, and support from qualitative findings to draw conclusions about impacts of the HHVBP Model. We

expect this strategy to facilitate policymakers' subsequent use of the findings for decision-making purposes.

2.3 HHCAHPS Survey of Beneficiaries at Small HHAs: Analytic Approach

We administered the 34-item HHCAHPS instrument to beneficiaries who receive home health care from small HHAs that are exempt from fielding the HHCAHPS survey. These survey data provide quantitative information on patient experience at small agencies that are not available from the publicly available HHCAHPS data and allow us to examine any potential unintended consequences related to the exclusion of HHCAHPS measures from the HHVBP performance incentives for small HHAs.

All beneficiaries who received care in CY 2018 from our population of small agencies and met our inclusion criteria (e.g., alive at time of the survey, not on hospice) were eligible for the survey. Among HHVBP states, we surveyed all beneficiaries who received care from eligible small agencies. To construct a comparable sample of beneficiaries from small agencies in non-HHVBP states, we sampled non-HHVBP agencies such that their distribution matched that of the HHVBP state agencies in terms of agency ownership, chain affiliation, and setting (i.e., freestanding or hospital-based).

The surveys were unique at the patient and home health agency level. The total number of returned surveys that were complete or partially complete was 4,324 (777 from HHVBP states, and 3,547 from non-HHVBP states) for an overall response rate of 25.5% (23.1% for HHVBP beneficiaries, 26.1% for non-HHVBP beneficiaries; see Section A.3.16 [Page 81] in the Technical Appendix for more detail).

2.4 Qualitative Analytic Approach

This report contains findings from three sets of interviews: one set of interviews with home health chain organizations and two sets of interviews with HHAs. The findings from these interviews are not representative of all chain organizations and agencies. Rather, this information provides context for evaluation results and informs hypotheses for future data collection activities and analyses.

In our interviews with home health chain organizations, we explored how chain affiliation among 25 chain organizations impacts HHVBP-related quality improvement activities in both HHVBP and non-HHVBP states, using data collected between May and July of 2019. To select participants, we identified chains that had the largest number of OASIS episodes in 2017 and operated in multiple states or an HHVBP state. For the HHA interviews, we examined responses among 53 HHAs to the increased weighting in the TPS of the two HHVBP claims-based measures: unplanned acute care hospitalization (ACH) and ED use without hospitalization. We selected agencies that fell into three types of TPS categories for the two HHVBP claims-based measures: 1) high achievers, 2) high improvers, and 3) low achievers. We also examined the influence of APMs on agency operations among 30 HHAs in 12 counties (six counties each in HHVBP states and non-HHVBP states). We selected counties with high APM activity, defined by the presence of Medicare Advantage plans, the BPCI initiative, the Comprehensive Care for Joint Replacement (CJR) model, and ACOs. We conducted both sets of HHA interviews between July and October of 2019. We provide more information on primary data collection and analysis in Sections B.1-B.3 (Pages 104-112) in the Technical Appendix.

To support integration of results across the evaluation, we applied a structured approach to developing qualitative lines of inquiry, 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, 2013). We have used qualitative data collection to document and

understand HHAs' plans and approaches to quality improvement and the context in which they are implemented, and to identify any challenges and priority areas for further analysis. Later, we will use qualitative data collection to identify any evidence of success, as well as additional challenges and priority areas for further analysis.

2.5 Structure of the Following Chapters

The following chapters present key findings based on our evaluation of the experience of home health patients, agencies, and chain organizations during the first three performance years of the HHVBP Model. Chapter 3 examines changes in home health utilization, agency entry and exit, and the case-mix of beneficiaries receiving care. Chapter 4 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, and includes further analyses of agency TPS scores and payment adjustments. The subsequent chapters present our findings regarding 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 several aspects of Medicare utilization and spending in Chapters 5 and 6, respectively, before presenting results for the OASIS-based quality measures in Chapter 7. In Chapter 8, we examine patient experience with care and access to higher quality care. In Chapter 9, we present findings from the interviews we conducted with representatives of HHVBP HHAs and home health chain organizations, followed by findings on HHVBP HHAs' use of the HHVBP Connect website and reporting rates for the three self-reported HHVBP measures. We conclude with a discussion of future activities in Chapter 10.

3. Results: No Early Evidence That HHVBP Has Impacted the Rate of Home Health Utilization

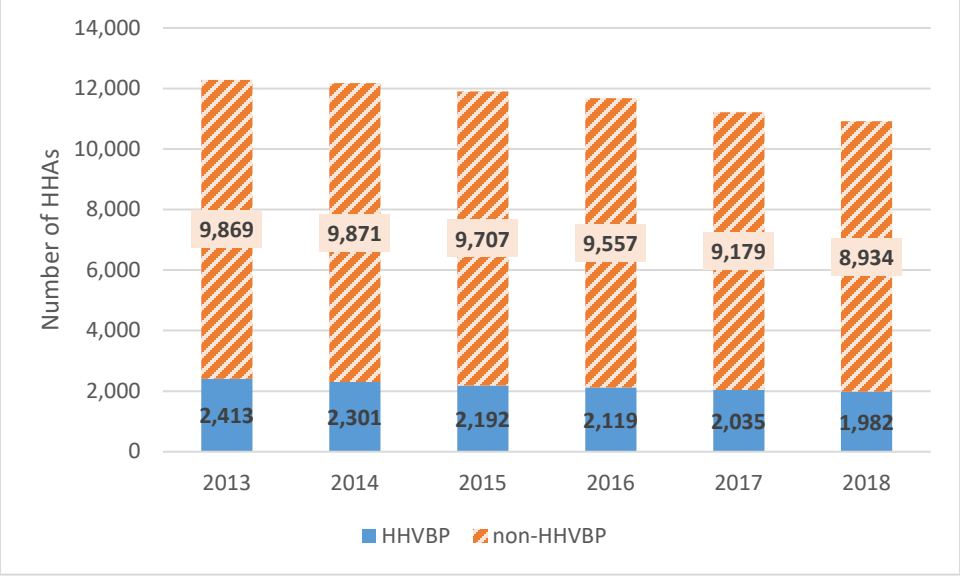
3.1 Introduction

This chapter presents an overview of characteristics of the home health industry in HHVBP and non-HHVBP states followed by analyses of home health utilization and patient case-mix between the two groups. Broadly, we did not find an HHVBP effect on home health utilization. Both the number of home health agencies and episodes declined in both HHVBP and non-HHVBP states, and this decline predated the HHVBP Model. We also did not find evidence of lower utilization in HHVBP states compared to non-HHVBP states. While we observed a pattern of increasing clinical severity over time among home health patients for multiple case-mix measures, these trends were generally similar in both HHVBP and non-HHVBP states. For the Hierarchical Condition Category (HCC) score (one of three broad measures of case-mix that we examined), we found evidence of modestly lower growth in severity among patients receiving care from HHVBP agencies relative to agencies in non-HHVBP states in the post-implementation period.

3.2 Overall Decline in the Number of Home Health Agencies

Overall, the number of HHAs has declined from 2013-2018 in both the HHVBP and non-HHVBP states, which began prior to the HHVBP Model implementation (Exhibit 5). The rate of decline in HHAs was almost twice as high among the nine HHVBP states compared to the non-HHVBP states over the six year period (17.9% decrease vs. 9.5% decrease, respectively). The decreasing number of HHAs among HHVBP states was almost entirely driven by Florida, which experienced a 33% decline in the number of agencies over the six year period (from 1,399 to 944; not shown). In 2018, Florida accounted for 48% of HHAs in HHVBP states, a decrease from 58% in 2013. See Exhibit C-33 (Page 151) in the Technical Appendix for additional information.

Exhibit 5. Number of Home Health Agencies in HHVBP and Non-HHVBP States, 2013-2018

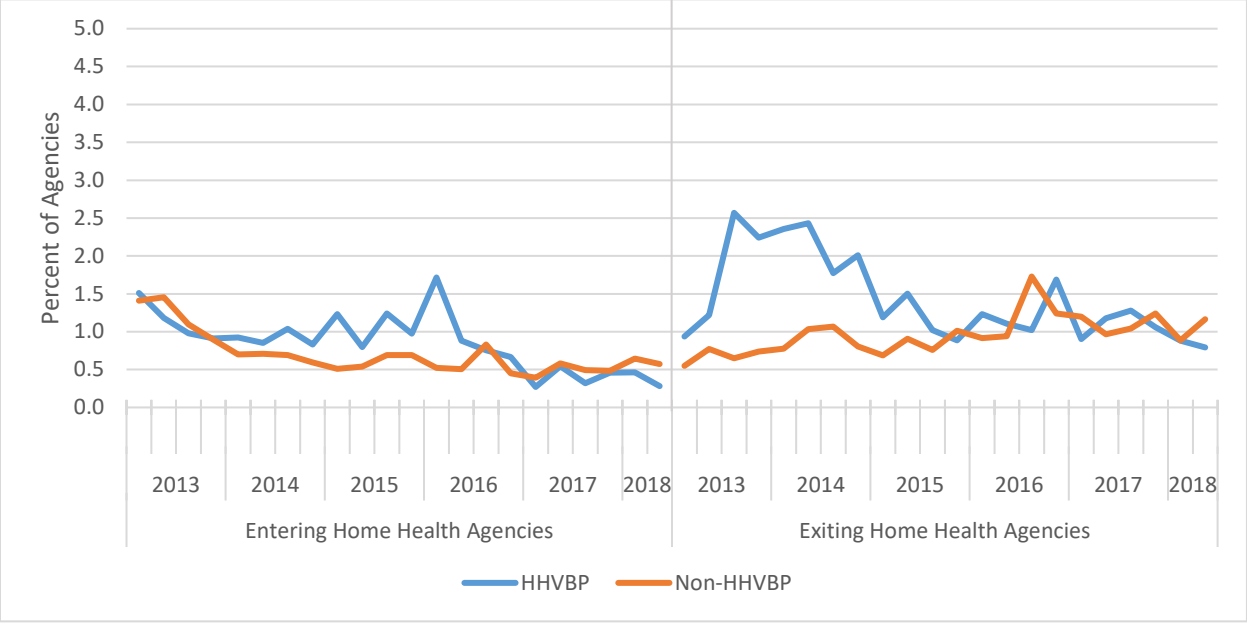


In the context of these preexisting declines in the number of HHAs in both HHVBP and non-HHVBP states, we examined whether the model may have affected the overall rate at which new agencies

appeared or the overall rate at which they terminated. The HHVBP Model could affect the delivery of home health services by influencing the market entry and exit decisions of HHAs. Changes in the overall availability of agencies could have implications for the utilization of home health services and beneficiary access to care.

Based on trends through Quarter 2 of 2018 (2018 Q2), the decreases in the number of agencies in operation were due to the total number of agencies exiting the market exceeding the number of new agencies entering the market. In general, prior to the implementation of HHVBP in 2016 Q1, HHVBP states had both higher agency entry rates and higher agency exit rates than non-HHVBP states, indicating greater volatility in the supply of HHAs in HHVBP states (Exhibit 6). However, since the implementation of HHVBP, agency entry and exit rates have been relatively similar in HHVBP and non-HHVBP states.

Exhibit 6. New and Terminating HHAs as Percent of Total HHAs per Quarter, 2013 Q1-2018 Q2



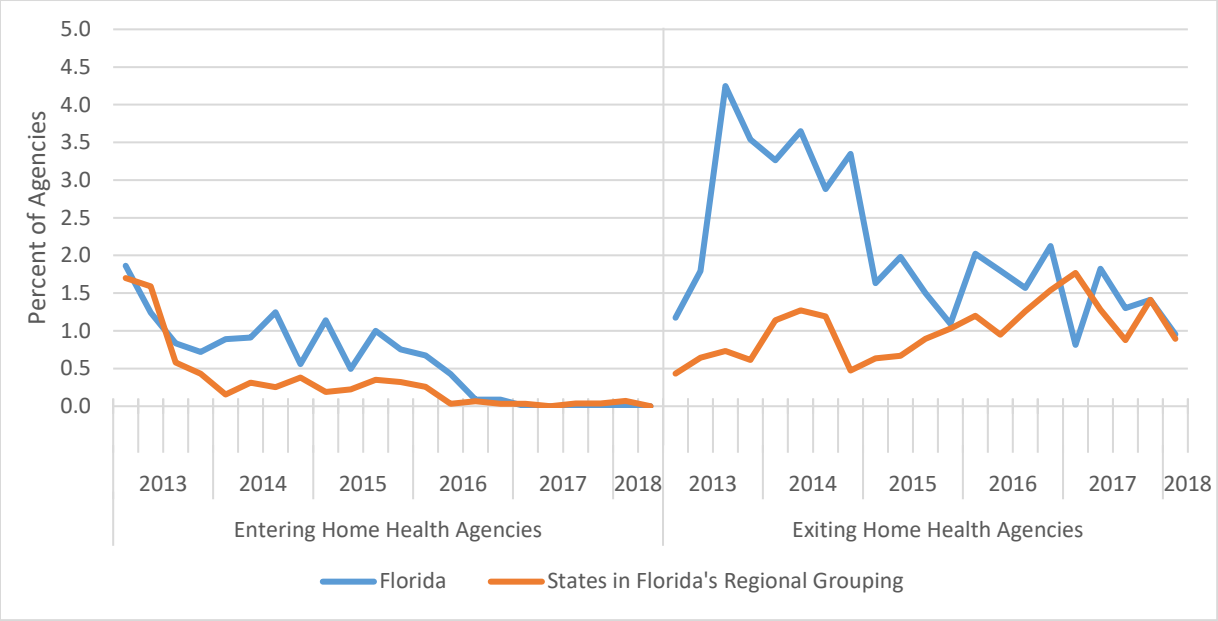
There have generally been reductions over time in the quarterly numbers and rates of new agencies opening from 2013 Q1 to 2018 Q2, in both HHVBP and non-HHVBP states. Approximately 1.5% of all open agencies in both groups were new in 2013 Q1 (Exhibit 6). The entry rate declined over time for both groups, with a larger decline in non-HHVBP states through 2014, followed by a spike in the number of new agencies in HHVBP states in 2016 Q1 (largely due to new agencies in Massachusetts). Agency exit rates were similar in HHVBP and non-HHVBP states for the remainder of the post-implementation period.

Prior to implementation, quarterly agency exit rates were sometimes twice as high in HHVBP states in comparison to exit rates in non-HHVBP states (Exhibit 6). From 2013 through 2015, exit rates ranged from 0.9% to 2.6% of open agencies exiting in HHVBP states in comparison to 0.5% to 1.1% in non-HHVBP states. As with agency entry rates, quarterly agency exit rates were similar in HHVBP and non-HHVBP states in the post-implementation period.

The observed differences between HHVBP and non-HHVBP states during the pre-implementation period were strongly influenced by the trends for a small number of states. In particular, the majority of new agencies in HHVBP states were located in Florida, Massachusetts, or Arizona during the pre-implementation period. After implementation of HHVBP, the number of agencies opening in Florida decreased and eventually stopped completely (Exhibit 7), likely reflecting the effect of the CMS moratorium on new Medicare home health agencies in Florida. Meanwhile, agencies continued to open in other HHVBP states (Exhibit 8), primarily in Massachusetts, Arizona, and Iowa.

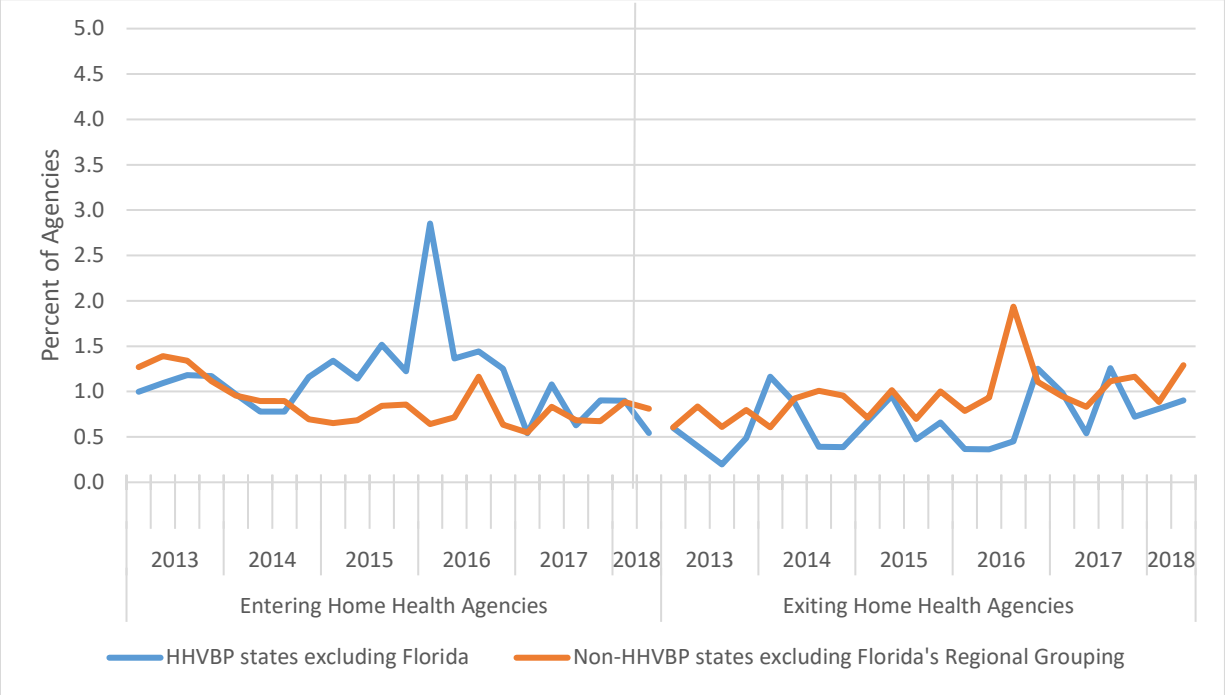
The relatively high exit rates among HHVBP states were largely due to agency closures in Florida (Exhibit 7). This difference became smaller starting in 2015. As with the overall rates at which new agencies entered, agency exit rates were relatively similar overall for the two groups in the post-implementation period.

Exhibit 7. New and Terminating HHAs in Florida and its Regional Grouping as Percent of Total HHAs per Quarter, 2013 Q1-2018 Q2



For Regional Grouping definitions, see Exhibit 4.

Exhibit 8. New and Terminating HHAs, Excluding Florida and States in its Regional Grouping, as Percent of Total HHAs per Quarter, 2013 Q1-2018 Q2

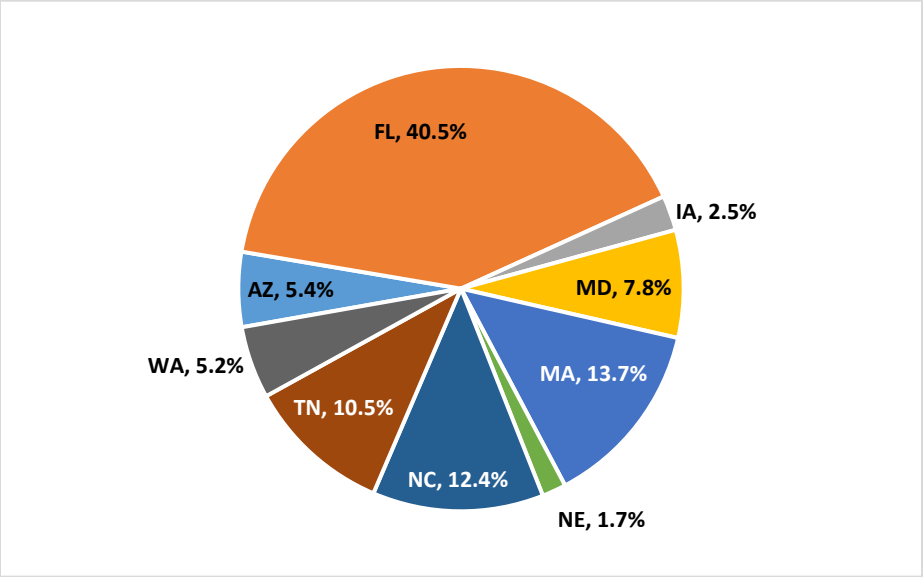


For Regional Grouping definitions, see Exhibit 4.

3.3 Decline in Utilization of Home Health Care by FFS Beneficiaries

The 1,982 HHAs operating in HHVBP states in 2018 (Exhibit 5) provided nearly 1.4 million home health episodes to 815,891 Medicare FFS beneficiaries, and the 8,934 HHAs in the 41 non-HHVBP states provided nearly 4.8 million home health episodes to over 2.5 million Medicare FFS beneficiaries (see Exhibit C-4 [Page 119] in the Technical Appendix). Overall, the nine HHVBP states and 41 non-HHVBP states were largely similar with regard to a range of home health agency, beneficiary, and episode characteristics (see Section C.1 [Page 113] in the Technical Appendix for additional information). However, there are important differences in the levels and trends in home health utilization among the nine HHVBP states. As Exhibit 9 shows, Florida alone accounted for 40.5% of all FFS episodes in the HHVBP states in 2018, while Nebraska accounted for just 1.7%.

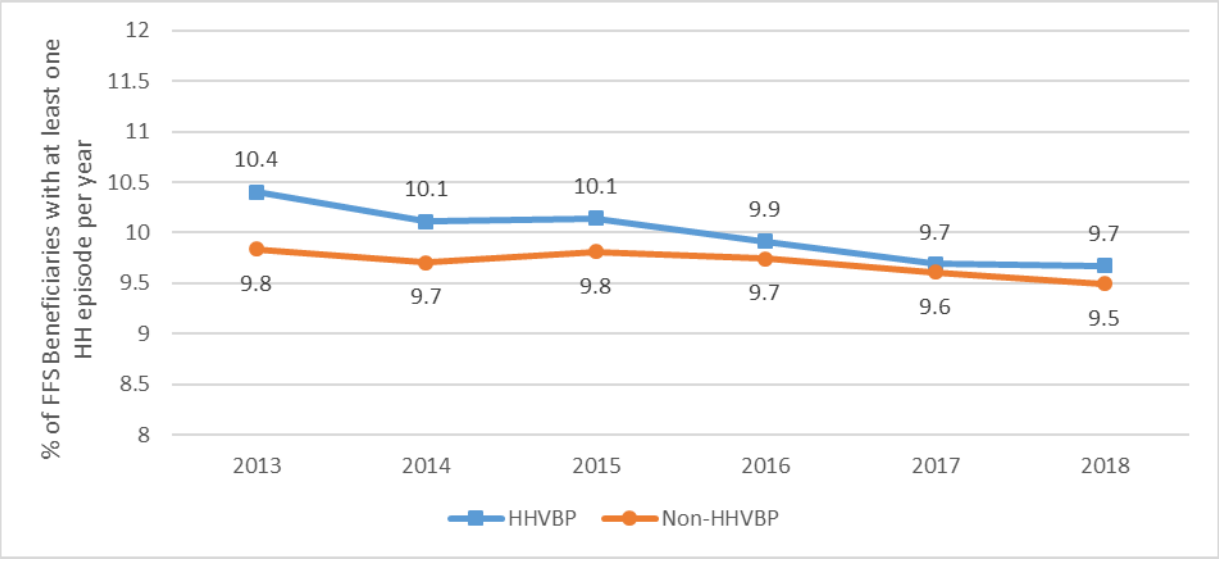
Exhibit 9. Percent of HHVBP Medicare FFS Home Health Episodes within each HHVBP State, 2018



To explore the potential impact of HHVBP on home health utilization, we examined trends in the utilization of home health care among Medicare FFS beneficiaries in both HHVBP and non-HHVBP states using two measures: the percent of Medicare FFS beneficiaries with at least one home health episode in a given year and the number of home health episodes per 1,000 FFS beneficiaries per year.

Nearly one in ten Medicare FFS beneficiaries utilized home health services per year from 2013-2018, and the proportion of the Medicare FFS population utilizing home health care in HHVBP states is becoming increasingly similar to that in non-HHVBP states (Exhibit 10). The percent of Medicare FFS beneficiaries with at least one home health episode per year has decreased slightly in both HHVBP and non-HHVBP states from 2013-2018 with larger decreases for Medicare FFS beneficiaries living in HHVBP states (i.e., 10.4% to 9.7%). The decrease in HHVBP states began prior to the implementation of the model.

Exhibit 10. Percent of Home Health Users among Medicare FFS Beneficiaries, 2013-2018

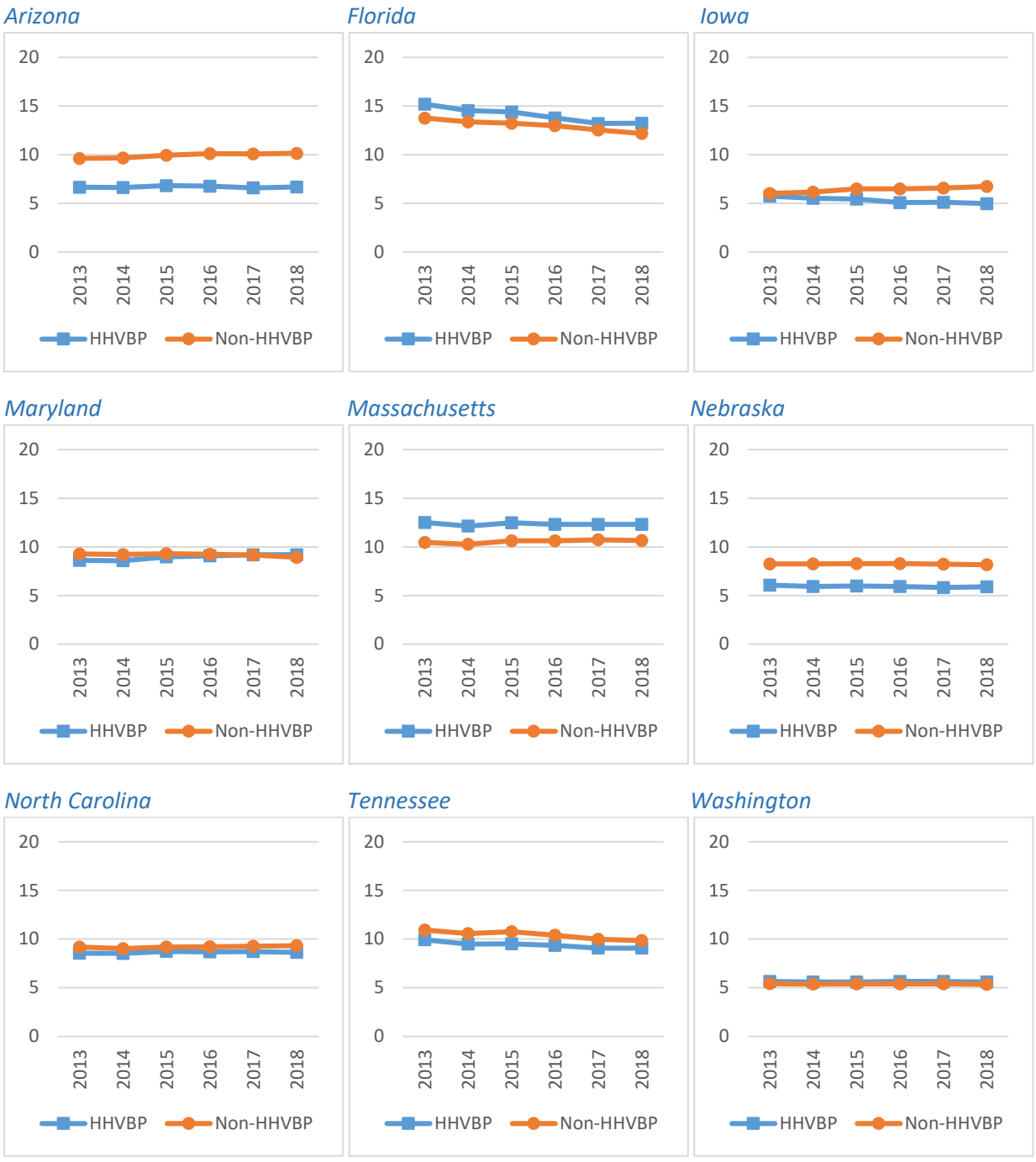


Prior to the implementation of HHVBP, levels of home health utilization varied across HHVBP states, but trends in home health utilization for each HHVBP state were similar to the non-HHVBP states in their regional grouping (Exhibit 11). Among the nine HHVBP states, the state with the highest percentage of Medicare FFS beneficiaries using home health services was Florida, while Iowa had the lowest percentage; this was consistent from 2013 to 2018. On average, the percent of Medicare FFS beneficiaries utilizing home health care was more than 2.5 times higher in Florida than in Iowa during both the pre-HHVBP and post-HHVBP periods.

Looking at trends from 2013 to 2018 across the states, home health utilization among Medicare FFS beneficiaries decreased in Florida, Iowa, Massachusetts, Nebraska, and Tennessee. Conversely, home health utilization increased slightly in Maryland, from an average of 8.7% of Medicare FFS beneficiaries using home health during the pre-HHVBP period (2013-2015) to 9.2% in the post-HHVBP period (2016-2018). Home health utilization remained stable across the six years in Arizona North Carolina, and Washington.

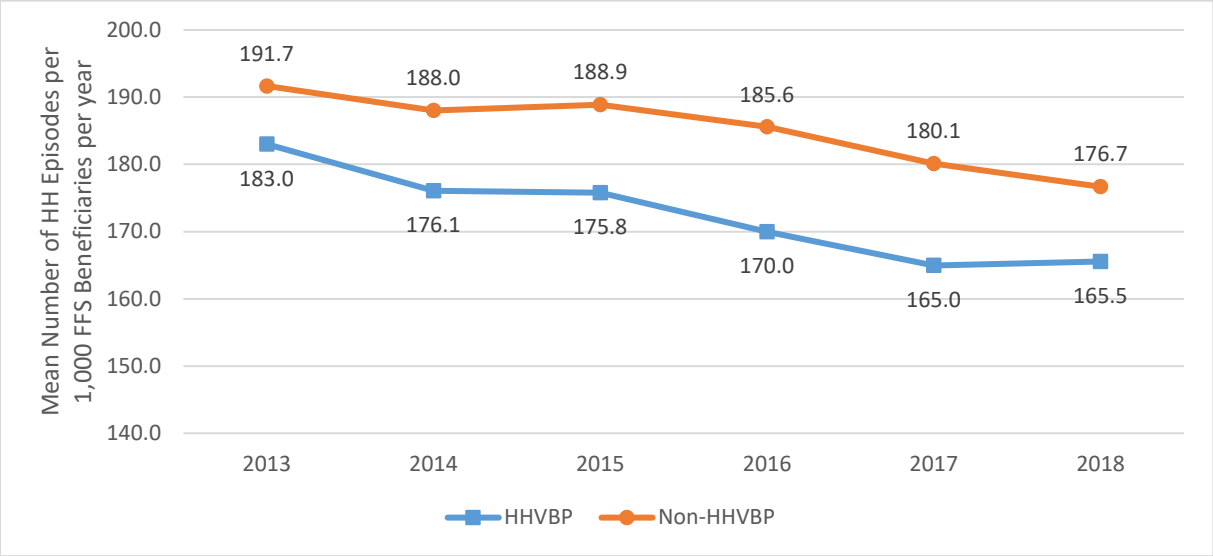
We also examined home health utilization based on a measure of volume: the number of home health episodes per 1,000 Medicare FFS beneficiaries. Similar to our findings above, we found that differences in overall levels of volume between the HHVBP and non-HHVBP states were within 4.5%-7.5% during the pre-HHVBP period (2013-2015) (Exhibit 12). Moreover, there was 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. This downward trend continued into the post-implementation period for both HHVBP and non-HHVBP states.

Exhibit 11. Percent of Medicare FFS Beneficiaries with at least One Home Health Episode per Year by HHVBP State and its Regional Grouping, 2013-2018



For each state, "Non-HHVBP" reflects the states in the corresponding HHVBP state's Regional Grouping (Exhibit 6).

Exhibit 12. Volume of Home Health Utilization among Medicare FFS Beneficiaries, 2013-2018



Overall, utilization rates declined or remained steady throughout the baseline and post-HHVBP periods for individual HHVBP states and their corresponding regional comparison groups. As observed within the percentage of Medicare FFS beneficiaries with at least one home health episode discussed above, these declines in the volume of home health services were not uniform across states, and were largely driven by declines during the baseline period in Florida. Iowa and Florida were also at the extremes for this measure, with more than a twofold difference in the pre-HHVBP period in the average annual number of home health episodes per 1,000 FFS beneficiaries (82.2 and 277.4, respectively; not shown). See Exhibit C-34 (Page 151) in the Technical Appendix for additional information.

Expanding on our descriptive analyses that showed similar declines in home health utilization across both HHVBP and non-HHVBP states, a simple D-in-D model with adjustment for state-specific linear time trends yielded non-significant D-in-D estimates, suggesting that the implementation of HHVBP did not impact home health utilization for Medicare FFS beneficiaries differentially in HHVBP states relative to non-HHVBP states, either overall during 2016-2018 or in individual years (Exhibit 13).

Exhibit 13. Impact of the HHVBP Model on Home Health Utilization among FFS Beneficiaries, 2013-2018

	Model Estimates				Average in HHVBP States, Baseline (2013-2015)	% Relative Change
	D-in-D	p-value	Lower 90% CI	Upper 90% CI		
Percent of FFS Beneficiaries with at Least One HH Episode[a]						
2016	-0.03	0.91	-0.43	0.38	10.22%	-0.28%
2017	0.01	0.98	-0.41	0.43		0.07%
2018	0.20	0.48	-0.27	0.68		1.99%
Cumulative	0.06	0.81	-0.36	0.48		0.59%
Number of HH Episodes per 1,000 FFS Beneficiaries						
2016	0.01	0.99	-7.15	7.18	178.28	0.01%
2017	2.99	0.58	-5.81	11.79		1.68%
2018	9.04	0.23	-3.34	21.43		5.07%
Cumulative	4.03	0.47	-5.06	13.11		2.26%

[a] D-in-D and 90% CI values represent percentage point changes. | CI= Confidence Interval. | These models include state-specific linear time trends (See Section A.1.4 [Page 12] of the Technical Appendix for more details). | See Exhibit 13n (Page 138) in the Technical Appendix for each measure's sample size.

As with all HHVBP states combined, we found no evidence of an impact of the model on home health utilization in most individual states. The exceptions included Tennessee and North Carolina, where cumulative D-in-D estimates for the percent of FFS beneficiaries with at least one home health episode were 0.56% and -0.35%, respectively (given average baseline levels of 9.6% and 8.6%, respectively). The other exception was Iowa, where results of the cumulative D-in-D model specifically for the measure of volume (i.e., number of home health episodes per 1,000 Medicare FFS beneficiaries) suggested a relative increase in home health ultilization post-HHVBP compared to states in its regional comparison group. See Exhibit C-43 (Page 179) in the Technical Appendix for additional detail.

3.4 HHVBP May Have a Small Impact on Agency Selection of Less Sick Patients

To further explore how HHVBP may have impacted home health utilization, we also examined changes in case-mix of home health beneficiaries. The change in financial incentives faced by HHAs in HHVBP states may affect agencies' decisions to accept patients for care. For example, agencies may engage in patient selection to obtain a favorable risk profile that enables them to obtain a higher TPS. However, such patient selection would be contrary to the intended impacts of HHVBP if this behavior reduces access to quality home health for some patients at greater risk of hospitalization, for example.

To understand how HHVBP may impact agencies' acceptance of patients based on their risk for health complications, we examined three patient case-mix measures:

(1) HCC score at the start of the earliest episode in a sequence during the previous year (which we refer to as, "HCC score at the start of care"), based on Medicare claims.
(2) A composite measure of the activities of daily living (ADL), which includes OASIS information from the start of care about ability to groom, to dress upper and lower body, toilet transferring, bed transferring, ambulation/locomotion, and eating.
(3) An indicator for fragile health at the start of care with ongoing high risk of serious complications and death or a serious progressive condition that could lead to death in a year (i.e., "poor overall health status"), reported in OASIS.

For all three measures, higher values indicate increased patient severity. See Section A.4.1.1 of the Technical Appendix (Page 86) for more detail on these case-mix measures. For each of these three measures of patient case-mix, we estimated a D-in-D model, adjusted for agency characteristics (i.e., agency size, chain affiliation, ownership type), state fixed effects, and state-specific linear trends to examine differences between HHVBP and non-HHVBP states.

Broadly, we found modest increases over time in patient severity from 2013-2018 for all three measures of case-mix in both HHVBP and non-HHVBP states (Exhibit 14). For example, average HCC scores at the start of care increased from 2.7 in the baseline period to 2.9 in the HHVBP states, and from 2.6 to 2.8 in non-HHVBP states.

Exhibit 14. Baseline and Post-HHVBP Performance Period Means for Measures of Case-Mix Severity, All HHVBP and Non-HHVBP States

Measure	HHVBP States, Baseline (2013-2015)	Non-HHVBP States, Baseline (2013-2015)	HHVBP States, Post-HHVBP (2016-2018)	Non-HHVBP States, Post-HHVBP (2016-2018)
HCC Score at the Start of Care	2.7	2.6	2.9	2.8
OASIS ADL Composite Index	3.1	3.1	3.7	3.6
Episodes with Poor Overall Health Status	38.4%	37.1%	44.1%	40.6%

See Exhibit 14n (Page 138) in the Technical Appendix for each measure's sample size.

Our D-in-D analysis indicated no evidence of an impact of HHVBP on patient severity for two of the three case-mix measures (ADL composite index and patients with poor overall health status; Exhibit 15). However, we found evidence of a statistically significant, modest decline in average HCC score at the start of care in HHVBP states relative to non-HHVBP states, on average across the three performance years as well as individually for each of the three years. The cumulative average estimate of -0.04 for this measure translates to a decrease of 1.5% per year relative to the baseline average of 2.67. The yearly estimate of this measure of patient case-mix increased in magnitude each year (i.e., -0.01, -0.04, and -0.07 for 2016, 2017, and 2018, respectively), which may suggest an emerging impact on patient selection and should continue to be monitored as the HHVBP Model progresses.

However, our state-specific analysis suggests that this finding in the aggregate may primarily reflect agency behavior in only two states: Tennessee and Florida. In particular, for Tennessee we found evidence with two of the case-mix measures, OASIS ADL composite index (-5.0% relative to baseline average) and HCC score at the start of care (-2.8% relative to baseline average), of agencies potentially responding to the HHVBP financial incentives in an unintended manner as there is a lower rate of increase in the average severity of patients they serve relative to agencies in its regional comparison states. In Florida, the D-in-D estimate for HCC score at the start of care was smaller (-1.1% relative to baseline average; p=0.07), and we found no evidence of changes in case-mix relative to its regional comparison group for the other two measures shown in Exhibit 15. See Exhibit C-42 (Page 178) in the Technical Appendix for additional detail.

Exhibit 15. Impact of HHVBP on Case-Mix of Home Health Patients

	Model Estimates				Average in HHVBP States, Baseline (2013-2015)	% Relative Change
	D-in-D	p-value	Lower 90% CI	Upper 90% CI		
HCC Score at the Start of Care						
2016	-0.01	0.02	-0.02	-0.004	2.67	-0.5%
2017	-0.04	<.001	-0.06	-0.03		-1.6%
2018	-0.07	<.001	-0.09	-0.05		-2.5%
Cumulative	-0.04	<.001	-0.06	-0.03		-1.5%
OASIS ADL Composite Index						
2016	0.02	0.24	-0.01	0.04	3.15	0.5%
2017	0.01	0.71	-0.03	0.05		0.3%
2018	-0.03	0.35	-0.09	0.02		-1.0%
Cumulative	-0.003	0.91	-0.04	0.04		-0.1%
Percent of Episodes with Poor Overall Health Status[a]						
2016	-0.30	0.60	-1.24	0.64	38.35%	-0.8%
2017	-0.40	0.69	-2.04	1.24		-1.0%
2018	-0.81	0.56	-3.11	1.49		-2.1%
Cumulative	-0.52	0.59	-2.09	1.06		-1.3%

[a] D-in-D and 90% CI values represent percentage point changes. | CI = Confidence Interval. | Shading indicates significance at the p<0.05 level. | See Exhibit 15n (Page 138) in the Technical Appendix for each measure's sample size. | Poor overall health status was defined from OASIS M1034, Options 2 or 3.

Our state-level D-in-D analyses for the other case-mix measures in Exhibit 15 showed no consistent patterns across states. For the ADL composite index, Tennessee was the only state with a negative, significant cumulative D-in-D estimate, whereas there was a positive cumulative D-in-D estimate for Maryland (corresponding to a 6.1% increase relative to its baseline value). For the percentage of episodes with poor overall health status, there was a positive cumulative D-in-D estimate for Arizona and a negative cumulative D-in-D estimate for Nebraska. None of the D-in-D estimates for other states were statistically significant for either of these two case-mix measures. See Exhibit C-42 (Page 178) in the Technical Appendix for additional detail on state-level findings.

3.5 Discussion

Altogether, comparing HHVBP and non-HHVBP states, we observed similar declines in the number of home health agencies in operation and levels of home health utilization, as well as similar increases in the severity of home health beneficiaries treated. Our analyses of new and terminating agencies did not point to a clear impact of HHVBP on market entry and exit decisions. Rather, agency entry and exit rates have been similar in HHVBP and non-HHVBP states and relatively stable between the two groups since the model was implemented.

Our findings for measures of both numbers of agencies and levels of utilization suggest that, for the nine HHVBP states combined, the implementation of HHVBP has not impacted the overall rate of home health care utilization among Medicare FFS beneficiaries. Our analysis showed overall declines in rates of utilization of home health services that began prior to implementation of HHVBP. While there has been a more pronounced decline in utilization in Florida, we observed a similarly high level and rate of

decline in Florida's regional comparison group. Although the overall average does not show evidence of differential decreases in utilization due to implementation of HHVBP, which might signal an unintended impact of HHVBP on access to care for some beneficiaries, this evaluation will continue to monitor trends in home health utilization to investigate any potential impacts on vulnerable subgroups of beneficiaries, such as beneficiaries who are dual eligible for Medicare and Medicaid or those located in rural areas.

Two out of three measures of the overall severity of home health patient case-mix indicated no difference in the increasing trend in patient severity occurring in both HHVBP and non-HHVBP states. However, there was evidence that the average HCC score for a beneficiary's first home health episode increased at a slightly slower rate in HHVBP states in comparison to non-HHVBP states following the implementation of HHVBP. This overall finding for all nine HHVBP states combined was largely driven by the experience of two states (Tennessee and Florida). Together, these mixed results for the case-mix measures raise the question of whether agencies in HHVBP states may be making early efforts under the model to slow the rate of increase in their proportion of higher severity patients more so than agencies in non-HHVBP states. The extent of any such patient selection by HHAs and the potential impact on access to home health care for some groups of vulnerable patients warrants additional monitoring and analysis for future reports.

4. Results: Higher Agency Total Performance Scores in HHVBP States than Comparison States in Each of the First Three Model Performance Years

4.1 Introduction

This chapter presents our analyses of the impact of the HHVBP Model on the quality performance of home health agencies in the nine model states. As discussed above, the performance of eligible agencies under the HHVBP Model is measured using TPS scores, which are the basis for adjusting Medicare payments to agencies in the model states. For example, 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. Similarly, CMS used agency 2017 TPS scores to adjust payments to HHAs during CY 2019. Furthermore, CMS has proposed to publicly report HHAs' TPS Scores in late 2021 (HHS, 2019). 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 TPS scores in each of the first three years of the model*** for agencies in the nine model states compared to those in the non-model states. In examining patterns in performance over time among individual HHAs, we found most HHAs had consistently lower or higher levels of performance in consecutive performance years. However, we did not find a strong pattern of HHVBP HHAs with consistently lower TPS scores in the two most recent performance years being more likely than other HHAs to care for beneficiaries with social risk factors. Further, based on an analysis of profitability among freestanding HHAs, we found no relationship between HHA profitability and overall performance under HHVBP.

4.2 Higher TPS Scores among Agencies in HHVBP States Compared to Non-HHVBP States in First Three Performance Years

Agencies eligible to receive a TPS score include those 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 2018, we calculated a TPS score for 81.8% of HHAs in HHVBP states[5] and 75.9% of HHAs in non-model states (Exhibit 16). As expected, a key distinguishing characteristic of HHAs without a TPS score is that they tended to be small. In addition to being notably smaller overall, agencies without a TPS score were in operation for a relatively shorter period of time, for both those in HHVBP states and in non-model states (see Exhibit C-13 [Page 130] in the Technical Appendix).

Since agencies ineligible to receive a TPS tended to be much smaller, agencies with a TPS score account for a large percentage of overall home health episodes in the U.S. Based on our analyses of TPS scores for the most recent performance year, 2018, HHAs eligible to receive a TPS accounted for 99.2% of OASIS episodes in HHVBP states and 98.3% of OASIS episodes in non-model states (Exhibit 16). Similar rates also were observed in 2016 and 2017 (see Exhibits C-11 and C-12 [Page 130] in the Technical

[5] Among HHAs in HHVBP states, our calculated TPS aligns closely with the TPS calculated by the HHVBP Implementation Contractor (See Section A.2.8 [Page 70] in the Technical Appendix), as does the percentage of HHAs in HHVBP states that received a TPS in 2018 from the HHVBP Implementation Contractor (See Exhibit C-1 [Page 113] in the Technical Appendix).

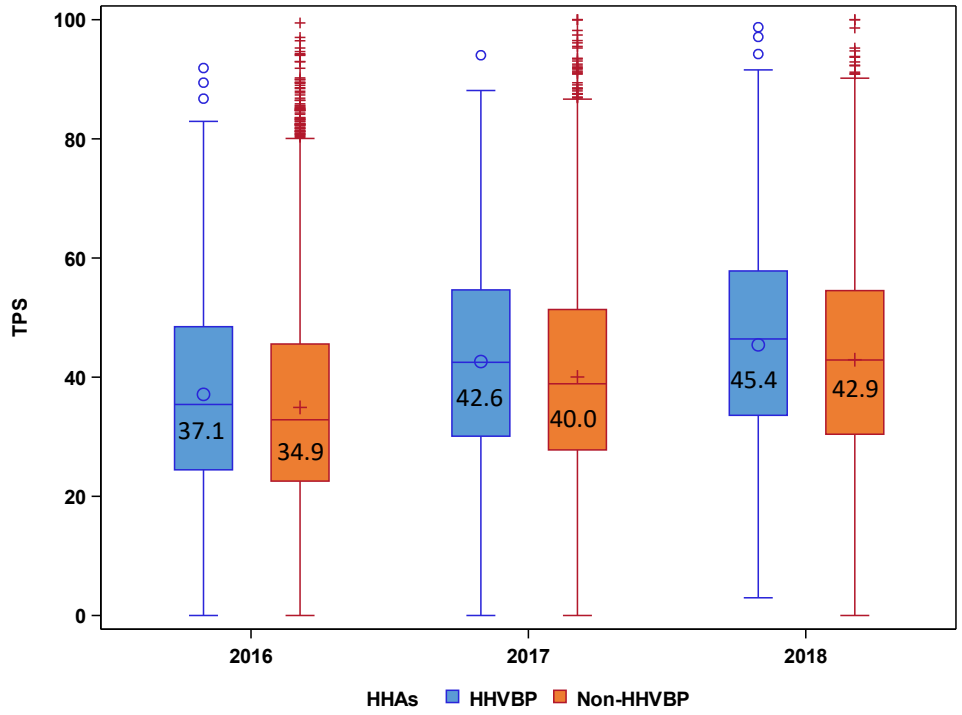
Appendix). The agency TPS scores examined in this report will therefore reflect the quality performance of a very high proportion of the home health episodes for Medicare and Medicaid patients in the U.S.

Exhibit 16. HHA Eligibility for Calculating a TPS Score in 2018

	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	1,622	360	1,982	6,779	2,155	8,934
% of HHAs	81.8%	18.2%	100.0%	75.9%	24.1%	100.0%
Number of OASIS episodes	1,661,621	12,957	1,674,578	5,514,884	93,703	5,608,587
% of OASIS episodes	99.2%	0.8%	100.0%	98.3%	1.7%	100.0%
Number of Medicare claims episodes	1,388,621	11,318	1,399,939	4,666,266	110,039	4,776,305
% of Medicare claims episodes	99.2%	0.8%	100.0%	97.7%	2.3%	100.0%

In each of the first three performance years, TPS scores were slightly higher among HHAs in HHVBP states relative to those in non-model states (Exhibit 17). There was also a shift upward in the distribution of agency TPS scores between 2016 and 2018, for both groups of agencies. This shift reflects ongoing improvement in agency performance in 2018 over 2017 (and 2017 over 2016) relative to a combination of both the fixed baseline thresholds used to measure achievement for each of the HHVBP performance measures as well as each agency's own baseline performance used to measure improvement.

Exhibit 17. Distribution of Agency TPS Scores, 2016 to 2018



*The box shows the interquartile range, with the median represented by the horizontal line and the mean represented by the circle or the "plus" sign for HHVBP and non-HHVBP groups, respectively. 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 the "fence").*

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 HHVBP performance measures for agencies in HHVBP and non-HHVBP states (see Section A.2.8 [Page 70] of the Technical Appendix). The results of these comparisons show that for 2016 through 2018, the relatively higher TPS scores among agencies in the HHVBP states are almost entirely the result of higher scores for the OASIS-based outcome measures (see Exhibit C-14 [Page 132] 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-HHVBP groups.[6] Model estimates indicated TPS scores that were 1.6, 2.1, and 1.7 points higher among agencies in HHVBP states in 2016, 2017, and 2018, respectively (Exhibit 18). These effect sizes indicate TPS scores for HHVBP agencies that were 4.6%, 5.3%, and 4.0% higher than those for non-HHVBP agencies in 2016, 2017, and 2018, respectively.

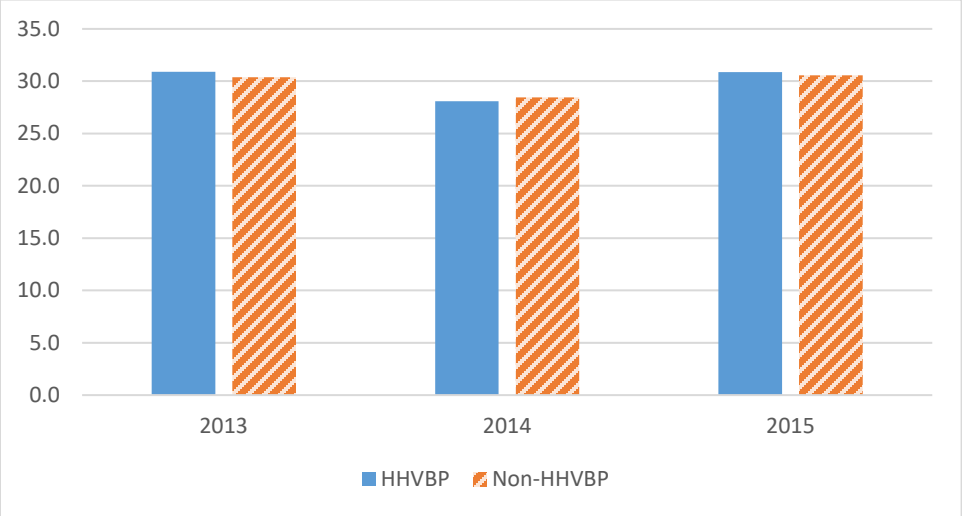
[6] As discussed above, we did not use a D-in-D approach for these analyses since the TPS score already captures changes over time in performance. See Section A.2.8 (Page 70) in the Technical Appendix for additional detail.

Exhibit 18. Regression Analysis of Agency TPS Scores in HHVBP versus Non-HHVBP States, 2016-2018

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%
2018	1.7	<0.001	42.9	4.0%

We considered the results of 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.[7] Agency TPS scores were similar in HHVBP and non-HHVBP states in each year from 2013-2015 (Exhibit 19), suggesting initial balance in the overall performance of agencies in these two groups prior to the implementation of the model.[8]

Exhibit 19. Average Agency TPS Scores in HHVBP and Non-HHVBP States by Year, 2013-2015



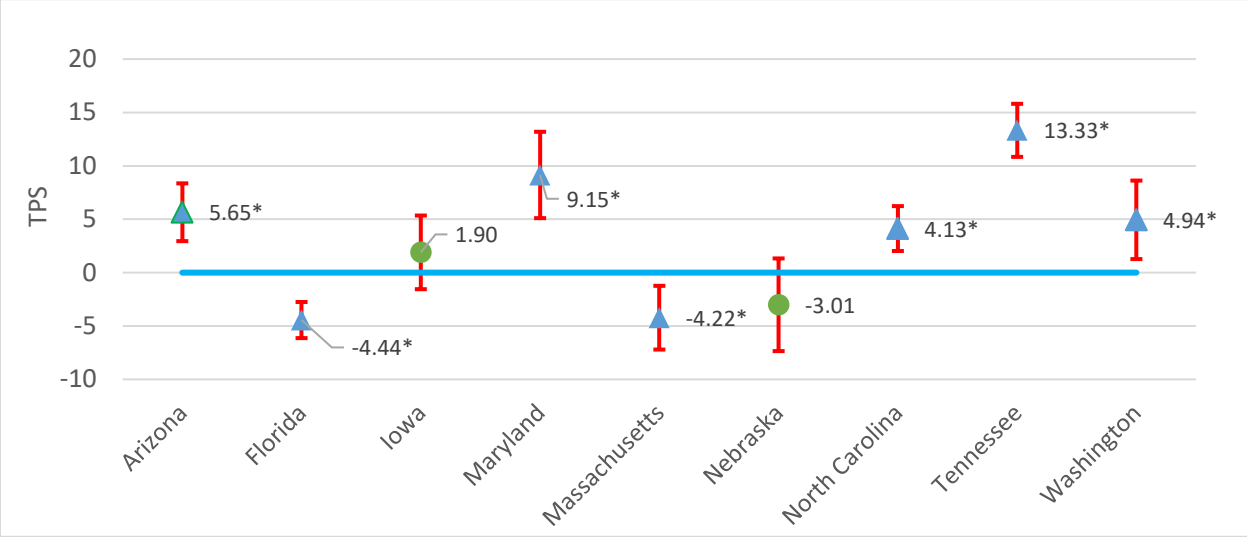
To explore whether the impact of the model on the overall quality measure performance of agencies varied among the nine individual HHVBP states, we examined agency TPS scores for each state relative to its respective regional comparison group. As with the analyses of all HHVBP states combined, we performed separate regression analyses for each of the first three years of the model. In 2018, agency TPS scores were higher for five HHVBP states relative to their respective regional comparison groups (Exhibit 20). This includes four states with agency TPS scores that were also higher relative to their regional comparison groups in both 2016 and 2017 (Arizona, Maryland, Tennessee, and Washington; see Exhibits C-15 and C-16 [Page 133] in the Technical Appendix). For the two states in Exhibit 22 with lower

[7] 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.

[8] We note that we do not compare TPS scores during 2013-2015 with those observed during 2016-2018, 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).

agency TPS scores in 2018 than their regional comparison group (i.e., Florida and Massachusetts), only Florida had lower TPS scores in one of the first two years of the model (for 2017; see Exhibits C-15 and C-16 [Page 133] in the Technical Appendix).

Exhibit 20. Difference in Agency TPS Scores between HHVBP States and their Regional Comparison Groups, 2018



▲ *signifies statistical significance of p < 0.1; * p < 0.05*

4.3 No Evidence that Application of the Initial HHVBP Payment Adjustments Prompted Additional Gains among HHAs with Lower Overall Performance

The HHVBP Model is designed to incentivize agencies to improve performance on quality measures through performance-based adjustments to their Medicare payments in future years. Through the first two years of model implementation, no payment adjustments were yet being applied. However, starting in 2018, there may have been stronger incentives for agencies in HHVBP states to improve quality or to sustain high levels of quality relative to agencies in non-HHVBP states, as payment adjustments began to be applied under the model.

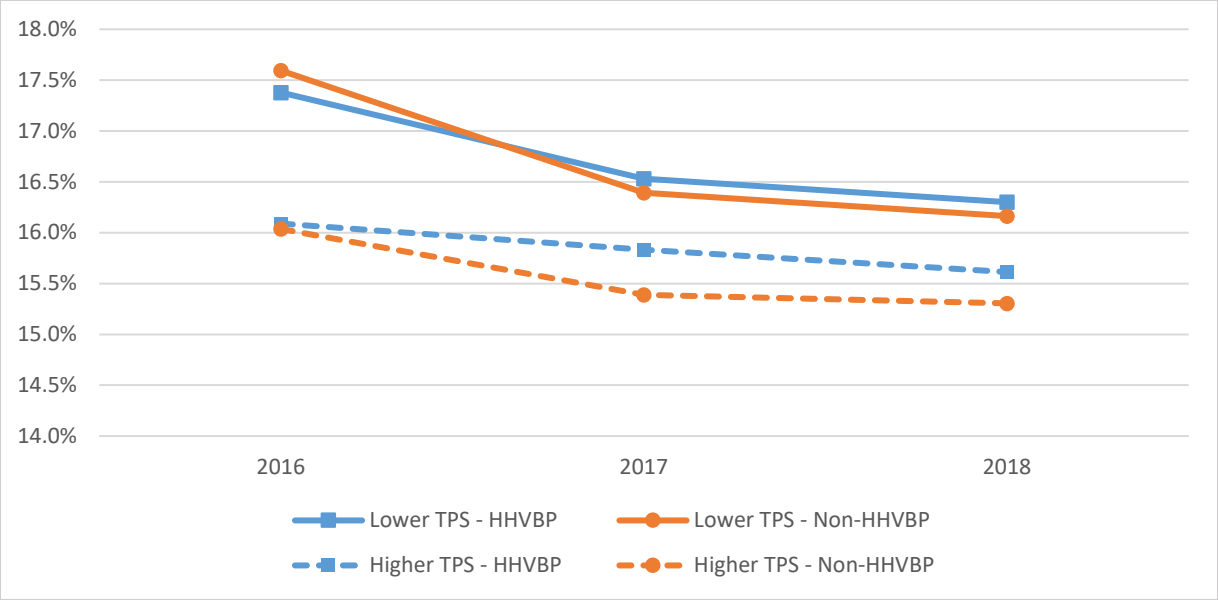
We hypothesized that the initial payment adjustments may have been more likely to prompt a response from agencies with lower overall performance whose payments were being reduced the most due to HHVBP. We therefore examined whether HHVBP agencies with initially lower performance (based on 2016 TPS scores) were more likely to improve their performance on quality measures during 2018, when the corresponding payment adjustments were being applied, than non-HHVBP agencies with lower 2016 TPS scores. To test whether agencies with higher overall performance may have responded differently to the initial adjustments under the model, we also compared changes in quality measure rates during 2018 among HHVBP and non-HHVBP agencies with higher 2016 TPS scores.

Similar to the previous section, we classified agencies into groups based on their overall performance on measures included in the TPS. Our focus for this analysis is on two groups of agencies that were defined as: (1) Lower TPS, based on being in the lowest quartile of TPS scores among agencies in the same state cohort in 2016; and (2) Higher TPS, based on being in the highest quartile of TPS scores among agencies in the same state cohort in 2016. We examined changes over time for a total of 11 HHVBP performance

measures, including two claims-based measures, seven OASIS-based outcome measures, and two OASIS-based process measures (of note, the drug education measure was dropped from the HHVBP Model starting in CY 2018). We used a multivariate regression approach to generate adjusted average measure values for home health episodes in HHVBP states and non-HHVBP states, with covariates for agency and beneficiary characteristics set to the mean values among all episodes for both groups during 2013-2018. Details regarding model covariates can be found in Section A.1.4.2 (Page 14) in the Technical Appendix.

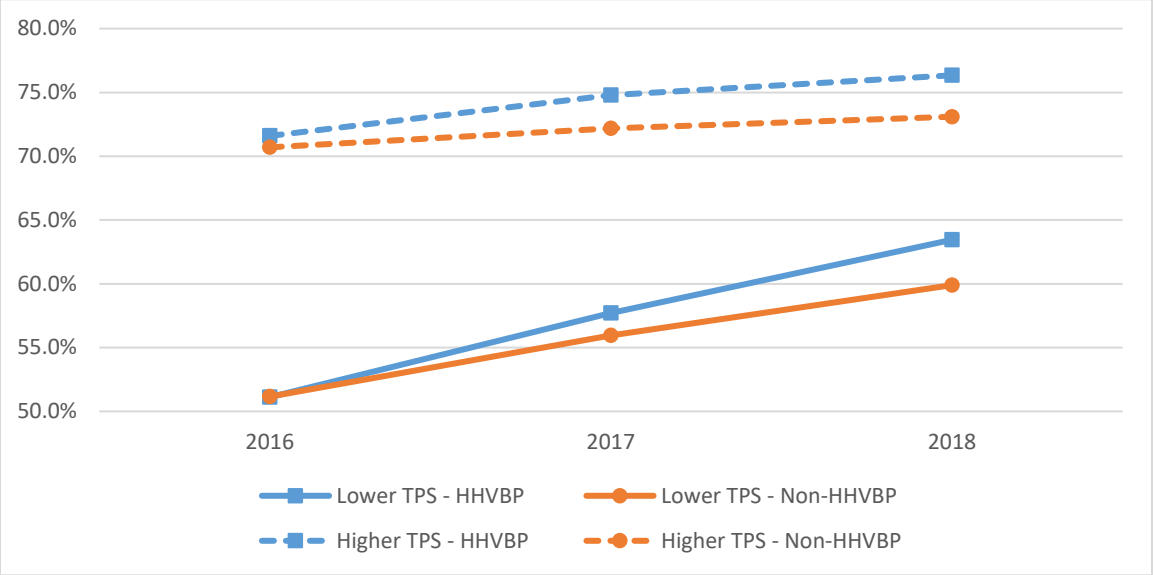
Overall, results were mixed for the 11 measures examined; we did not systematically find larger gains in measure rates among agencies with lower overall performance in HHVBP states relative to their counterparts in non-HHVBP states at the time that the initial payment adjustments were applied under the model. For example, although the lower TPS group in HHVBP states showed a decline in unplanned ACHs among first episodes between 2017 and 2018, the rate of the decline was not steeper than that of the lower TPS group in non-HHVBP states (Exhibit 21). For comparison, the adjusted measure rate for the higher TPS group declined at a slightly faster rate during 2017-2018 in HHVBP states than in non-HHVBP states.

Exhibit 21. Assessing the Potential Impact of the Initial HHVBP Payment Adjustments on Adjusted Rates of Unplanned Acute Care Hospitalizations (First Episodes)



In contrast, adjusted measure values for improvement in management of oral medications showed a somewhat larger *increase* during 2017-2018 among lower TPS agencies in HHVBP states compared to those in non-HHVBP states (Exhibit 22). Our findings for other measures are presented in Exhibit C-17 (Page 134) in the Technical Appendix.

Exhibit 22. Assessing the Potential Impact of the Initial HHVBP Payment Adjustments on Adjusted Rates of Improvement in Management of Oral Medications

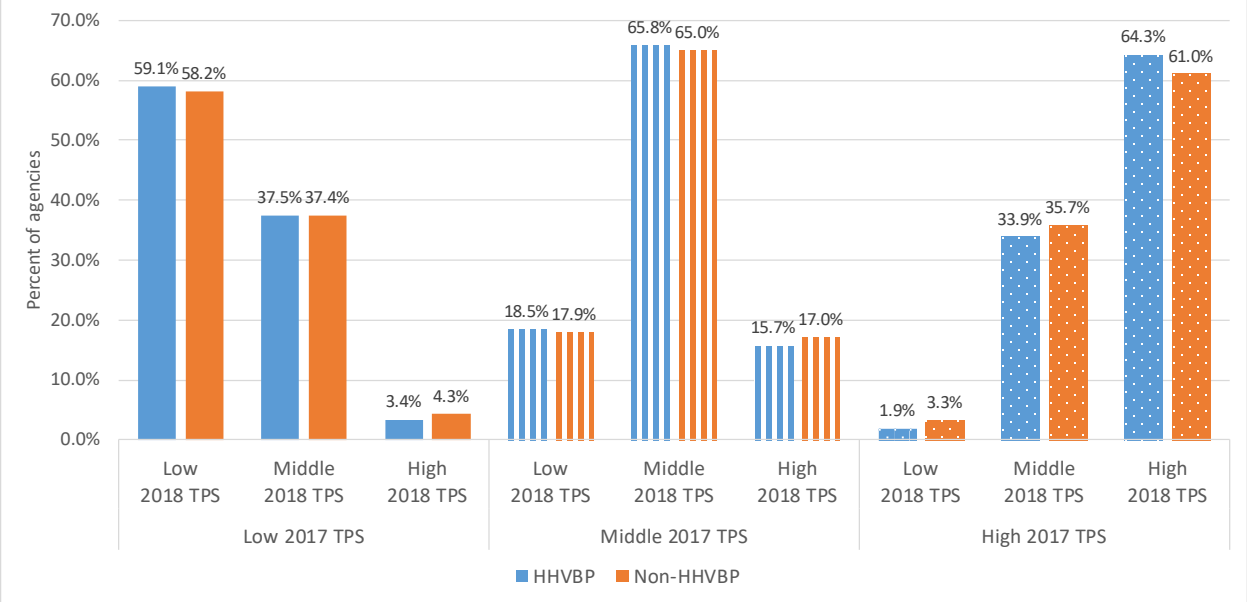


4.3.1 No Strong Evidence that Agencies with Consistently Lower TPS Scores in 2017 and 2018 Care for More Patients with Social Risk Factors

Some agencies may be facing greater challenges in responding to the quality performance incentives under HHVBP. This may include agencies caring for beneficiary populations with greater social risk factors. If such agencies consistently have lower levels of performance and negative payment adjustments, and agencies perceive their poorer results as being influenced by factors beyond their control, the model may discourage agencies from caring for certain patient populations.

This risk will first depend on the extent to which agencies are consistently achieving either lower or higher overall levels of performance over time under the HHVBP Model. We classified 2017 and 2018 TPS scores as being in either (a) the lowest quartile of agencies in the same state cohort for that year, (b) the highest quartile, or (c) the middle two quartiles. We then compared each agency's TPS group for 2017 with its TPS group for 2018. First, we found that most agencies in a particular TPS group in 2017 (whether low, middle, or high) remained in the same TPS group in 2018. For example, 59.1% of agencies in HHVBP states in the low TPS group in 2017 remained in the low TPS group in 2018 (Exhibit 23). The percentage is similar for agencies in non-HHVBP states (58.2%). For both HHVBP and non-HHVBP states, nearly all of the remaining agencies transitioned to the middle TPS group in 2018, with only 3-4% of agencies transitioning to the high TPS group in 2018.

Exhibit 23. Change in Agency TPS Categories between 2017 and 2018, HHVBP and Non-HHVBP States



Persistently lower overall levels of performance over time for some agencies may have varying implications for agencies and for beneficiaries. One implication is a need for some agencies to more strongly emphasize, reprioritize, or redesign quality improvement activities. To the extent that HHVBP encourages such efforts and they are successful for some lower performing agencies, we might expect an increase over time in the rate at which HHVBP agencies with a lower TPS transition to a higher TPS group. Since TPS scores are calculated to reflect the performance of agencies relative to other agencies in their state, for this to happen there would also need to be an increase over time in the extent to which HHVBP agencies with a higher TPS moved to a lower TPS group.

Another possible explanation for persistently lower levels of performance over time, however, is that agencies face challenges in caring for specific beneficiary populations. Consistently poorer results under the model could disincentivize agencies from continuing to provide care for beneficiaries for whom they see higher levels of performance as being more difficult or costly to achieve. In this way, there is a risk that the model could adversely affect access to care for some beneficiaries.

To explore this possibility in the early years of the model, we examined agency performance over time based on their mix of beneficiary demographics and social risk factors. We considered the extent to which HHVBP agencies with a larger proportion of beneficiaries in certain demographic or social risk factor groups were more likely to have consistently lower TPS scores over time. We defined three groups of agencies: (1) Lower TPS, based on the lowest quartile of TPS scores among agencies in the same state cohort in both 2017 and 2018; (2) Higher TPS, based on being in the highest quartile of TPS scores among agencies in the same state cohort in both 2017 and 2018; and (3) Middle TPS, which includes all other agencies.

Overall, we did not find that agencies in HHVBP states with consistently lower TPS scores in 2017 and 2018 were systematically more likely than other agencies in HHVBP states to care for beneficiaries with certain demographic characteristics or for those with social risk factors (Exhibit 24 and Exhibit 25). For example, in HHVBP states, there were higher percentages of beneficiaries who were dual eligible or

living in a high poverty area among agencies with a consistently higher TPS (Exhibit 25). Differences across TPS groups in the percentage of patients living in rural areas were relatively small (Exhibit 25). While agencies in HHVBP states with consistently lower TPS scores in 2017 and 2018 cared for a higher percentage of black non-Hispanic beneficiaries than other agencies in HHVBP states (Exhibit 24), we also found a similar association among agencies in non-HHVBP states.

Exhibit 24. Comparison of Patient Demographics by Agency 2017-2018 TPS Category, HHVBP and Non-HHVBP States

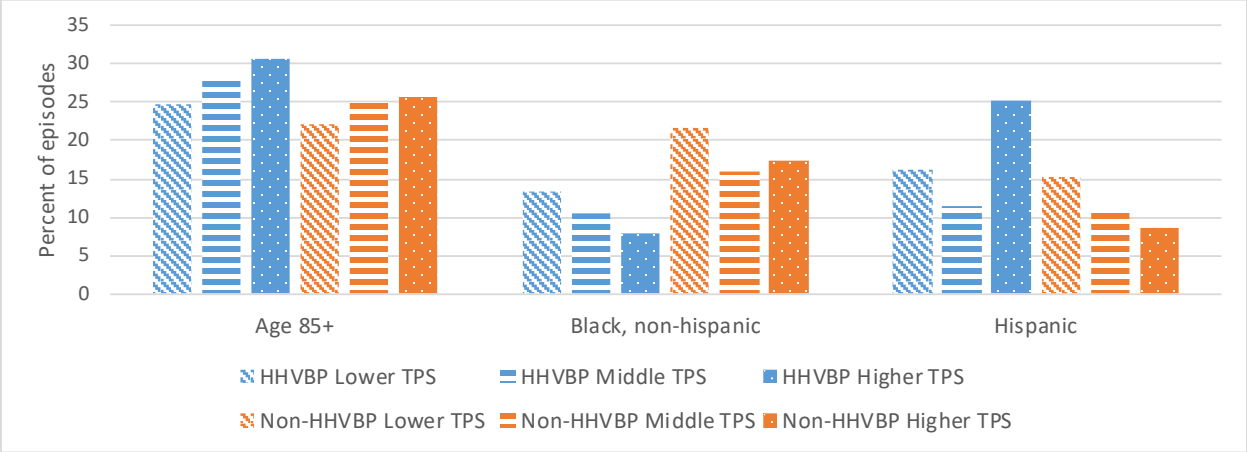
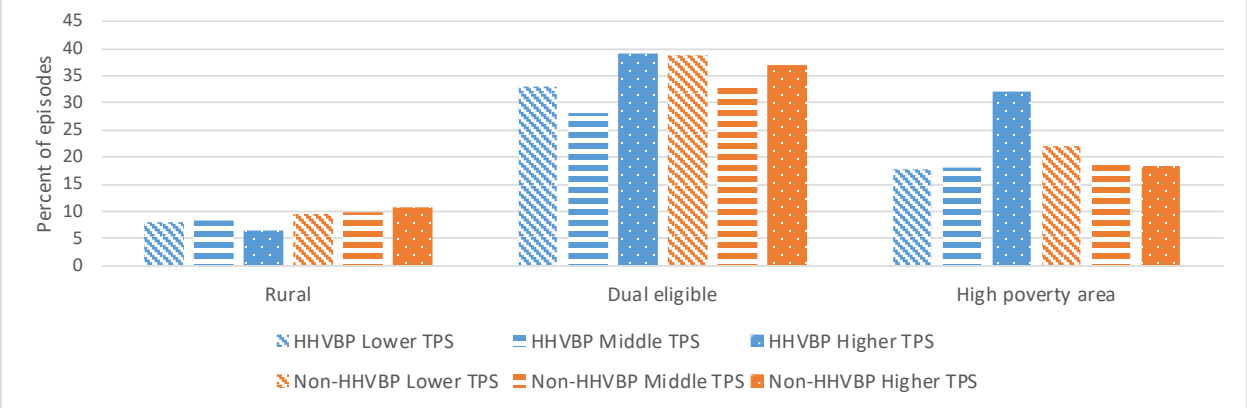


Exhibit 25. Comparison of Patient Social Risk Factors by Agency 2017-2018 TPS Category, HHVBP and Non-HHVBP States



4.4 No Relationship between HHA Profitability and Performance

In 2018 and 2019, the third and fourth years of the HHVBP Model, HHAs in HHVBP states received Medicare PPS payment changes based on performance over quality measures reported in 2016 and 2017. Because payments are directly related to revenue and home health inputs are directly related to costs, we incorporated HHA cost report data to identify if relationships exist between profitability and HHVBP payment changes. More specifically, we used a trimmed sample of cost reports to examine whether Medicare profit margins in 2016 and 2017 were correlated to performance under HHVBP and resulting HHVBP payment changes in later years. For our analyses, we utilized cost report data from FY

2011 to FY 2017 for freestanding and hospital-based HHAs. See Section A.2.1 (Page 42) in the Technical Appendix for more information.

Most freestanding agencies maintained positive profit margins. In 2017, over 75% of agencies in our trimmed sample reported positive profits. Within the same year, the national median profit margin was 15.9%. We also observed positive profit margins in freestanding agencies in HHVBP states, where the median profit margin was slightly higher at 18.0%. Approximately one-third of agencies' cost reports revealed profit margins above 25%, while just over one-fifth of agencies had negative profit margins (Exhibit 26).

Exhibit 26. Distribution of Profit Margins Reported by Freestanding HHVBP Agencies, FYs 2016-2017

	2016	2017
Total Number of Agencies	**1,244**	**1,240**
Profit Margin		
Greater than or equal to 50%	4.6%	3.6%
49% to 25%	30.1%	30.1%
24% to 20%	10.4%	12.0%
19% to 15%	11.3%	10.2%
14% to 10%	10.5%	8.9%
9% to 5%	6.7%	7.1%
4% to 0%	6.3%	5.4%
-1% to -5%	3.9%	3.9%
-6% to -10%	3.6%	2.4%
-11% to -15%	2.4%	2.6%
-16% to -20%	1.7%	2.1%
-21% to -25%	1.4%	1.5%
-26% to -50%	3.5%	5.0%
Less than -50%	3.7%	5.2%

Source: FY 2016-2017 CMS 2552-10 and 1728-94 cost reports

We then compared 2018 and 2019 HHVBP payment adjustments derived from 2016 and 2017 data with the FY 2016 and FY 2017 profit margins. The data showed a limited relationship between HHA profit margins and payment adjustments (Exhibit 27). Both positive- and negative-profit agencies received payment increases and decreases, on average, and the magnitude of average HHVBP payment adjustments showed no correlation with HHA profitability.

Exhibit 27. Average HHVBP Payment Adjustments by Profit Margin for Freestanding HHVBP Agencies, FYs 2016-2017

	2016	2017
Total Number of Agencies	**1,165**	**1,189**
Profit Margin		
Greater than or equal to 50%	0.02%	0.40%
49% to 25%	-0.05%	-0.20%
24% to 20%	0.12%	0.20%
19% to 15%	0.11%	-0.10%

	2016	2017
14% to 10%	0.06%	0.10%
9% to 5%	0.20%	0.00%
4% to 0%	0.10%	0.10%
-1% to -5%	0.24%	0.10%
-6% to -10%	-0.09%	0.60%
-11% to -15%	-0.25%	-0.20%
-16% to -20%	-0.06%	-0.40%
-21% to -25%	-0.33%	-0.10%
-26% to -50%	0.07%	0.20%
Less than -50%	-0.02%	-0.20%

Source: FY 2016-2017 CMS 2552-10 and 1728-94 cost reports

The average magnitude of HHVBP payment adjustments across profit margin categories varied by less than ±1% and was unlikely to affect whether most agencies were profitable. However, for agencies with profit margins closer to zero, payment adjustments were more likely to determine whether an agency had positive or negative profits.

Focusing on HHAs nearest the 0% profit margin threshold, we grouped agencies into two categories: (i) agencies with between 0-10% profit margin and (ii) agencies with between -1% to -10% profit margin. For agencies around the 0% profit margin threshold, we found that average payment adjustments were slightly positive (Exhibit 28) and therefore did not change average profit margins from positive to negative.

Exhibit 28. Average HHVBP Payment Adjustments for Agencies with Profit Margins Nearest Zero, FYs 2016-2017

	2016	2017
Total Number of Agencies	**209**	**197**
0% to 10%	0.17%	0.06%
-1% to -10%	0.06%	0.21%

Source: FY 2016-2017 CMS 2552-10 and 1728-94 cost reports

4.5 HHVBP Payment Adjustments for 2019 Differ by Agency Type

In August 2018, eligible agencies in HHVBP states received notifications of their preliminary payment adjustments for 2019, the second year in which Medicare payments to HHAs were being adjusted based on their quality performance. These HHVBP agency-specific payment adjustments were based on agency TPS scores for 2017 and had a maximum range between -5% and +5% (Exhibit 1). The payment adjustments were finalized in November 2018, and were applied to all Medicare FFS home health claims beginning January 1, 2019.

Among the 2,035 HHVBP agencies with at least one Medicare claims-based or OASIS-based home health episode in CY 2017, 1,616 (79%) were eligible to receive a payment adjustment to their FFS claims in CY 2019. The average and median payment adjustment across HHAs was -0.118% and -0.09%, respectively, and ranged from -5% to 4.96%.

Whereas 34% of HHAs received payment adjustments either lower than -1% or higher than 1% in 2018, this increased to 52% of HHAs in 2019 (Exhibit 29). This includes 29% of HHAs that received a payment adjustment lower than -1%, and 23% of HHAs that received a payment adjustment greater than 1%. Relative to other HHAs, the highest performing HHAs that received a 1% to 5% payment adjustment during 2019 were smaller and less likely to be affiliated with a chain (Exhibit 29). The lowest performing HHAs that received a -5% to -1% payment adjustment were also smaller and more likely to have for-profit ownership. Additional details regarding the distribution of both the CY 2019 and CY 2018 payment adjustments across HHA characteristics are provided in Exhibits C-18 and C-19 (Pages 136-137) in the Technical Appendix.

Exhibit 29. Characteristics of HHAs by 2019 HHA Payment Adjustment Category

Characteristics*	CY 2019 HHA Payment Adjustment Categories				Overall	p-value
	[-5%, -1%]	(-1%, 0%]	(0%, 1%]	(1%, 5%]		
Number of HHAs with a TPS	463	383	393	377	1,616	--
% of HHAs in each payment adjustment category	28.7%	23.7%	24.3%	23.3%	100.0%	--
Type						
Hospital-based	6.3%	9.9%	7.1%	9.8%	8.3%	<0.001
Freestanding	93.7%	90.1%	92.9%	90.2%	91.8%	
Ownership						
For profit	79.0%	64.1%	73.5%	69.4%	71.1%	<0.001
Nonprofit	17.4%	34.0%	24.7%	27.1%	26.4%	
Government owned	3.6%	1.9%	1.8%	3.6%	2.5%	
Chain affiliation						
Yes	54.9%	59.4%	68.2%	49.9%	59.8%	<0.001
No	43.4%	37.8%	31.7%	50.0%	39.1%	
Unknown	1.7%	2.7%	0.0%	0.1%	1.2%	
Size: Number of OASIS episodes						
1-59	0.7%	0.2%	0.2%	0.6%	0.4%	<0.001
60-249	7.5%	2.4%	2.6%	7.5%	4.4%	
250-499	10.9%	5.8%	4.7%	13.1%	7.7%	
500-999	17.5%	13.0%	12.8%	22.5%	15.5%	
≥1,000	63.4%	78.6%	79.6%	56.3%	72.0%	
HHA Age						
<4 years	2.2%	1.9%	2.1%	2.4%	2.1%	<0.001
4-10 years	22.8%	14.5%	15.8%	27.7%	18.9%	
>10 years	75.1%	83.7%	82.0%	69.9%	79.0%	

**HHA characteristics from CY 2017.*

4.6 Discussion

In this report, we find a positive impact of HHVBP on the overall performance of agencies on quality measures included in the TPS that is similar through each of the first three years of the model. This includes the first year in which HHVBP payment adjustments were applied to Medicare HHA payments

under the HH PPS, where only 34% of HHAs received adjustments exceeding +/-1%. In late 2018, HHAs were notified of their upcoming payment adjustments for 2019, where 52% would receive payment adjustments exceeding +/-1%. The adjustments that were applied at this early stage of the model were small, relative to a median of 15.9% in HHA profit margins in 2017. It will be important to continue to evaluate impacts of HHVBP on HHA performance on quality measures as the payment adjustments grow larger over time.

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 19), 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 among agencies in HHVBP states each year from 2016 to 2018 is consistent with an impact of HHVBP on overall agency performance on the measures that comprise the TPS which extends beyond any effects of pre-existing initiatives such as the Star Ratings program. Based on results through the first three performance years, including the first year in which HHVBP payment adjustments were applied, we did not find evidence yet of a widening gap in overall performance between HHVBP and comparison agencies as the model evolves. We also did not find strong evidence that the initial payment adjustments in 2018 prompted lower performing agencies to improve at a faster rate in order to avoid recurring payment reductions in future years of the model.

We also explored whether there were patterns in overall performance among individual HHAs through 2018 that might reflect early warning signs for certain beneficiary populations under the model. We did not find this to be the case, as beneficiary social risk factors were not systematically more common among HHVBP HHAs with lower TPS scores in both 2017 and 2018 compared to higher performing HHAs. These early results do not suggest broad adverse consequences of HHVBP for the care of potentially vulnerable beneficiary populations. However, our finding that over half of HHAs with a low TPS score in 2017 also had a low TPS score in 2018 may suggest challenges for quality improvement among some HHAs that require better understanding for the model to have a larger impact. Further, as the HHVBP payment adjustments become larger over time and the measures included in the TPS are modified and reweighted, it will be important to continue to assess whether agencies that care for more vulnerable patient populations tend to have lower performance, which could adversely affect access to care for some patients.

We did not find an association between HHA profitability and performance under HHVBP, measured by resulting payment changes, in our trimmed sample of freestanding HHAs in 2016 or 2017. The majority of HHAs in HHVBP states reported substantial profit margins in 2016 and 2017, suggesting the incentive to continue to provide care for Medicare beneficiaries under HHVBP. The magnitude of profit margins relative to forthcoming payment changes under HHVBP do not indicate that profitability will be qualitatively affected. Furthermore, for HHAs nearest to the zero percent profit margin threshold, we found that HHVBP payment changes tended to be positive. As the payment adjustments become larger over time under HHVBP, however, they may be more likely to determine whether individual agencies are profitable, and HHAs may be increasingly aware of this prospect as the model continues to evolve.

5. Results: HHVBP Had Modest Impacts on Medicare Utilization in the First Three Model Years

5.1 Introduction

This chapter examines the impact of HHVBP on measures of health care utilization during the first three years of the model. We found that HHVBP produced ***intended impacts on claims-based acute care hospitalization (ACH) and skilled nursing facility (SNF) use measures among FFS beneficiaries receiving home health services with offsetting unintended impact on ED utilization without hospitalization*** among FFS beneficiaries receiving home health services. Furthermore, in supporting descriptive analyses, we found that HHVBP was not associated with changes in the distribution of primary diagnosis categories for ACHs during home health episodes. Also, we found descriptive evidence of the HHA practice of frontloading home health visits early during episodes, particularly skilled nursing visits among post-acute hospitalization episodes. An additional supporting descriptive analysis revealed that HHVBP is associated with lower ACHs and ED use among home health episodes associated with APMs.

More specifically, the D-in-D results indicate relative declines under HHVBP in unplanned hospitalizations, both among first and all home health episodes in a sequence, and use of SNFs, of approximately 0.1 to 0.4 percentage points (1 to 5% relative to baseline averages in HHVBP states). These findings provide evidence of the HHVBP Model's achievement of intended impacts, since hospitalization is an important indicator of health status and the largest driver of health care expenditures. However, we also observe a relative *increase* in ED use among HHVBP states of 0.3 percentage points, which reflects a convergence of a slightly lower rate among beneficiaries in HHVBP states prior to implementation of the model towards the rate observed in non-HHVBP states. We note these findings reflect behavior of HHAs that occurs during the first two years of the model prior to application of the initial payment adjustments (2016-2017) as well as the first year of HHVBP payment adjustments in CY 2018 when agencies in HHVBP states received adjustments up to a ±3%. These changes in utilization are consistent with our findings for Medicare spending measures presented in the following chapter.

Below, we present detailed findings about the impact of HHVBP on the utilization measures. In subsequent sections of this chapter, we explore nuances related to these D-in-D findings by descriptively examining (1) the distribution of primary diagnoses associated with hospitalizations during home health episodes; (2) evidence of the agency practice of frontloading visits by examining the distribution of number and types of visits during the first four weeks of home health episodes; and (3) trends in ACH and ED use for home health episodes associated with APMs.

5.2 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 that allow baseline comparisons between HHVBP and non-HHVBP states to provide 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 (listed in italics in Exhibit 30). During the three years preceding the start of HHVBP, ED utilization among HHVBP states was slightly lower at 11.7% of first home health episodes compared to non-HHVBP states, which had a 12.3% rate, but converged to a 12.8% rate similar to the 12.9% rate of non-HHVBP states post HHVBP

(2016-2018). The 15.7% rate of unplanned ACHs for first FFS episodes was slightly lower in HHVBP states relative to the 16.3% rate for non-HHVBP states during the pre-intervention years, and the two rates converged to equal average levels of 15.9% during 2016-2018. In contrast, the measure of unplanned ACHs for all FFS episodes (17%) was somewhat greater in HHVBP states relative to non-HHVBP states (15.9%) in the baseline period, maintaining a nearly constant difference on average during the post-HHVBP period. SNF use was somewhat higher among HHVBP states (4.9%) relative to non-HHVBP states (4%) during the baseline period and remained higher at 5% for HHVBP relative to 4.2% for non-HHVBP states through the first three years of the model. Rates of the other two publicly reported measures (unplanned hospital readmission in the first 30 days of home health care and ED use following hospitalization [without hospital readmission] in the first 30 days) were nearly equivalent on average across HHVBP and non-HHVBP states during both the baseline and post-HHVBP periods.

Exhibit 30. Baseline and Post-HHVBP Performance Period Means for FFS Claims-Based Health Care Utilization Measures, All HHVBP States and Non-HHVBP States

Measure	HHVBP States, Baseline (2013-2015)	Non-HHVBP States, Baseline (2013-2015)	HHVBP States, Post-HHVBP (2016-2018)	Non-HHVBP States, Post-HHVBP (2016-2018)
*ED Use (no Hospitalization)/First FFS HH Episodes**	11.7%	12.3%	12.8%	12.9%
*Unplanned Acute Care Hospitalization/First FFS HH Episodes**	15.7%	16.3%	15.9%	15.9%
Unplanned Acute Care Hospitalization/All FFS HH Episodes	17.0%	15.9%	17.0%	15.8%
Unplanned Hospital Readmission in the First 30 Days of HH Care	13.0%	13.0%	12.5%	12.5%
ED Use Following Hospitalization (without Hospital Readmission) in the First 30 Days of HH Care	9.7%	10.0%	10.2%	10.5%
SNF Use /All FFS HH Episodes	4.9%	4.0%	5.0%	4.2%

** Key Impact Measure | HHVBP Measures indicated by italic text.*
See Exhibit 30n (Page 138) in the Technical Appendix for each measure's sample size.

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 what would have happened in HHVBP states if the model had not been implemented. Details are shown in Section A.1.5 (Page 21) in the Technical Appendix.

5.3 HHVBP Reduces Acute Hospitalizations While Increasing Outpatient Emergency Department Use

We examined effects of HHVBP on several claims-based measures of utilization associated with or following home health episodes. Because home health care also entails monitoring patient status, facilitating early interventions, and promoting more rapid recovery of health and functional status, 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 ACHs among first home health episodes. We also examined SNF use and other measures of hospitalization and ED use.

Overall, we found the average annual impact of the HHVBP Model over 2016-2018 to involve relative decreases in utilization in HHVBP states compared to non-HHVBP states for most of these measures, but we also found relative increases in ED use (Exhibit 31). HHVBP led to a cumulative impact of a 0.28 percentage point increase in ED utilization and a 0.21 percentage point decrease in unplanned ACHs among FFS home health beneficiaries in HHVBP states relative to non-HHVBP states during the first three years of the model (Exhibit 31). These cumulative effects translate to a 2.4% increase relative to the baseline average ED use of 11.7% and a 1.3% decrease relative to the 15.7% average unplanned hospitalization rate for first home health episodes in HHVBP states during the baseline period. 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, a trend that we will continue to monitor in future years. We observed no change in the other measure that examined ED use (ED Use following Hospitalization within the First 30 Days of Home Health Care) and was publicly reported in 2018. See Section A.2.2 (Page 51) in the Technical Appendix for additional detail on how the two measures of ED use differ.

We also report results for the broader measure of unplanned hospitalizations among all FFS home health episodes to have a more comprehensive view of any effects of HHVBP on hospitalization (e.g., if HHVBP stimulates quality improvements that reduce the risk of hospitalization over the longer term). This approach also allows us to analyze possible unintended consequences of the design of the HHVBP hospitalization measure, for example if agencies are able to avoid certain hospitalizations in the near-term that instead occur in later episodes in a sequence at which point they are not directly penalized by the model. As with the HHVBP measure that only includes hospitalization during first episodes, we estimated a similar reduction for unplanned hospitalizations among all home health episodes: cumulative estimate of -0.30 percentage points, corresponding to an average annual decrease of 1.8% in HHVBP states relative to the baseline period rate of 17.0%. 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 of -0.25 percentage points, corresponding to a 1.9% average annual reduction in unplanned hospital readmissions in HHVBP states relative to the baseline period rate of 13.0%. We found a similar relative decline of 0.24 percentage points per year in SNF use among home health FFS beneficiaries in HHVBP states compared to those in non-HHVBP states, reflecting a 4.9% decline relative to the 4.9% baseline rate of SNF use.

For these claims-based utilization measures, the separate yearly D-in-D estimates for 2016-2018 showed some fluctuations from year to year. Five of the six utilization measures showed a pattern of smaller impacts in 2017 relative to 2016 and 2018. Among all measures that had a significant cumulative D-in-D estimate, the largest change in impact magnitudes from 2016 to 2017 was a 0.35 percentage point (78%) reduction from -0.45 to -0.1 percentage points for unplanned hospital readmission in the first 30 days of home health care. For these same measures, the largest increase in magnitude of impact from 2017 to 2018 was an increase of 0.18 percentage points (86%) from 0.21 to 0.39 percentage points for ED use without a hospitalization among first FFS home health episodes. SNF use among all home health FFS beneficiaries is the only utilization measure that had a pattern of steadily increasing statistically significant impact magnitudes over the first three HHVBP Model years (i.e., -0.20, -0.23, and -0.29

percentage points in 2016, 2017, and 2018, respectively). For unplanned hospitalization among first home health episodes, the yearly D-in-D estimates indicated reductions due to HHVBP in 2016 (-0.29 percentage points) and 2018 (-0.21 percentage points) but no statistically significant changes in 2017.

Exhibit 31. 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[a]	p-value	Lower 90% CI[a]	Upper 90% CI[a]		
ED Use (no Hospitalization)/First FFS HH Episodes						
2016	0.25	<0.001	0.13	0.36	11.7%	2.1%
2017	0.21	<0.01	0.08	0.34		1.8%
2018	0.39	<0.001	0.25	0.53		3.3%
Cumulative	0.28	<0.001	0.18	0.39		2.4%
Unplanned Acute Care Hospitalization/First FFS HH Episodes						
2016	-0.29	<0.001	-0.43	-0.15	15.7%	-1.9%
2017	-0.12	0.18	-0.27	0.03		-0.8%
2018	-0.21	0.04	-0.38	-0.05		-1.3%
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	-0.16	17.0%	-1.6%
2017	-0.27	<0.01	-0.41	-0.13		-1.6%
2018	-0.36	<0.001	-0.51	-0.21		-2.1%
Cumulative	-0.30	<0.001	-0.42	-0.19		-1.8%
Unplanned Hospital Readmission in the First 30 days of HH Care						
2016	-0.45	<0.001	-0.65	-0.25	13.0%	-3.5%
2017	-0.10	0.44	-0.31	0.11		-0.8%
2018	-0.17	0.20	-0.40	0.05		-1.3%
Cumulative	-0.25	0.01	-0.42	-0.09		-1.9%
ED Use Following Hospitalization (without Hospital Readmission) in the First 30 Days of HH Care						
2016	0.11	0.26	-0.05	0.27	9.7%	1.1%
2017	-0.01	0.95	-0.18	0.17		-0.1%
2018	0.15	0.18	-0.04	0.33		1.6%
Cumulative	0.09	0.26	-0.04	0.22		0.9%
SNF Use/All FFS HH Episodes						
2016	-0.20	<0.001	-0.25	-0.14	4.9%	-4.1%
2017	-0.23	<0.001	-0.30	-0.16		-4.7%
2018	-0.29	<0.001	-0.36	-0.21		-5.9%
Cumulative	-0.24	<0.001	-0.29	-0.19		-4.9%

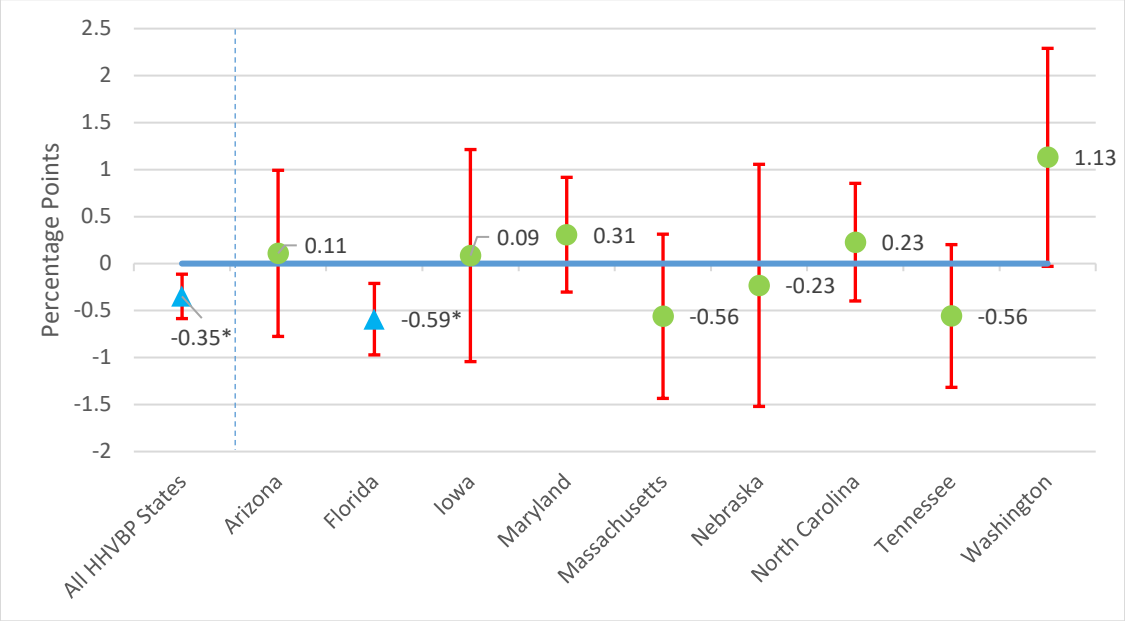
HHVBP Measures indicated by italic text. CI= Confidence Interval. Shading indicates significance at the p<0.05 level.
See Exhibit 31n (Page 139) in the Technical Appendix for each measure's sample size.
[a] Values represent percentage point changes.

5.3.1 HHVBP Impacts on Acute Care Hospitalizations and Unintended Impacts on Outpatient ED Use Are Driven Primarily by Florida

In our analysis of state-specific impacts among HHVBP states, we found strong evidence of intended impacts in at least two states for two of the six claims-based utilization impact measures: unplanned hospitalizations among all home health episodes and SNF use. For one state in particular, Florida, we found consistently strong evidence of intended impacts on unplanned hospitalizations among first and all home health episodes and unplanned hospital readmissions in the first 30 days of home health care, with offsetting unintended impacts on ED use without hospitalization during first episodes (Exhibit 32 and Exhibit 33).

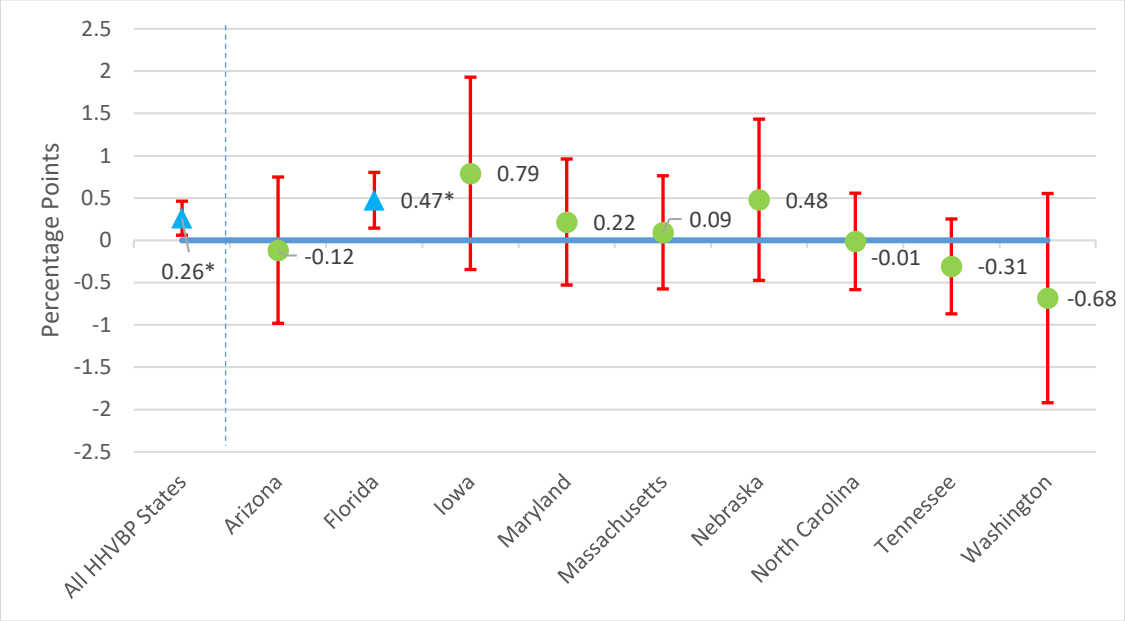
Florida has average annual impact estimates of -0.6 percentage points (-4.2% relative to Florida's baseline level) for unplanned hospitalizations among first home health episodes (Exhibit 35), -0.9 percentage points (-5.6% relative to Florida's baseline level) for unplanned hospitalizations among all home health episodes, and -0.9 percentage points for unplanned hospital readmissions in the first 30 days of home health care (see Exhibit C-44 [Page 179] in the Technical Appendix). We also find strong evidence that the HHVBP incentives contributed to intended impacts in Tennessee on unplanned hospitalizations among all home health episodes (-0.62 percentage points; -3.6% relative to Tennessee's baseline level) and for SNF use (-0.5 percentage points; -11% relative to Tennessee's baseline level) [see Exhibit C-44 [Page 179] in the Technical Appendix]. We found some evidence of unintended impacts increasing unplanned hospitalizations among all home health episodes by 1.0 percentage point (+6% relative to the state baseline level) in Washington (see Exhibit C-44 [Page 179] in the Technical Appendix). For Florida only, we found strong evidence of unintended cumulative impacts increasing ED use during first episodes by 0.5 percentage points (+4.8% relative to the state baseline level; see Exhibit 36) and some evidence of unintended cumulative impacts of 0.6 percentage points (+7% relative to the state baseline level) increasing ED use after hospitalization within the first 30 days of home health care (see Exhibit C-44 [Page 179] in the Technical Appendix).

Exhibit 32. Cumulative D-in-D Estimates for Unplanned Acute Care Hospitalization/First FFS HH Episodes, Overall and for each HHVBP State



▲ *signifies statistical significance of p < 0.1; * p < 0.05*

Exhibit 33. Cumulative D-in-D Estimates for Emergency Department Use (no Hospitalization)/First HH Episodes, Overall and for each HHVBP State



▲ *signifies statistical significance of p < 0.1; * p < 0.05*

5.4 No Evidence of an HHVBP Impact on Reason for Hospitalization

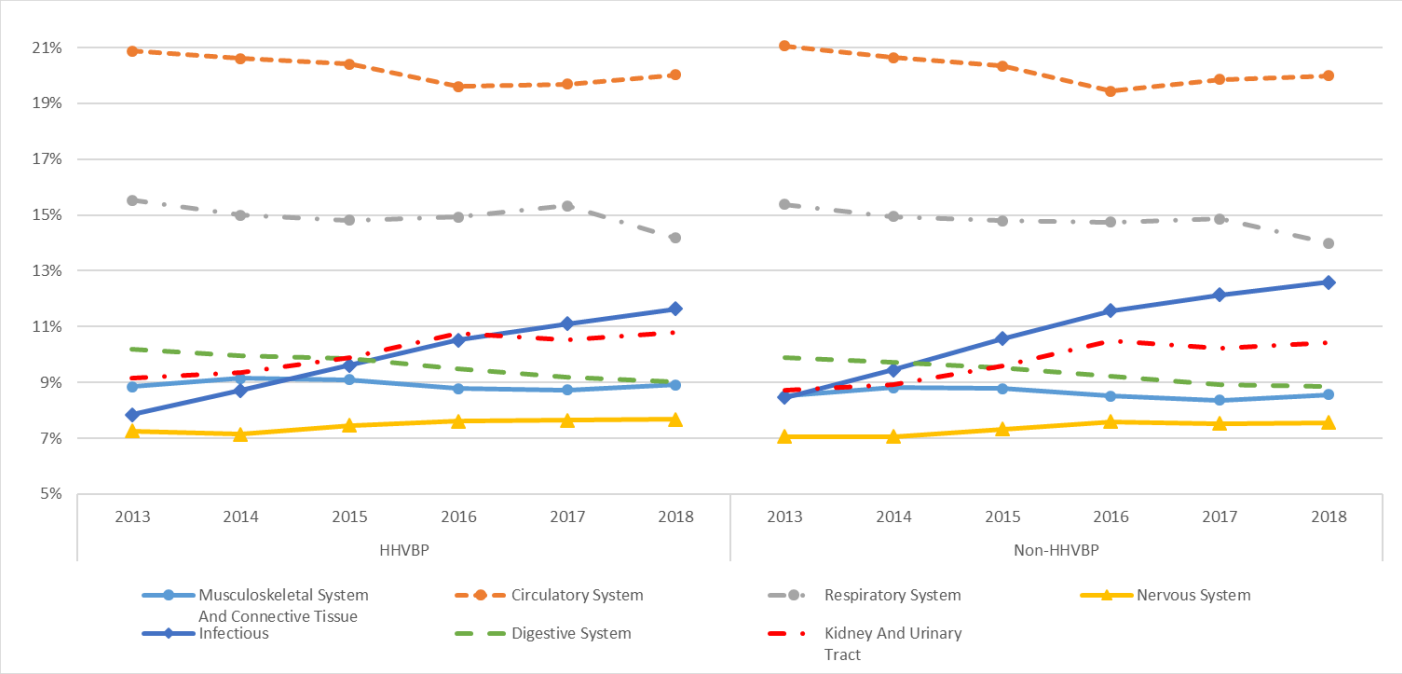
Ideally, effective home care provides early recognition and management of changes in patient status that might otherwise result in a hospitalization, which is often preceded by an ED visit. This benefit of home care underlays the central importance of the unplanned ACH measure in the HHVBP Model in addition to hospitalization's role as one of the more important targets of efforts to improve the management of healthcare costs. Given our findings that show slower growth in hospitalizations during home health episodes (Section 5.3) and hospital expenditures in HHVBP states compared to non-HHVBP states (discussed in Chapter 6 below), we examined the primary diagnoses of hospitalizations during home health episodes to better understand which conditions may be most associated with hospitalizations and if these conditions differ between HHVBP and non-HHVBP states over time. We also examined trends in and reasons for rehospitalizations during home health episodes (that is, the condition for a hospitalization during the home health episode that was preceded by a hospitalization prior to receiving home health care).

5.4.1 No Preliminary Evidence of Differences in Diagnosis of Hospitalization during a Home Health Episode between HHVBP and Non-HHVBP

Our operational definition of a hospitalization during a home health episode follows from the HHVBP unplanned hospitalization measure (i.e., includes any unplanned ACH admission within 60 days of the start of a home health episode). We used the hospitalization's discharge diagnosis to classify hospitalizations into Major Diagnostic Categories (MDCs) of the Medicare Severity Diagnosis Related Group (MS-DRG). The MDC approach assigns over 700 discrete MS-DRG categories to a more manageable 25 organ system classification (CMS, 2019). We then examined trends in hospitalizations' discharge diagnosis by MDC and HHVBP from 2013-2018 to discern if there were changes in MDCs post HHVBP implementation.

Seven MDCs (circulatory system, respiratory system, infectious diseases, kidney/urinary tract, digestive system, musculoskeletal system, and nervous system) accounted for the majority (79-82%) of hospitalizations (Exhibit 34). The distribution of MDCs over the six-year period was similar for HHVBP and non-HHVBP states. The trends demonstrate modest increases in some MDCs (e.g., infections, kidney and urinary tract, nervous system) and decreases in others (e.g., circulatory system, digestive system, musculoskeletal system). Some of the changes in the MDC trends may be attributable to the conversion from ICD-9 to ICD-10 diagnosis codes in late 2015.

Exhibit 34. 2013-2018 Trends in the Percentages of the Top Seven MDCs for Hospitalizations during Home Health Episodes, by Total in HHVBP and Non-HHVBP States



5.4.2 No Preliminary Evidence of Differences in Rehospitalization during a Home Health Episode between HHVBP and Non-HHVBP

As discussed above, the rate of hospitalizations during the home health episode has been adopted as a measure of home health quality under the assumption that high quality home health care can prevent some of these hospitalizations. For home health episodes that are preceded by a hospitalization, services would generally be tailored around the hospitalization discharge diagnosis and ideally with a special focus on reducing the risk of a rehospitalization. Accordingly, effective home health care could lower the risk of a subsequent hospitalization related to the original diagnosis. To examine trends in rehospitalization rates, we analyzed home health episodes that had a prior hospitalization within 14 days of their home health episode start date, and also had a subsequent hospitalization during the home health episode (i.e., an unplanned ACH admission within 60 days of the start of a home health episode).[9]

Similar to the analyses described above, we used MDCs to classify diagnoses from both the prior hospitalization and the hospitalization during the home health episode. We further categorized the prior hospitalizations into surgical versus medical (CMS, 2019).[10] For a prior *surgical* hospitalization, any

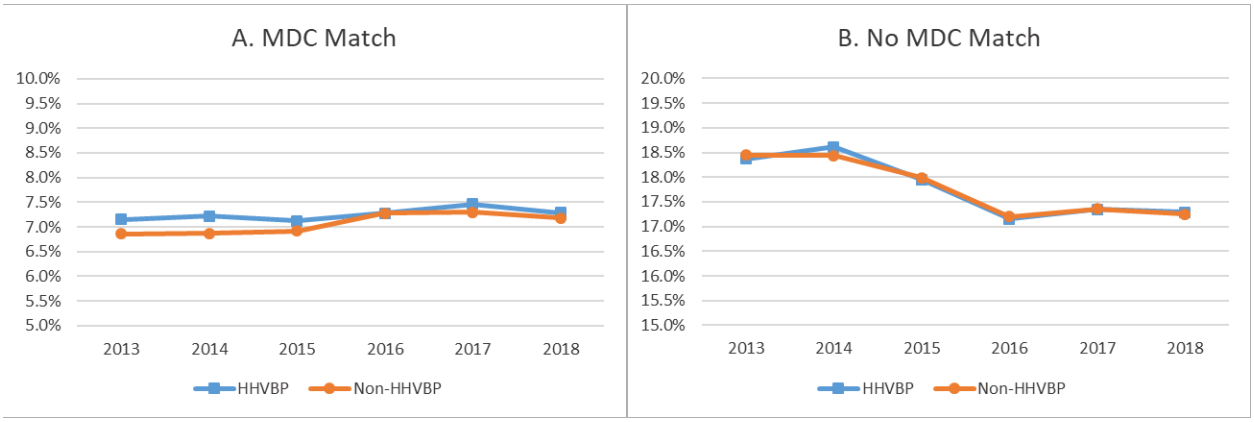
[9] Our analysis of rehospitalization analysis bears similarities to the CMS Hospital Readmission Reduction Program (HRRP) as well as the new publicly reported measure on HHC (Potentially Preventable 30-Day Post-Discharge Readmission), but there are important differences. Both the HRRP and the HHC measure uses a 30-day window whereas we follow the home health convention of using a 60-day window. Also, unlike our rehospitalization measure, the HRRP readmissions are diagnosis-specific and adjusted for patient characteristics, whereas our analyses provides an overall description of rehospitalization. See Section A.4.1.2 (Page 91) in the Technical Appendix for more detail on our approach.

[10] The designation of a "surgical" hospitalization requires at least one procedure code claim entry for an operative procedure that generally occurs within a formal operating room as distinct from procedures performed in other settings that are usually less complicated. "Medical" hospitalizations are defined by the absence of an operative

unplanned rehospitalization (i.e., regardless of MDC) could indicate an avoidable complication. For example, an infectious complication of surgery that resulted in a rehospitalization would not necessarily share the same MDC as the prior hospitalization and would usually not be classified as a surgical hospitalization. Therefore, our analyses of rehospitalization among home health patients who had a surgical hospitalization prior to the home health episode did not distinguish between matched and unmatched MDCs. In contrast, for a prior *medical* hospitalization, we reasoned that home health services would have a greater impact on rehospitalization for the same MDC (i.e., diagnosis) than for an unrelated MDC. Therefore, for prior hospitalizations that were categorized as medical, we analyzed rehospitalization rates separately based on the presence or absence of an MDC match between the prior hospitalization and the hospitalization during the home health episode.

Among patients who had a prior hospitalization categorized as medical (vs. surgical), rehospitalization rates for MDCs that were the same in both hospitalizations were approximately 7% throughout the six-year period in both HHVBP and non-HHVBP states (Exhibit 35A). Rehospitalizations for an MDC unrelated to the prior hospitalization showed a different pattern with rates decreasing from approximately 18.5% in 2013-2014 to just over 17% in 2016-2018 (Exhibit 35B) with nearly identical trends in HHVBP and non-HHVBP states. Together, these descriptive results suggest that HHVBP did not have an effect on rehospitalization rates among patients whose home health episode was preceded by a medical hospitalization, regardless of whether the hospitalizations were related (Exhibit 35A) or not (Exhibit 35B).

Exhibit 35. Rehospitalization Percentage after Prior Medical Hospitalization within 14 Days of Home Health Episode, by MDC Matches or No Matches



For patients who had a surgical hospitalization prior to their home health episode, the percentage of rehospitalizations (regardless of MDC) fell from approximately 15% in 2013 to 13% in 2016 (not shown). Rehospitalization rates were generally higher in HHVBP states than non-HHVBP states, but both groups followed the same trends, suggesting no differential impact for patients in HHVBP states. For future

procedure. Most medical hospitalizations involve patients with chronic disease whose medical issues continue after the hospitalization (e.g., congestive heart failure, chronic obstructive pulmonary disease, diabetes). Accordingly, these patients face a higher risk of readmission and ED visits. In contrast, many surgical hospitalizations provide more definitive treatment that, if successful, may eliminate the underlying problem (e.g., joint replacement) and the risk of repeated hospitalizations and ED visits.

work, we plan to build on these unadjusted analyses to further investigate if HHVBP had an impact on rehospitalization rates for both medical and surgical prior hospitalizations.

5.5 Frontloading Home Health Visits: Both HHVBP and Non-HHVBP Agencies Provide More Skilled Nursing Visits Earlier in Post-Hospitalization Episodes than in Non-Post-Hospitalization Episodes

The findings that show slower growth in claims-based utilization and spending measures in HHVBP states compared to non-HHVBP states (see Section 5.3 and Chapter 6 of this report) suggest that HHAs are responding to the HHVBP incentives by making changes to their operations and practices to prevent some hospitalizations. Furthermore, anecdotal reports from our interviews with home health chain organizations and HHAs mention the use of timely initiation of care and frequent visits early in the episode of care, practices collectively referred to as *frontloading*, as strategically important to achieve HHVBP-related goals (see Chapter 9). In order to explore the potential impact of an HHVBP effect on frontloading practices, we examined distributions of number of home health visits by the first, second, third, and fourth weeks of first home health episodes among Medicare FFS beneficiaries. Although we found evidence that HHAs frontload skilled nursing visits to home health episodes that followed a hospitalization, we found no descriptive evidence of an association between HHVBP and the use of frontloading.

There is little research literature to date on the practice of frontloading by home health agencies and how it affects quality of care and patient outcomes. A few published studies suggest it has benefits for home health patients (Rogers, 2007). According to clinician consultants for this evaluation, patient conditions for which frontloading may have the most benefits include those with congestive heart failure, wound care, stroke, and those needing rehabilitation. Published research on frontloading has also focused on congestive heart failure, in particular, and used ad hoc definitions, such as three visits during the first week with the first visit occurring on the first day of an episode (Murtaugh, 2017), and 60% of planned visits occurring during the first two weeks of a home health episode (Rogers, 2007).

In pursuit of an operational definition of frontloading, we examined the frequency, timing, and discipline of home health visits among all FFS first home health episodes from 2013-2018. The most prominent visit type was skilled nursing visits, which make up the largest share of visits through the first 14 days of all home health episodes. Physical therapist visits also account for of the second most common type of home health visit (not shown). Over the entire reporting period, over 99% of claims-based episodes had a visit on Day 1 of the home health episode in both HHVBP states and non-HHVBP states. Notably, a majority of first day visits were from the skilled nursing discipline: 69% in HHVBP states and 78% in non-HHVBP states in the pre-intervention period. First day visits performed by skilled nursing declined slightly to 68% and 75%, respectively for HHVBP and non-HHVBP states in the post-intervention period.

Exhibit 36 shows the pre- and post-intervention period average cumulative visits overall and by the skilled nursing discipline at 1, 7, 14, 21, and 28 days after the home health episode start date.[11] Overall, in the pre-intervention period (2013-2015), FFS beneficiaries receiving home health in HHVBP states received a slightly greater number of visits on average compared to those in non-HHVBP states at each time checkpoint within the first 28 days. For example, on the first day, beneficiaries in HHVBP states

[11] Visits were included in the calculation of cumulative averages provided that their episodes lasted at least as long as the time checkpoint being considered.

received 1.17 visits on average, while beneficiaries in non-HHVBP states received 1.11 visits, a difference of only 0.06 visits. By Day 28, average cumulative visits totaled 13.8 visits in HHVBP states, compared to 13.0 visits in non-HHVBP states, a difference of almost one visit.

The difference in skilled nursing visits between HHVBP states and non-HHVBP states was negligible throughout the six-year period and at each checkpoint (Exhibit 36), further signaling the lack of broad impact of the intervention on visit frequency in the first four weeks of care. In both HHVBP and non-HHVBP states, virtually all episodes had a skilled nursing visit by Day 7 (not shown).

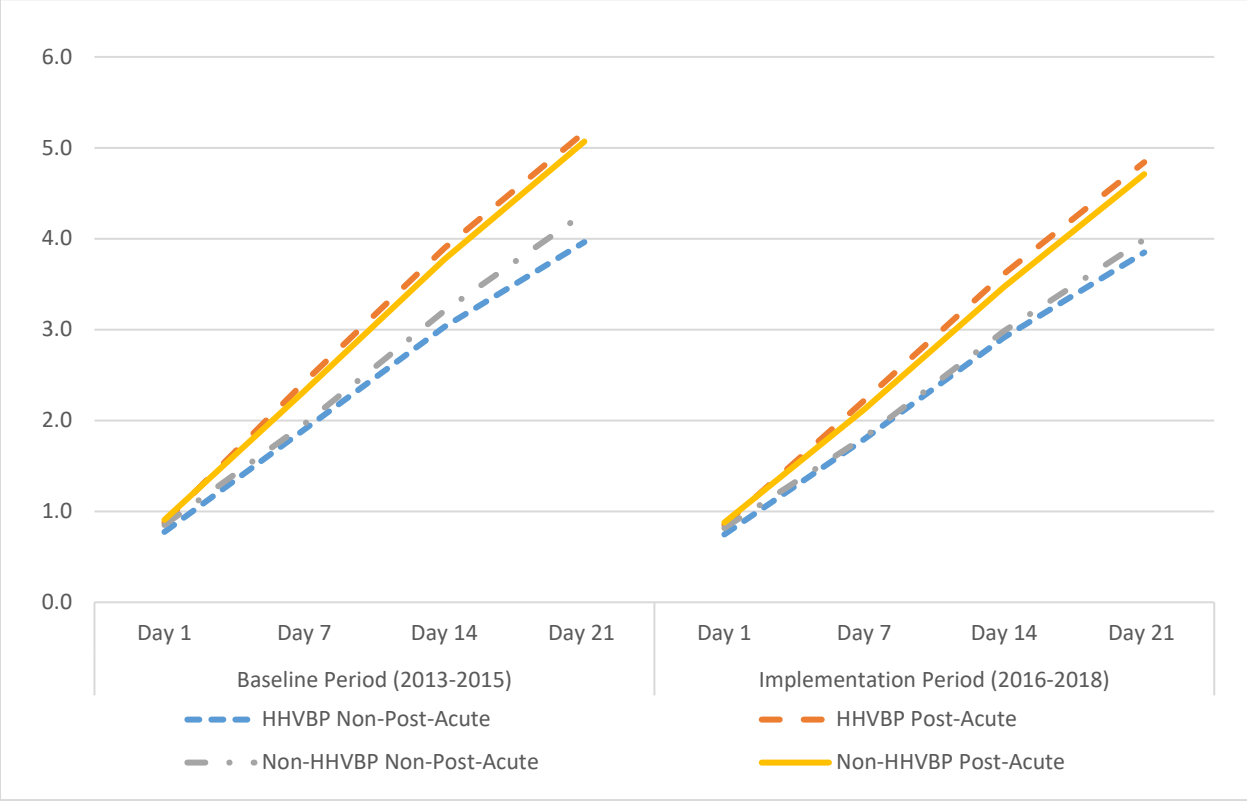
Exhibit 36. Pre- and Post-Intervention Period Average Cumulative Visits during Home Health Episodes — Overall and for Skilled Nursing

		Day 1	Day 7	Day 14	Day 21	Day 28
Average Cumulative Visits						
2013-2015	HHVBP Overall	1.17	4.28	7.75	10.92	13.80
	Non-HHVBP Overall	1.11	3.98	7.29	10.28	12.96
2016-2018	HHVBP Overall	1.15	4.13	7.53	10.66	13.58
	Non-HHVBP Overall	1.12	3.92	7.20	10.20	12.94
Average Cumulative Skilled Nursing Visits						
2013-2015	HHVBP Skilled Nursing	0.81	2.09	3.33	4.35	5.38
	Non-HHVBP Skilled Nursing	0.87	2.10	3.41	4.55	5.63
2016-2018	HHVBP Skilled Nursing	0.79	1.96	3.17	4.19	5.18
	Non-HHVBP Skilled Nursing	0.84	1.93	3.16	4.23	5.26

We also stratified our analysis of average cumulative skilled nursing visits, by prior care setting; that is, distinguishing whether the home health patient had been discharged from the hospital within 14 days of their home health episode start date. Broadly, our analyses provides descriptive evidence that on average, home health patients coming from a post-acute setting received a greater number of skilled nursing visits in the early days of their home health episodes than patients referred to home health through the community, for both HHVBP and non-HHVBP states.

Exhibit 37 displays the divergence between skilled nursing visits for post-acute patients compared to non-post-acute (i.e., community-referred) patients in both the baseline and post-implementation period across HHVBP and non-HHVBP states. In the baseline period, post-acute beneficiaries in HHVBP and non-HHVBP states received around 2.4 visits on average by Day 7, compared to just under two visits for patients who were not recently discharged from an acute care facility; the difference between these two groups widens further by Day 21. Trends in visit rates are largely similar between HHVBP states and non-HHVBP states both during the baseline period and post-implementation, suggesting that there does not appear to be a distinct HHVBP effect on the frequency of skilled nursing visits at the start of the home health episode.

Exhibit 37. Average Cumulative Skilled Nursing Visits by Days of Home Health Episodes, Baseline and Implementation Period, All HHVBP States and Non-HHVBP States



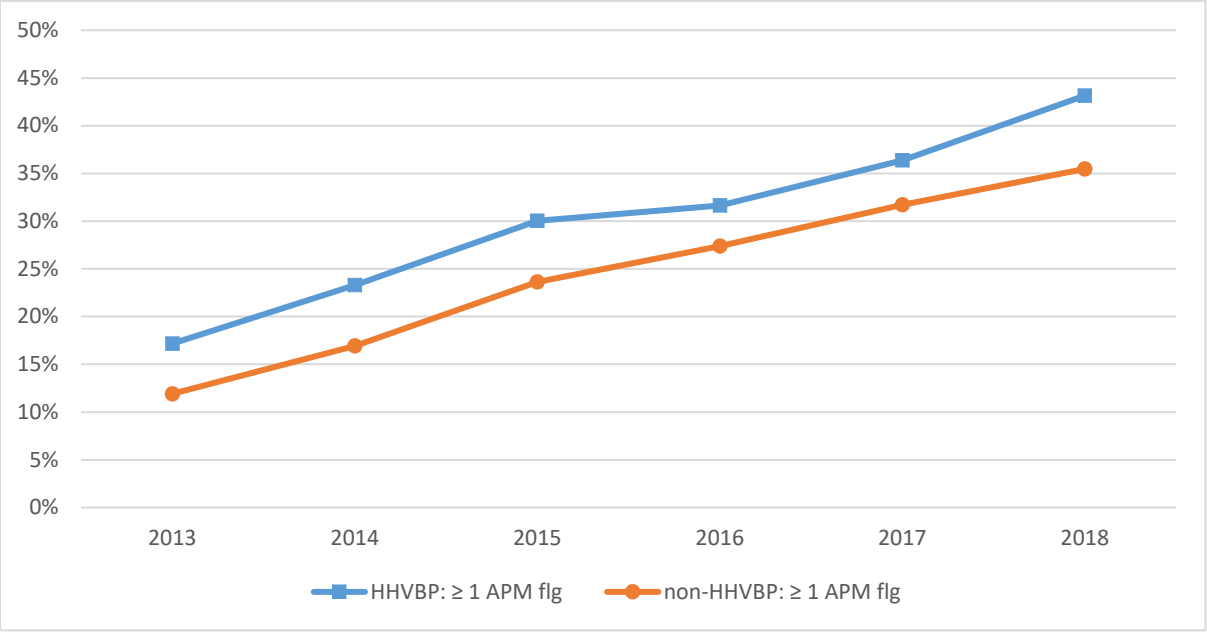
Additional analyses with stratification by agency characteristics, including agency size, ownership (i.e., for-profit, non-profit, or government owned), chain status, and setting (i.e., hospital-based or freestanding) also showed no evidence of an HHVBP effect on the number of visits provided earlier in a home health episode (not shown). While our unadjusted descriptive analyses did not provide evidence of an impact of HHVBP through performance year three, our initial exploration into care delivery patterns among home health providers helps inform future analysis of alternative plausible definitions of frontloading as well as extension of this work to a regression-adjusted analysis in future reports.

5.6 Home Health Patients in Advanced Alternative Payment Models Have Lower Rates of Unplanned Hospitalizations and ED Use

Overall, there is an increasing trend in the share of home health episodes linked to an APM over the course of the evaluation period in both HHVBP and non-HHVBP states (Exhibit 38). In 2013, 17.2% of home health episodes were aligned with one or more APM in HHVBP states, compared to 11.9% in non-HHVBP states (Exhibit 38). By the first performance year (2016) of the HHVBP model, APM penetration had increased to 31.6% in HHVBP states and 27.4% in non-HHVBP states. In 2018, 43.1% of home health episodes in HHVBP states were aligned to one or more APMs compared to 35.5% of non-HHVBP episodes. The increase in APM penetration over time is partially attributable to the growth in the number of active APMs which peaked in 2016 when the MSSP, the Pioneer ACO model, the Next Generation ACO, and the BPCI Models 2 and 3 were all active. However, increases in the alignment of home health episodes to these APMs continued through 2018. While home health episodes in HHVBP states showed consistently higher APM penetration than non-HHVBP episodes, the rates of increase

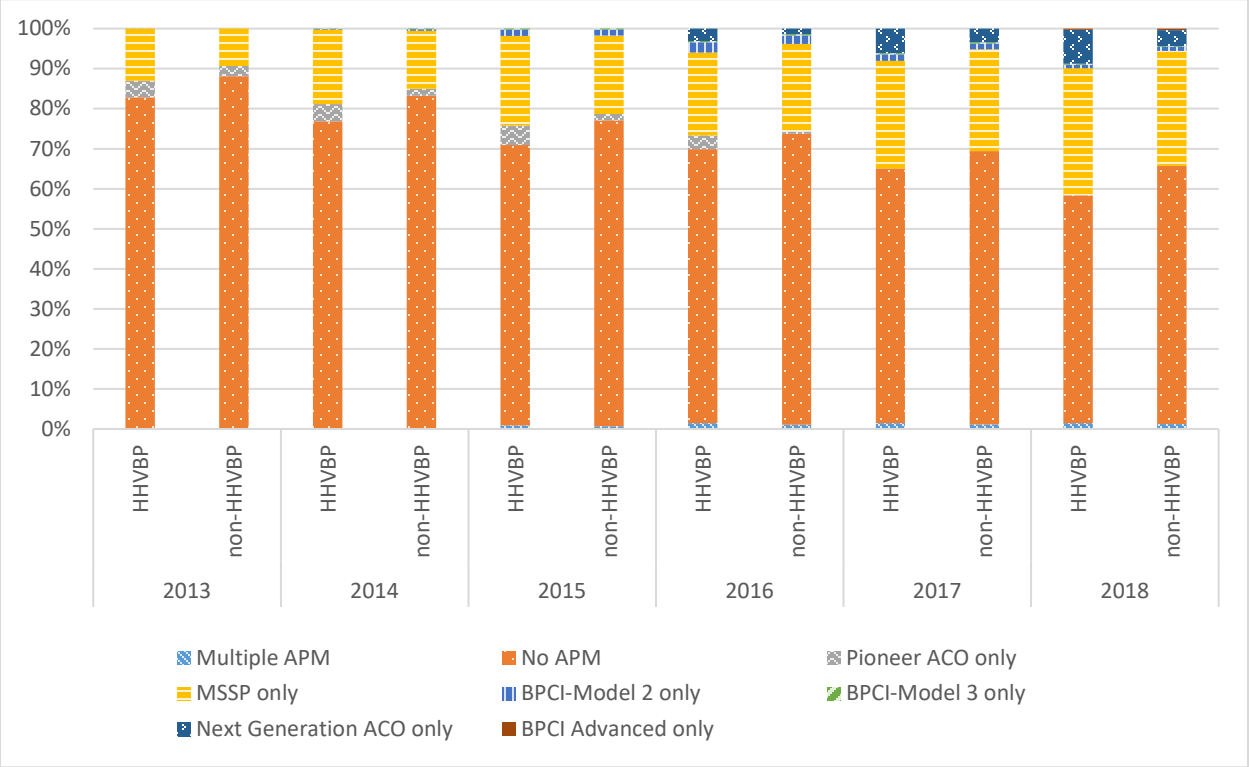
have been similar for the two groups, such that trends are nearly parallel over the course of the evaluation period.

Exhibit 38. APM Penetration among Home Health Episodes for FFS Beneficiaries in HHVBP and Non-HHVBP States, 2013-2018



We also examined differences between HHVBP and non-HHVBP states in the alignment of FFS beneficiary home health episodes to individual APMs (Exhibit 39). Throughout the study period for our evaluation, the MSSP was the predominant model linked to all home health episodes, regardless of HHVBP intervention status. In the baseline years, a larger proportion of HHVBP episodes were linked to the MSSP and Pioneer ACO models compared to non-HHVBP episodes. HHVBP states continued to have a larger proportion of combined ACO-linked episodes in the post-implementation period, with an average of 14.3% compared to 12.2% in non-HHVBP states. HHVBP states also had an average of 0.9% of BPCI-linked episodes in the post-implementation period compared to 0.8% in non-HHVBP states. The proportion of home health episodes linked to multiple models was very low for both groups throughout 2013-2018.

Exhibit 39. Penetration of Individual APMs among FFS Home Health Episodes for Beneficiaries in HHVBP vs. Non-HHVBP States, 2013-2018

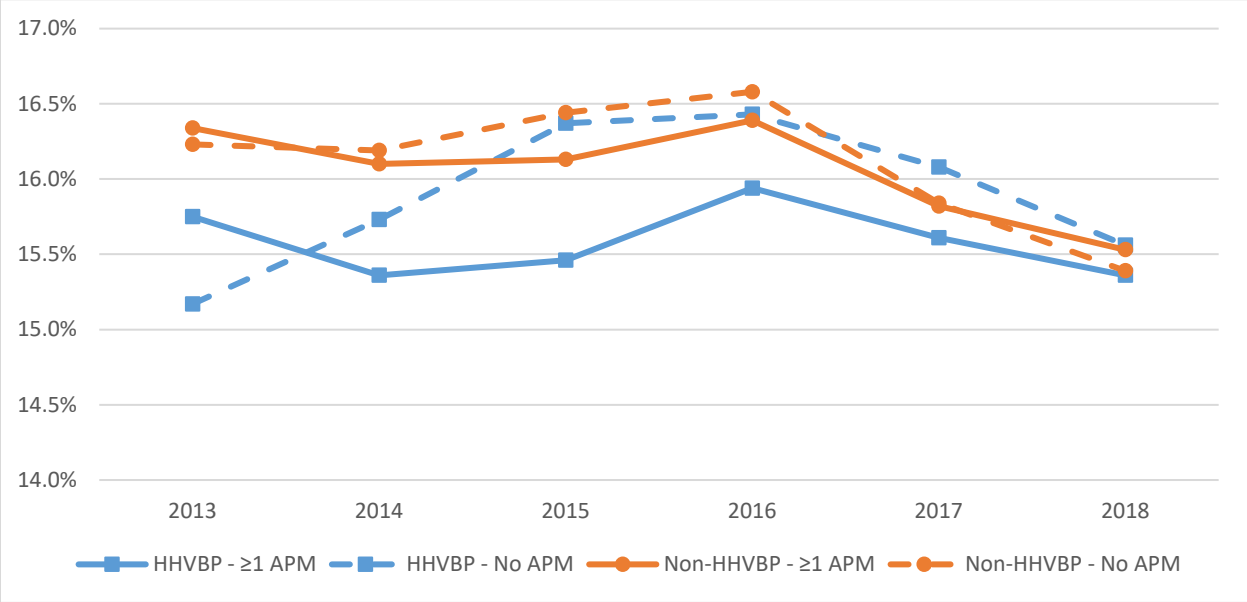


Multiple APM: Episodes linked to >1 of BPCI Model 2, BPCI Model 3, BPCI Advanced, MSSP, Pioneer ACO, or Next Generation ACO.

In the baseline period (2013-2015), unadjusted rates of unplanned ACH among first FFS home health episodes were similar between HHVBP and non-HHVBP states for patients that were linked to one or more APMs (Exhibit 40). ACH trends in the baseline period among non-APM-linked episodes were more varied between HHVBP and non-HHVBP episodes. Although these rates are unadjusted, the trends suggest a possible stronger HHVBP impact on the non-APM-linked episodes. In future analyses, we will further explore this relationship.

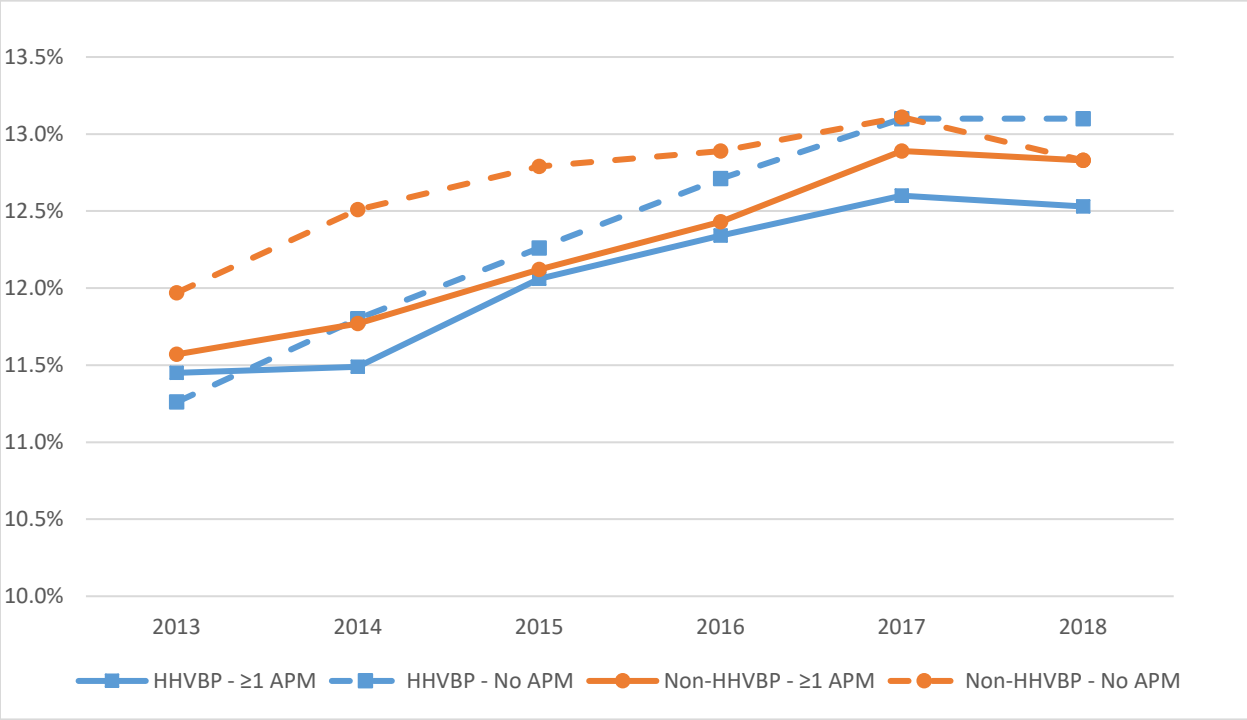
In the post-HHVBP period (2016-2018), unadjusted ACH rates among first home health episodes decreased slightly in both groups for HHVBP and non-HHVBP states, ranging from a 0.6 percentage point decrease among HHVBP episodes linked to one or more APM to a 1.2 percentage point decrease among non-HHVBP episodes linked to no APM. Through a majority of the reporting period (2014-2018), ACH rates were lowest among HHVBP episodes linked to one or more APM. In 2018, the ACH rate among APM-linked first episodes in HHVBP states was 15.4% compared to the HHVBP population average of 15.5% (not shown).

Exhibit 40. Unadjusted Unplanned Hospitalizations among First FFS Home Health Episodes by APM Status, HHVBP vs. Non-HHVBP



The unadjusted rate of ED use among first FFS home health episodes increased modestly from 2013-2017 regardless of APM status (Exhibit 41). The largest increase occurred among non-APM-linked episodes in HHVBP states, which had a 2013 average ED use rate of 11.3% that climbed to 13.1% in 2018. Through 2017, HHVBP episodes, both APM-linked and non-APM-linked, showed lower rates of ED use compared to non-HHVBP episodes. However, in 2018, ED use declined slightly for episodes not linked to an APM in non-HHVBP states, while rates remained stable for APM-linked episodes in both HHVBP and non-HHVBP states and non-APM-linked episodes in HHVBP states. Similar to trends in ACH, ED rates were lowest among HHVBP episodes linked to one or more APM for the majority of the reporting period, while non-APM-linked episodes in non-HHVBP states had the highest ED rates during the same period. In 2018, ED use for APM-linked episodes in HHVBP states was 12.5% compared to the HHVBP population average of 12.8% (not shown).

Exhibit 41. Unadjusted ED Use Rates by APM status, HHVBP vs. Non-HHVBP



5.7 Discussion

Our findings that HHVBP has decreased acute hospital use and SNF use aligns with the intentions of policymakers to incentivize HHA activities that reduce unnecessary acute care use. However, we find evidence of offsetting increases to outpatient ED use attributable to HHVBP, possibly indicating agency behavior that steers patients toward outpatient ED services as a substitute for acute care use. However, as described in Section 9.3 of this report, findings from our interviews with HHAs suggest that they use similar strategies to decrease both types of utilization. In future analyses, we plan to examine impacts specifically on hospitalizations that result from initial ED visits. While we currently find increases in outpatient ED use attributable to HHVBP, we will evaluate if these may be offset by decreases in ED use that results in hospitalization.

Our development of an operational definition of prior hospitalization and hospitalizations during the home health episode has facilitated our exploratory analysis of trends in the distribution of primary diagnoses for hospital events during home health episodes. At this point, we have not found clear differences between HHVBP and non-HHVBP states. However, based on experience in other areas of the evaluation, the full assessment of potential differences requires careful adjustment for patient and community factors that may differ between the model and comparison groups. We anticipate that this work will prompt further discussion and refinement of key definitions. Furthermore, we will explore supplementing the descriptive trend analysis we have outlined in this report with regression-adjusted analyses.

Our descriptive analysis of HHA frontloading practices shows greater volume of skilled nursing visits throughout the duration of home health episodes for episodes that had a prior hospitalization relative to episodes that did not follow recent hospitalizations. These initial findings do not support the

hypothesis that HHVBP's effect of reducing unplanned hospitalization and SNF use is due to HHA use of frontloading as a mechanism. Because heterogeneity in patient and agency characteristics may mask an HHVBP effect on frontloading practices in unadjusted descriptive statistics, for future reports we will provide a regression-adjusted analysis of the impact of HHVBP on these practices and of the possible use of frontloading as a mechanism for the changes in hospital, SNF, and ED use we have found attributable to HHVBP.

In another descriptive analysis, we found that unplanned hospitalization and ED use rates were consistently the lowest among APM-linked episodes from HHVBP states. These preliminary results provide a foundation for further examination of regression-adjusted trends in utilization between APM-linked and non-APM-linked episodes between HHVBP and non-HHVBP states to explore if HHVBP has a differential impact. The incorporation of APM into our evaluation of the HHVBP Model, beginning with this report, allows us to further explore synergistic relationships in the impacts of multiple CMMI initiatives with HHVBP on health care utilization and the health outcomes of the Medicare FFS population.

6. Results: HHVBP Slowed the Rate of Growth in Medicare Spending Largely Due to Impacts on Inpatient and Skilled Nursing Facility Spending

6.1 Introduction

By design, the HHVBP Model aims to incentivize higher quality of care by HHAs, which may prevent hospitalizations and other forms of health care utilization associated with poor quality that in turn reduce Medicare spending. While the model may lead to changes in utilization that are consistent with quality improvements in the home health setting (e.g., through more timely management of beneficiary conditions), there may also be inadvertent or otherwise offsetting changes that could lead to increased spending for some types of services. In this chapter we examine potential effects of HHVBP on several impact measures of Medicare spending to help determine whether the HHVBP Model is accomplishing its aim of lowering expenditures and improving quality of care. We also examine potential effects of HHVBP on individual components of Medicare spending to identify any key cost components driving the effects on overall Medicare spending.

Overall, we found that HHVBP led to a ***decline in Medicare spending for FFS beneficiaries receiving home health services*** through the first three years of the model. There is evidence of a 1.2% decline in average Medicare expenditures per day for FFS beneficiaries during and within 30 days following home health episodes due to HHVBP. This impact reflects a reduced rate of growth in total Medicare spending among beneficiaries receiving home health services in HHVBP states compared to non-HHVBP states, and reflects an average annual reduction in total Medicare spending during and within 30 days following home health episodes of $141 million. We find that much of this overall decline reflects impacts on spending for inpatient and SNF services, and corresponds to estimated annual savings of $81 million and $39 million, respectively.

In contrast, there is evidence of a small, positive effect of HHVBP on Medicare spending for outpatient ED use. However, the observed increase in outpatient ED spending in HHVBP states represents a small offset to the other savings due to the relatively small expenditures associated with ED use (approximately 1.6% of total spending in the baseline period).

The overall impact of HHVBP on Medicare spending is driven largely by impacts observed in five states: Florida, Iowa, Massachusetts, Nebraska, and Tennessee. In Florida and Iowa, there is also evidence of a decline specifically in average expenditures for unplanned hospitalizations. As with our findings for all HHVBP states combined, evidence of cost savings related to HHVBP for individual states are concentrated in the period during (rather than immediately following) home health episodes of care.

In the remainder of this chapter, we first provide an overview of the measures of Medicare spending that are analyzed in this report. We then describe trends in Medicare spending among beneficiaries receiving home health care in HHVBP and non-HHVBP states, present the results of D-in-D analyses of the impact of the model on total Medicare spending, and examine impacts for both key components of spending and for individual HHVBP states.

6.2 Overview of Medicare Spending Measures

To assess average effects of HHVBP on Medicare spending for all nine HHVBP states combined and for individual HHVBP states, we focused on four primary spending measures. Three of these measures are

related to total Medicare spending for FFS beneficiaries receiving home health care. While the **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,[12] for the 60% of home health episodes that had no subsequent home health episode, we were able to examine a second measure, **Average Medicare Spending per Day following FFS Home Health Episodes of Care**. This measure 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.[13] For the remaining approximately 40% of home health episodes, there was a subsequent home health episode within seven days such that no post-home health spending could be examined for that episode. The former measure includes expenditures for inpatient hospitalizations that occurred concurrently with the home health episode of care, while the latter measure captures expenditures associated with any hospitalizations or other services occurring within 30 days after a home health episode ends. We combine these two measures to calculate a measure of **Average Medicare Spending per Day during and following FFS Home Health Episodes of Care**. For home health episodes followed within seven days by a subsequent home health episode, the combined measure reflects spending only during the home health episode.

Finally, our fourth primary spending impact measure corresponds to a key component of the overall cost to Medicare for FFS beneficiaries receiving home health care: unplanned hospitalizations. This measure, which closely corresponds to the unplanned ACH utilization measure for all FFS home health episodes, reflects **the costs associated with all the unplanned hospitalizations** among all FFS home health episodes, and was calculated on a per-day basis to be comparable with the other spending measures.

For each of the above three measures of total Medicare spending for FFS beneficiaries receiving home health care, we also defined measures for key components of Medicare spending. As explained further in the Technical Appendix (Section A.2.2 [Page 51]), we calculated measures of average Medicare spending per day for each of the following service categories: inpatient hospitalizations, home health care, Part B non-institutional services (i.e., carrier and durable medical equipment claims), outpatient institutional services (which include outpatient ED services), skilled nursing, and hospice services. We note that by definition, the home health component is not relevant to the *downstream total spending measure* as it includes expenditures within 30 days after a home health episode ends.

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

As shown in Exhibit 42, the average Medicare spending per day during home health episodes of care increased at a slower rate between the baseline and post-implementation period in the HHVBP states than in the non-HHVBP states (by 5.7% and 8.8%, respectively). This measure also increased at a somewhat lower rate during the baseline period in HHVBP states relative to non-HHVBP states when adjusting for model covariates (see Exhibit A-6 [Page 26] in the Technical Appendix for a comparison of

[12] 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 (Page 51) in the Technical Appendix for more detail.
[13] 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 (Page 51) in the Technical Appendix for more detail.

trends in spending between the two groups, and Exhibits C-7 [Page 124] and C-8 [Page 126] in the Technical Appendix for unadjusted annual means for 2013-2018 for the two groups).[14]

Exhibit 42. Baseline and Post-HHVBP Performance Period Means for FFS-Claims Based Spending Measures, All HHVBP States and Non-HHVBP States

Measure	HHVBP States, Baseline (2013-2015)	Non-HHVBP States, Baseline (2013-2015)	HHVBP States, Post-HHVBP (2016-2018)	Non-HHVBP States, Post-HHVBP (2016-2018)
Average Medicare Spending per Day during and following FFS HH Episodes of Care*	$138.33	$131.61	$146.66	$141.65
Average Medicare Spending per Day during FFS HH Episodes of Care*	$150.59	$135.33	$159.24	$147.25
Average Medicare Spending per Day following FFS HH Episodes of Care*	$106.01	$116.58	$113.38	$121.78
Average Medicare Spending per Day for Unplanned Acute Care Hospitalization among all FFS HH Episodes*	$33.58	$32.15	$33.72	$32.35

** Key Impact Measure | See Exhibit 42n (Page 139) in the Technical Appendix for each measure's sample size. Average is based on capped expenditure measures.*

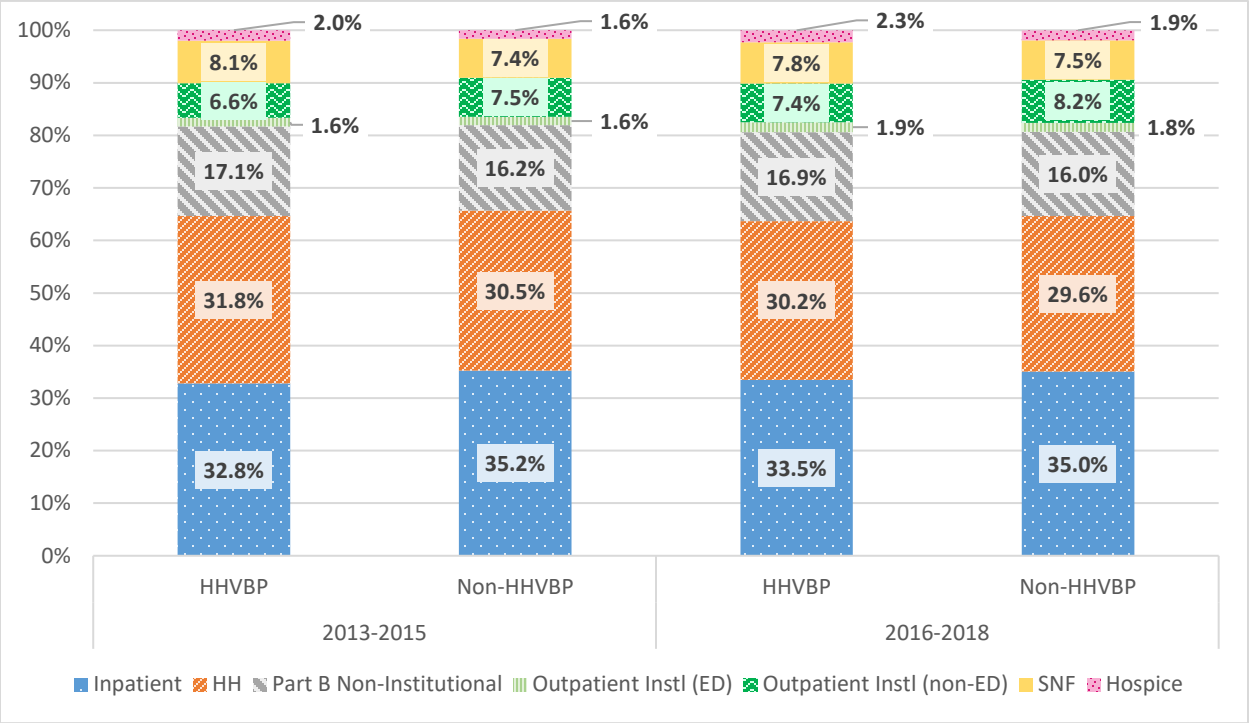
The components of total Medicare FFS spending during the baseline period were similar among beneficiaries receiving home health care in HHVBP and non-HHVBP states (Exhibit 43). For HHVBP, approximately 65% (66% for non-HHVBP) of total Medicare expenditures during and following home health episodes of care in the baseline period were associated with inpatient and home health services, followed by Part B non-institutional services (17% for HHVBP; 16% for non-HHVBP), outpatient institutional services (8% for HHVBP; 9% for non-HHVBP), skilled nursing (8% for HHVBP; 7% for non-HHVBP), and hospice (2% for both HHVBP and non-HHVBP). Expenditures for outpatient ED use represent approximately one-fifth of total outpatient institutional expenditures and 1.6% of total expenditures for both groups during the baseline period.

There were similar changes over time in the major components of total spending in HHVBP and non-HHVBP states. For both groups, outpatient institutional services accounted for an increasing share of total spending, increasing by 13.4% for HHVBP and 10% for non-HHVBP relative to their baseline period shares. Meanwhile home health and Part B non-institutional services accounted for a declining share of total spending (Exhibit 43)—decreasing by 1.2% for Part B non-institutional services in both groups and by 5% and 3% respectively for HHVBP and non-HHVBP home health spending relative to baseline period shares of total spending. These trends were also reflected in the average expenditure per day amounts for each period (Exhibit 44). While these average dollar amounts increased over time for all components in both HHVBP and non-HHVBP states, we observed the largest increases for the inpatient and

[14] Consistent with the downward trend in home health FFS episodes over time that we report in Exhibit 42 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 42n [Page 139] in the Technical Appendix).

outpatient institutional categories. Unadjusted means for the components of the other total spending measures are included in the Technical Appendix (see Exhibit C-20 [Page 142]).

Exhibit 43. Components of Total Medicare Spending for FFS Beneficiaries, HHVBP States and Non-HHVBP States, Baseline (2013-2015) and Post-Implementation (2016-2018) Period



Percentages are based on uncapped total Medicare spending during and following FFS home health Episodes of Care.

*Exhibit 44. Average Medicare Spending per Day during and following FFS HH Episodes of Care, by Service Category, 2013-2015 and 2016-2018**

Measure	HHVBP States 2013-2015	Non-HHVBP States 2013-2015	HHVBP States 2016-2018	Non-HHVBP States 2016-2018
Total	$138.33	$131.61	$146.66	$141.65
Home health	$44.87	$41.07	$45.21	$42.88
Inpatient	$45.60	$46.70	$49.28	$49.88
Outpatient institutional	$10.95	$11.62	$13.14	$13.78
Outpatient emergency department	$2.20	$2.08	$2.79	$2.56
Other	$8.74	$9.53	$10.35	$11.23
Skilled nursing facility	$11.36	$9.93	$11.69	$10.72
Hospice	$2.81	$2.19	$3.38	$2.78
Part B non-institutional	$23.32	$21.20	$24.49	$22.43

**Average is based on capped expenditure measures.*

6.4 HHVBP Results in Overall Reductions in Medicare Spending

We found HHVBP to be associated with a decline in Medicare spending for two of the three total spending measures (Exhibit 45). The cumulative D-in-D estimate of -$1.62 suggests that HHVBP led to a reduction in average daily Medicare spending during and following home health episodes among FFS

beneficiaries, which corresponded to a 1.2% decrease compared to average HHVBP levels observed for 2013-2015. This D-in-D estimate translated to an estimated average annual savings among FFS beneficiaries receiving home health services of $141 million during 2016-2018. This estimate corresponded 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).

These overall savings reflect the impact on spending during, rather than in the 30 days following, home health episodes of care. The cumulative D-in-D results for average daily Medicare spending during FFS home health episodes were relatively similar in magnitude to those of the combined spending measure (e.g., -$1.40 vs. -$1.62, respectively), and corresponded to a 0.9% decline relative to pre-HHVBP levels (Exhibit 45). Based on the D-in-D estimate of -$1.40 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 $86 million during 2016-2018. This estimate corresponded 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 were smaller and not statistically significant.

There is evidence that the overall spending impact is strongly related to changes in spending for unplanned hospitalizations. The D-in-D analysis indicates reductions in average daily Medicare spending for unplanned hospitalizations among FFS beneficiaries receiving home health care in HHVBP states relative to non-HHVBP states, both cumulatively during 2016-2018 and for each year (Exhibit 45). The cumulative D-in-D estimate indicated a reduction in average Medicare spending per day for unplanned hospitalizations of $1.50 (Exhibit 45). The cumulative D-in-D estimate translates to a 4.5% reduction in spending based on the baseline average daily Medicare spending for unplanned hospitalizations in HHVBP states of $33.58 and an estimated average annual savings among FFS beneficiaries receiving home health services of $101 million during 2016-2018.

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 the model. The separate D-in-D spending impact estimates for 2016, 2017, and 2018 were largely consistent with the cumulative results, such that there is no strong evidence through 2018 of an increasingly larger impact on Medicare spending emerging over time under the model.

Exhibit 45. 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 during and following FFS HH Episodes of Care						
2016	-$1.21	<0.01	-$1.91	-$0.52	$138.33	-0.9%
2017	-$2.02	<0.01	-$3.10	-$0.94		-1.5%
2018	-$1.64	0.06	-$3.11	-$0.18		-1.2%
Cumulative	-$1.62	<0.01	-$2.63	-$0.62		-1.2%
Average Medicare Spending per Day during FFS HH Episodes of Care						
2016	-$0.96	0.04	-$1.74	-$0.18	$150.59	-0.6%
2017	-$1.75	0.02	-$3.01	-$0.50		-1.2%
2018	-$1.49	0.15	-$3.21	$0.22		-1.0%
Cumulative	-$1.40	0.05	-$2.57	-$0.24		-0.9%
Average Medicare Spending per Day following FFS HH Episodes of Care						
2016	-$0.40	0.57	-$1.58	$0.78	$106.01	-0.4%
2017	-$0.27	0.79	-$1.94	$1.39		-0.3%
2018	$1.12	0.39	-$1.04	$3.27		1.1%
Cumulative	$0.13	0.89	-$1.43	$1.69		0.1%
Average Medicare Spending per Day for Unplanned Acute Care Hospitalizations among all FFS HH Episodes						
2016	-$1.29	<0.001	-$1.69	-$0.90	$33.58	-3.9%
2017	-$1.48	<0.001	-$2.08	-$0.89		-4.4%
2018	-$1.69	<0.001	-$2.45	-$0.92		-5.0%
Cumulative	-$1.50	<0.001	-$2.04	-$0.95		-4.5%

CI= Confidence Interval. Shading indicates significance at the p<0.05 level.
These models include state-specific linear time trends (See Section A.1.5 [Page 21] in the Technical Appendix for more details). See Exhibit 45n (Page 139) in the Technical Appendix for each measure's sample size.

6.5 HHVBP Impact on Total Medicare Spending Driven by Decreases for Inpatient and Skilled Nursing Facility Services

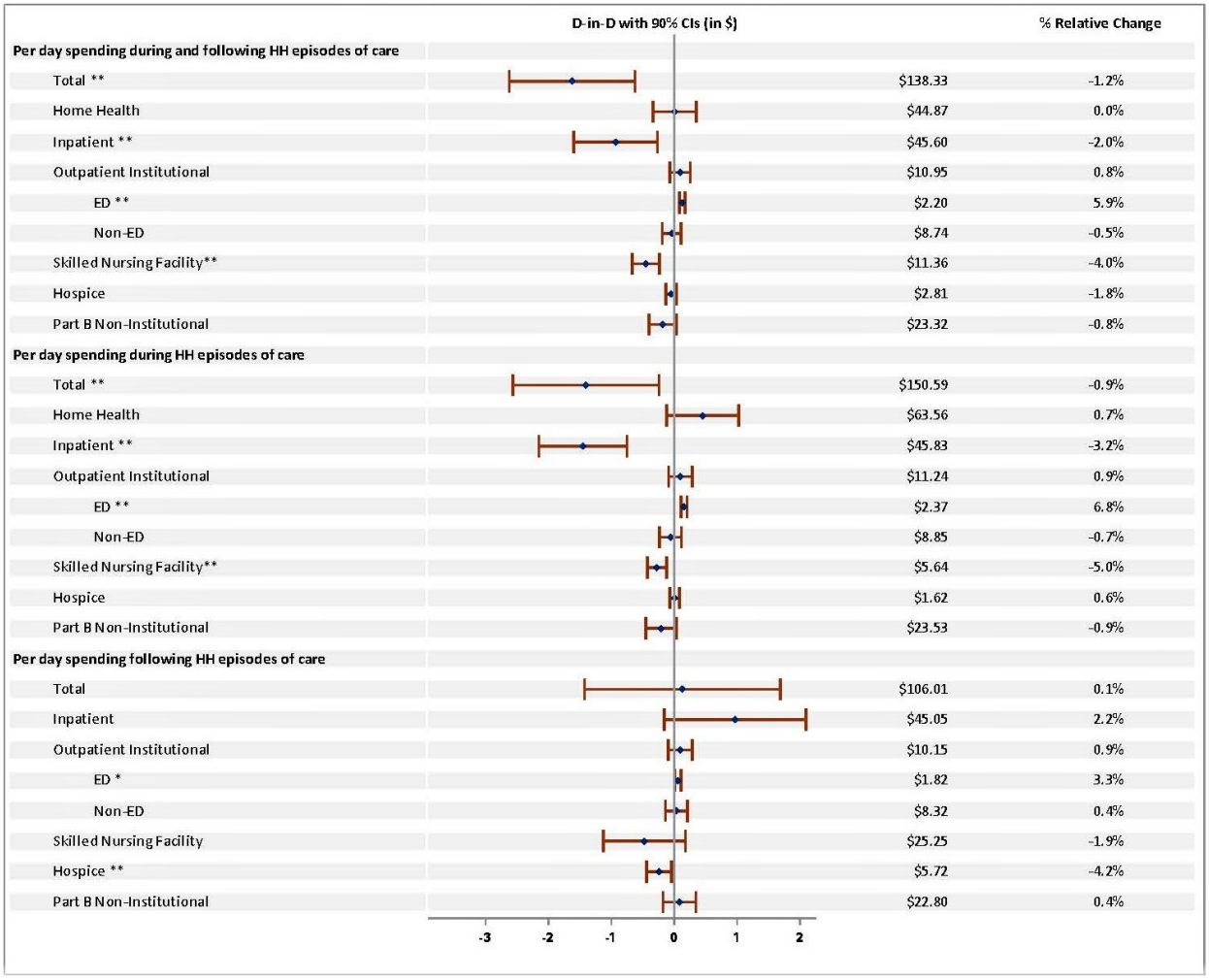
In this section, we examined components of the three total Medicare spending impact measures to identify service categories that accounted for the estimated savings to Medicare. We also evaluated the impact of HHVBP on Medicare spending in each of the nine HHVBP states, for our four primary spending impact measures. As we did for analyses at the national level, we applied a D-in-D model specification that incorporated state-specific linear time trends for the spending measures at the state level.

As shown in the forest plot below (Exhibit 46), inpatient and SNF services were the largest contributors to the overall reduction in average Medicare spending *during and following* home health episodes of care due to HHVBP. The cumulative D-in-D estimates indicate that HHVBP led to a $0.93 and $0.45 reduction in average daily spending for inpatient and SNF services, respectively, which corresponds to a 2.0% and 4.0% decline relative to pre-HHVBP implementation average measure values, respectively. These reductions in inpatient and SNF expenditures per day correspond to estimated annual savings to Medicare of $81 million and $39 million, respectively. In contrast, there was a small positive impact of the model on outpatient ED expenditures ($0.13) during and following home health episodes of care, which corresponds to a 5.9% increase compared to pre-HHVBP levels and an estimated annual cost to Medicare of $11 million.

Similar declines in inpatient and SNF expenditure components and an increase in outpatient ED expenditures were noted for the average Medicare spending *during* home health episodes. The total estimated savings due to HHVBP for this impact measure (cumulative D-in-D estimate of -$1.40; Exhibit 46) largely reflected the impact on spending for inpatient services (cumulative D-in-D estimate of -$1.45; see Exhibit C-21 [Page 143] in the Technical Appendix). By definition, the inpatient expenditure component of Medicare spending *during* home health episodes is closely related to the measure of average Medicare spending per day for unplanned ACHs among all home health episodes, as both measures account for expenditures attributable to inpatient hospitalizations during home health episodes. As expected, the cumulative D-in-D estimates for the two measures are similar (-$1.50 for average Medicare spending per day for unplanned ACHs, Exhibit 45; vs. -$1.45 for average Medicare inpatient expenditures per day *during* home health episodes, Exhibit C-21 [Page 143] in the Technical Appendix). We found no overall effect of HHVBP on expenditures for home health services *during* home health episodes. The cumulative D-in-D estimate for home health services was positive ($0.45) but not statistically significant (Exhibit 46).

As with our findings for total Medicare spending *following* home health episodes, there was also generally no impact of HHVBP on the components of Medicare spending (Exhibit 46). The exception was for hospice services. The cumulative D-in-D estimate of -$0.24 corresponds to a 4.2% decrease in average daily Medicare spending for hospice services.

Exhibit 46. Impact of the HHVBP Model on Components of Medicare FFS Spending

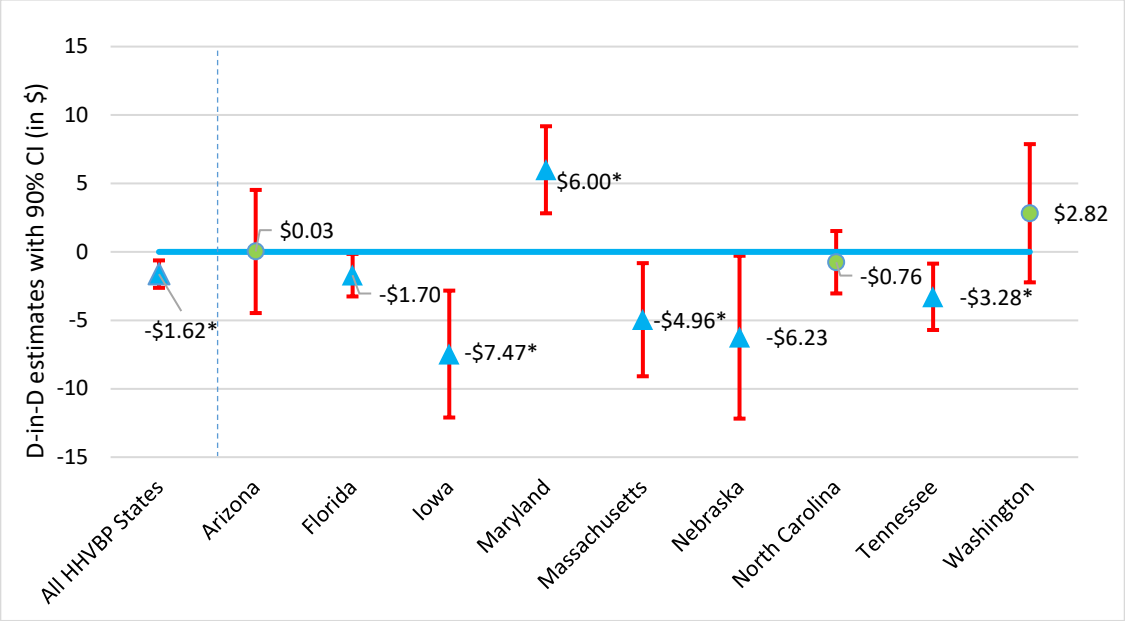


*#Average is calculated based on the capped expenditure components. | *Indicates significance at the p<0.10 level. | **Indicates significance at the p<0.05 level*

6.6 HHVBP Impact on Total Medicare Spending Driven by Five HHVBP States

Among the nine HHVBP states, we found evidence that the overall savings due to HHVBP largely reflect impacts in five states: Florida, Iowa, Massachusetts, Nebraska, and Tennessee (Exhibit 47). Among these five states, the cumulative D-in-D estimates for average Medicare spending per day *during and following* home health episodes of care indicate reductions in spending for Iowa (-$7.47), Nebraska (-$6.23), Massachusetts (-$4.96), Tennessee (-$3.28) and Florida (-$1.70). These results tend to reflect larger impacts for smaller states (i.e., having D-in-D estimates with larger confidence intervals) and smaller impacts for larger states. For example, as shown previously in Exhibit 9, the percentage of home health episodes for FFS beneficiaries in HHVBP states is much smaller for Iowa (2.5%) and Nebraska (1.7%) compared to Massachusetts (13.7%), Tennessee (10.5%), and especially Florida (40.5%). So while the spending impact estimates are largest for Iowa and Nebraska, the overall spending impacts for HHVBP will be strongly influenced by the reductions in spending observed in the three other states (Florida, Massachusetts, and Tennessee) which together account for close to two-thirds of FFS home health episodes in the nine states.

Exhibit 47. Cumulative D-in-D Estimates for Average Medicare Spending per Day during and following FFS Home Health Episodes of Care, Overall and for Each HHVBP State



▲ *signifies statistical significance of p < 0.1; * p < 0.05. State-level models include state-specific linear time trends (See Section A.1.4 [Page 12] in the Technical Appendix for more details).*

In contrast, Maryland had a positive cumulative D-in-D estimate which suggests that the model led to an increase in average spending per day during and following FFS home health episodes of care of $6.00 (Exhibit 47). We found no statistically significant impact on Medicare spending during and following home health episodes of care in the three remaining states, which include Arizona, North Carolina, and Washington.

Our analysis of three other spending measures sheds some light on the source of the overall spending impacts observed in the individual states. We found evidence of reductions in average Medicare spending per day *during h*ome health episodes of care in three states: Iowa, Massachusetts, and Tennessee (see Exhibit C-45 [Page 181] in the Technical Appendix). When focusing on Medicare spending for unplanned ACHs, there is evidence that savings in this area were important contributors to the overall spending impacts in three states: Florida (-$1.99), Iowa (-$4.05) and Massachusetts (-$2.27; see Exhibit C-45 [Page 181] in the Technical Appendix). As we found above for all HHVBP states combined (Exhibit 47), there is no individual HHVBP state with an estimated reduction in average Medicare spending per day *following* home health episodes of care due to HHVBP. However, we found that the observed impact of HHVBP on total spending in Maryland largely appears to reflect a positive impact on spending following home health episodes of care ($9.42, p<0.01) rather than during home health episodes of care ($3.24, p=0.22; see Exhibit C-45 [Page 181] in the Technical Appendix).

6.7 Discussion

There is broad alignment between the overall findings of this evaluation regarding the impact of HHVBP on the utilization of services for FFS beneficiaries receiving home health care and the impact on Medicare spending. Through the first three years of the model, there is evidence of overall reductions in spending due to HHVBP that appear to largely reflect savings related to decreases in inpatient hospital

and SNF services. As shown in Chapter 5, we observe declines in utilization in each of these areas due to HHVBP. These findings may indicate that HHVBP has successfully incentivized quality improvements that have reduced the need for more resource-intensive forms of care, though we are not yet able to identify specific practices or mechanisms that we can confirm have generated cost savings in these areas. While we show that the increase in outpatient ED use has the effect of offsetting these savings somewhat, this has a limited impact due to the relatively small share of overall spending that is related to outpatient ED services.

As we found for measures of quality performance (e.g., agency TPS scores in Chapter 4) and utilization (Chapter 5), there is no evidence of an acceleration in the overall impact of HHVBP on Medicare spending through the third year of the model. Impact estimates for the spending measures do not indicate a strong or consistent trend during 2016-2018, which includes the first year in which agency performance affected their Medicare payments through the HH PPS. Given how the financial stakes for agencies are growing over time through yearly increases in the maximum payment adjustments under the model, it will be important to assess whether larger cost savings to Medicare emerge in future years.

Our finding of overall cost savings to Medicare is not seen uniformly across the HHVBP states. There is evidence of a reduction in total Medicare spending in five of the nine states due to HHVBP, no overall spending impact in three states, and an unintended increase in spending in Maryland. For three of the five states where we found HHVBP to be associated with overall cost savings to Medicare (in Florida, Iowa, and Massachusetts), there is evidence that reduced spending for unplanned ACHs may have an important role. While the result for Florida can be attributed at least in part to a decline in the frequency of unplanned ACHs, which we also observed in that state (as shown in Chapter 5), we did not also observe the same pattern of declining hospitalizations in Iowa and Massachusetts.

HHVBP was not expected to lead to an increase in Medicare spending for FFS beneficiaries receiving home health services, which is what we observe in Maryland. One of the strengths of our analytic approach for both national and state-level analyses of spending is that we have explicitly accounted for any effects of several other major CMS initiatives that were in operation during the time period of this evaluation and may have had implications for FFS beneficiaries receiving home health care. An additional potential confounder for our analyses of the impact of HHVBP in Maryland, however, is the implementation of the Maryland All-Payer Model, which began in 2014. The evaluation of the Maryland All-Payer Model found evidence of cost savings for Medicare beneficiaries starting in 2016 (RTI, 2019). Since this model is a statewide initiative that overlapped with the implementation of HHVBP and was not also adopted in other states, we are unable to formally control for any effects it may have had specifically for FFS beneficiaries receiving home health services that would not also have occurred for beneficiaries in its regional comparison states.

While the inclusion of state linear time trends in our D-in-D model allows us to control for the decline in average Medicare spending among FFS home health beneficiaries that we observed in Maryland from 2013 through 2015, which is immediately prior to implementation of HHVBP, our D-in-D model also reflects an assumption that this trend would have continued in the absence of HHVBP. This may not necessarily be the case, if for example any initial effects of the Maryland All-Payer Model in 2015 on the HHVBP beneficiary population of interest diminished during the initial years of HHVBP. In this scenario, we would be overstating the decline that would have occurred in Maryland in the absence of HHVBP. We therefore should not rule out the possibility that the impact estimates from our D-in-D model may in

part falsely attribute spending increases after 2015 in Maryland (relative to its regional comparison states) to HHVBP. In future Annual Reports, we will continue to evaluate the impact of HHVBP in Maryland by further examining trends for individual components of spending and continuing to explore the sensitivity of our findings to alternative assumptions regarding trends in spending and utilization that would have occurred in Maryland after 2015 in the absence of the HHVBP Model.

7. Results: HHVBP Produced Modest Improvements in OASIS-Based Outcome Quality Measures

7.1 Introduction

This chapter presents findings on the impact of HHVBP on all nine HHVBP OASIS-based quality measures (seven outcome measures and two process measures) as well as five publicly-reported OASIS-based quality measures. Using a linear time trend in our D-in-D analyses, we found a ***modest, positive impact of HHVBP for most of the OASIS-based outcome measures*** for agencies in the nine model states compared to those in the non-model states after the first three years of the model. These relative gains occurred in a context where average measure achievement rates exceeded 65% prior to implementation of HHVBP in both HHVBP and non-HHVBP states. At the state level, Arizona, Maryland, and Tennessee were consistent drivers of the overall HHVBP findings for most of the OASIS-based outcome measures, while Florida's results were mostly negative. We found ***no strong pattern in the effect of HHVBP for the OASIS-based process measures***. We continued to find a trend over time of lower functional status reported at the start of care on OASIS assessments for beneficiaries in both HHVBP and non-HHVBP states, which was supported by analyses of case-mix measures derived from non-OASIS data (e.g., HCC scores and prior hospitalizations within 30 days) that also found evidence of increasing patient acuity. We also found that improvement occurs across all levels of patient acuity reported at the start of care on the OASIS assessment, which suggests that agencies are effective at improving the functional status of their patients regardless of level of impairment.

Below, we present trends in measure values over time—including changes in functional status at the start of care—followed by our D-in-D findings.

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

Trends for the six OASIS-based outcome improvement measures that are used in the TPS showed a general trend towards increasing rates of improvement over time in both HHVBP and non-HHVBP states that began prior to HHVBP implementation (Exhibit 48). For example, rates for Improvement in Ambulation-Locomotion increased by 18.7% for HHVBP states (65.2% to 77.4%) and by 17.7% in non-HHVBP states (62.8% to 73.9%). The smaller increase over time for both groups for the sole OASIS-based outcome measure that is not used as an HHVBP performance measure (Improvement in Status of Surgical Wound) was likely due to the relatively high baseline measure rates for both HHVBP and non-HHVBP states (90.3% and 89.2%, respectively; Exhibit 48).

Similar to the OASIS-based outcome measures, performance rates also increased for the OASIS-based process measures in both HHVBP and non-HHVBP states through the third year of the HHVBP Model (Exhibit 48). The smaller increases observed over time for the OASIS-based process measures that are not used as HHVBP performance measures (e.g., last four rows of Exhibit 48) were likely constrained by the high baseline measure rates that were already at or above 90% for both HHVBP states and non-HHVBP states.

Exhibit 48. Baseline and Post-HHVBP Performance Period Means for OASIS-Based Impact Measures, All HHVBP States and Non-HHVBP States

Measure	HHVBP States, Baseline (2013-2015)	Non-HHVBP States, Baseline (2013-2015)	HHVBP States, Post-HHVBP (2016-2018)	Non-HHVBP States, Post-HHVBP (2016-2018)
OASIS-Based Outcome Quality Measures				
*Discharged to Community**	72.8%	70.1%	73.0%	71.4%
*Improvement in Ambulation-Locomotion**	65.2%	62.8%	77.4%	73.9%
Improvement in Bathing	70.5%	68.0%	79.4%	76.5%
Improvement in Bed Transferring	61.1%	58.4%	77.1%	72.1%
Improvement in Dyspnea	66.7%	66.1%	78.9%	76.0%
Improvement in Management of Oral Medications	51.5%	53.9%	67.1%	65.3%
Improvement in Pain Interfering with Activity	70.7%	67.7%	79.9%	77.0%
Improvement in Status of Surgical Wounds	90.3%	89.2%	92.0%	90.7%
OASIS-Based Process Quality Measures				
Influenza Immunization Received for Current Flu Season	61.8%	64.9%	67.1%	66.4%
Pneumococcal Polysaccharide Vaccine Ever Received	66.1%	68.2%	73.9%	74.0%
Depression Assessment Conducted	95.8%	95.2%	95.8%	95.4%
Diabetic Foot Care and Patient / Caregiver Education Implemented during All Episodes of Care	92.5%	94.1%	95.4%	95.9%
Multifactor Fall Risk Assessment Conducted for All Patients who Can Ambulate	98.3%	98.4%	99.0%	98.9%
Timely Initiation of Care	92.6%	89.8%	94.0%	91.6%

** Key Impact Measure | HHVBP Measures indicated by italic text. | See Exhibit 48n (Page 140) in the Technical Appendix for each measure's sample size.*

7.2.1 Changes in Functional Status at the Start of Care

Given the underlying trends in OASIS outcome measures that began prior to implementation of HHVBP (Exhibit 48) and findings from our 2017 interviews with HHAs that found many agencies responded to the HHVBP Model by educating their clinical staff about OASIS—particularly with regard to the Start of Care (SOC) assessment (Arbor Research, 2018)—we expanded our previous work that examined patient functional status at the initial and final OASIS assessments. Specifically, we examined changes in OASIS SOC assessments in the post-HHVBP period (2016-2018) to address the following questions:

1. To what extent are the changes in SOC for select OASIS measures observed in HHVBP and non-HHVBP states and across Medicare beneficiaries through 2018?
2. Are changes in OASIS SOC associated with changes in patient characteristics?
3. Are changes in OASIS SOC associated with certain agency characteristics?

Consistent with our Second Annual Report results (Arbor Research, 2019), we found shifts toward lower functional status at the SOC on five OASIS measures in both HHVBP and non-HHVBP states for the Medicare FFS population of home health users between the pre-HHVBP period (2013-2015) and post-

HHVBP period (2016-2018). Looking across the categories of each OASIS measure, we see that HCC scores increased for all categories, suggesting that *all beneficiaries in all categories* have higher medical needs in the post-HHVBP period than in the baseline period. We also found that the share of Medicare FFS episodes with a hospital claim in the 30-days prior to the OASIS SOC increased across nearly all categories. We also found that agencies in HHVBP states increased their share of episodes in relatively less functional categories at the beginning of the home health episode compared to agencies in non-HHVBP states. This shift towards lower reported levels of functional status at the OASIS SOC were more common in chain-affiliated and for-profit agencies compared to non-chain affiliated and non-profit agencies, in both HHVBP and non-HHVBP states. We discuss the findings in more detail below.

Declining Levels of Functioning Over Time at Start of Care in OASIS Accompanied by Increasing Acuity Based on Medicare FFS Claims

Using OASIS data for 2013 through 2018, we examined changes in the SOC status for five OASIS measures. To determine whether there were any differences between measures that were included in the HHVBP Model compared to those that were not, we examined three of the OASIS-based outcome measures used in the TPS (Improvement in Ambulation-Locomotion, Improvement in Dyspnea, and Improvement in Management of Oral Medications) and two OASIS-based outcome measures that are not used in the TPS (Improvement in Grooming and Improvement in Toilet-Transferring). The number of categories varies across measures, from as few as four (i.e., Improvement in Management of Oral Medications and Improvement in Grooming), to as many as seven (i.e., Improvement in Ambulation-Locomotion; Exhibit 49).

Exhibit 49. Select OASIS Measures and their Categories (from least to most functionally impaired)

Ambulation-Locomotion	Dyspnea	Management of Oral Medications	Grooming	Toilet Transferring
•Independent •One-handed device •Two-handed device •Only with supervision •Chairfast/ Able to wheel •Chairfast •Bedfast	•Not short of breath •When walking •With moderate exertion •With minimal exertion •At rest	•Independent •If prepared •If reminded •Unable	•Able •Utensils within reach •Need assistance •Unable	•Able •Assisted •Bedside commode •Bedpan •Dependent

Blue bars (left three columns): Measures used in the TPS; Orange bars (right two columns): Measures not used in the TPS.

We examined the changes in functional status at the OASIS SOC for these five measures in HHVBP and non-HHVBP states, focusing on Medicare FFS beneficiaries with OASIS assessments which allowed us to use Medicare administrative data to explore changes in their health status.[15] There was a shift over time, from the pre-HHVBP period (2013-2015) to post-HHVBP period (2016-2018), toward less

[15] Compared to the full population of home health users with an OASIS assessment, we found that the percentage point changes were generally similar, though higher, among the FFS Medicare population (not shown).

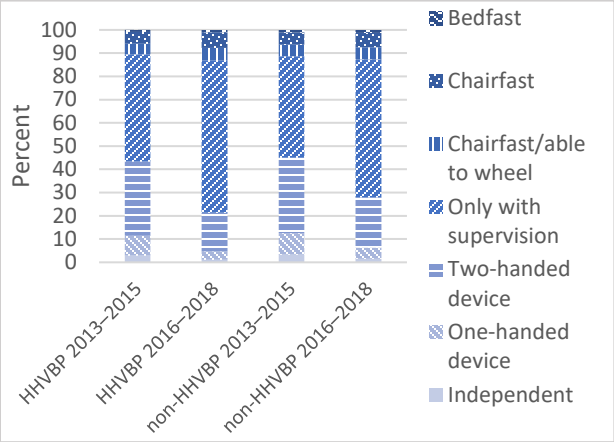
functional categories for all five OASIS measures in both HHVBP and non-HHVBP states (Exhibit 50). For all of the graphs in Exhibit 50, the darkening of the bars in the post-HHVBP period illustrates the shift toward less functional categories which, as reported in our previous report (Arbor Research, 2019), started in the pre-HHVBP period, and continued in the post-HHVBP period.

To determine whether this shift toward lower functional status was being driven by a change in patient acuity, we used two non-OASIS based data sources for the subset of Medicare FFS beneficiaries receiving home health care: HCC scores calculated at the start of the episode; and claims for prior hospitalizations within 30 days. If the shifts toward lower functional status categories in the OASIS measures were entirely due to coding practices, we would expect to see no increase in indicators of patient acuity for those episodes in the less functional categories post-HHVBP.

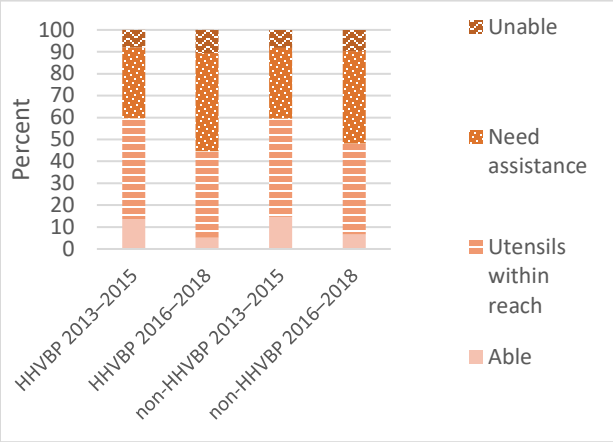
We found that the HCC scores increased for all categories within each OASIS measure for patients in HHVBP states (Exhibit 51); results are similar for patients in non-HHVBP states (not shown). This suggests that *all Medicare FFS beneficiaries in all measure categories* were sicker in the post-HHVBP period than pre-HHVBP implementation. Similarly, we observed that the share of Medicare FFS episodes with a hospital claim in the 30-days prior to the OASIS SOC assessment increased across nearly all categories of functional status within each OASIS measure between the pre- and post-HHVBP periods. This increase was driven mainly by changes in Florida, where there has been a reduction in the share of episodes that are community admissions by more than five percentage points (not shown). Finally, the share of OASIS episodes post-HHVBP with subsequent improvement in the measure increased within the response categories for each measure (see last two columns of Exhibit 51). This result indicated that in addition to the shift to lower reported functional status at start of care over time, there were also increasing shares of patients at each initial level of functioning showing improvement which contributed to the overall increase in improvement rates for OASIS measures. Preliminary descriptive analysis using characteristics of the inpatient stay from MedPAR data did not yield evidence of differences in changes between pre- and post-HHVBP periods in inpatient length of stay, major disease classifications, or Diagnosis Related Group (DRG) weights across patients grouped by OASIS categories (not shown).

Exhibit 50. Initial OASIS Assessment in HHVBP and Non-HHVBP States, Pre-HHVBP (2013-2015) and Post-HHVBP (2016-2018) Periods

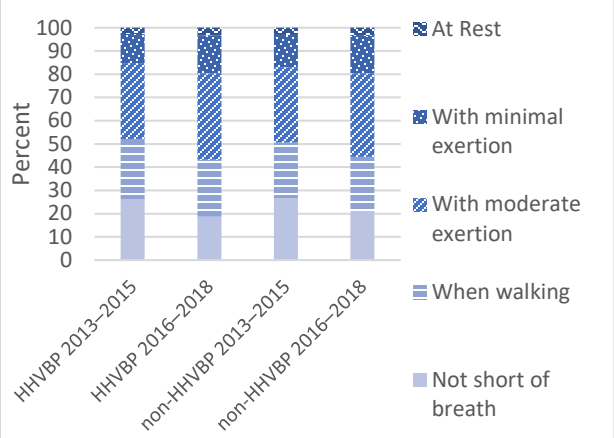
Ambulation-Locomotion



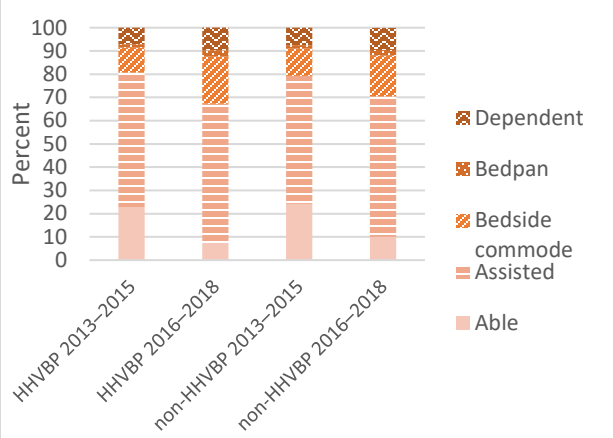
Assessment for Grooming



Assessment for Dyspnea



Toilet Transferring



Management of Oral Medications

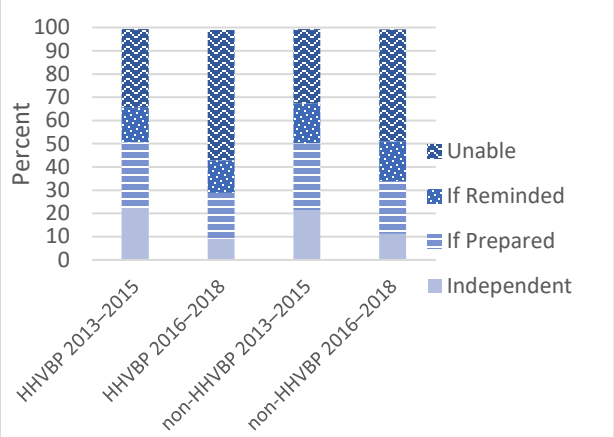


Exhibit 51. Characteristics of Medicare FFS Home Health Patients by Functional Status at SOC Categories, for Select OASIS Measures in HHVBP States, Pre-HHVBP (2013-2015) and Post-HHVBP (2016-2018) Periods

OASIS Measure	Categories	Average HCC		Share with prior hospitalization within 30 days		Share showing improvement in measure	
		Pre-HHVBP	Post-HHVBP	Pre-HHVBP	Post-HHVBP	Pre-HHVBP	Post-HHVBP
All		**2.68**	**2.92**	**46.4%**	**48.9%**	**67.5%**	**79.7%**
Improvement in Ambulation-Locomotion	Independent	2.27	2.41	54.0%	52.8%	N/A	N/A
	One-handed device	2.36	2.56	43.2%	47.6%	44.5%	57.3%
	Two-handed device	2.55	2.75	47.9%	50.1%	55.1%	61.6%
	Only with supervision	2.69	2.86	48.0%	51.0%	83.6%	88.4%
	Chairfast/Able to wheel	3.36	3.53	34.7%	36.0%	51.9%	62.0%
	Chairfast	3.34	3.49	34.2%	35.8%	55.9%	66.8%
	Bedfast	4.04	4.33	42.6%	43.7%	52.0%	55.8%
Improvement in Dyspnea	Not short of breath	2.27	2.39	46.1%	46.5%	N/A	N/A
	When walking	2.48	2.63	44.1%	47.0%	55.0%	69.0%
	With moderate exertion	2.84	3.03	44.9%	47.9%	72.6%	84.9%
	With minimal exertion	3.31	3.50	52.9%	54.1%	83.6%	90.3%
	At rest	3.70	4.01	59.1%	60.9%	81.3%	87.6%
Improvement in Management of Oral Medications	Independent	3.20	3.44	43.7%	48.3%	N/A	N/A
	If prepared	2.29	2.47	52.3%	51.7%	51.6%	64.3%
	If reminded	2.63	2.78	48.8%	52.3%	62.3%	75.7%
	Unable	2.83	3.00	46.6%	50.7%	46.1%	67.0%
Improvement in Grooming	Able	2.43	2.61	50.7%	50.7%	N/A	N/A
	Utensils within reach	2.57	2.75	49.1%	52.4%	70.6%	74.0%
	Need assistance	2.82	3.01	43.3%	47.9%	77.4%	84.6%
	Unable	3.17	3.35	36.1%	38.4%	60.8%	71.9%
Improvement in Toilet Transferring	Able	2.48	2.67	50.3%	51.2%	N/A	N/A
	Assisted	2.63	2.82	46.6%	50.8%	71.1%	73.7%
	Bedside commode	2.88	3.00	45.1%	47.8%	86.5%	91.0%
	Bedpan	3.24	3.33	43.1%	46.4%	82.0%	89.3%
	Dependent	3.35	3.47	35.3%	38.0%	52.1%	64.9%

Increasing Share of Home Health Patients with Lower Functioning at Start of Care Occurred Widely Across HHAs

We also examined whether changes in functional status at the OASIS SOC occurred across HHAs and whether they were related to specific agency characteristics. For this agency-level analysis, we restricted the sample to agencies with a sufficient number of OASIS episodes (i.e., 100 for each year) and with non-missing data for the five measures from 2013 to 2018. Unlike the analysis above, we used all of an agency's OASIS-eligible population (i.e., we did not restrict to the Medicare FFS population) to capture a

larger pool of agencies. This yielded a sample of 5,105 HHAs, representing 37.5% of all HHAs with at least one OASIS episode between 2013 and 2018 and 87.6% of OASIS episodes in that period.

To facilitate interpretation, we constructed a dichotomous variable of functionality for each OASIS measure in the pre- and post-HHVBP periods by combining the responses for each OASIS measure into two categories – "more functional" and "less functional." Because each measure has a different number of categories, the set of categories defined as "more functional" and "less functional" was identified independently for each measure. "More functional" categories are defined as those measure categories that had a *decrease* in the share of SOC assessments between the pre- and post-HHVBP periods, and "less functional" categories are defined as those measure categories that had an *increase*.

To determine agency-level changes in functional status at the start of care, we calculated the percentage point change between the pre- and post-HHVBP period in the share of beneficiaries in the "less functional" categories for each measure at the agency level.[16]

For agencies in both HHVBP and non-HHVBP states, we observed increases over time in the percentage of beneficiaries classified as being "less functional" at the start of home health episodes (Exhibit 52). Further, the median agency increase between the pre- and post-HHVBP periods in the share of episodes in the "less functional" categories at the SOC was higher among HHVBP agencies compared to agencies in non-HHVBP states across all five measures (Exhibit 52). For example, the median agency among HHVBP states had a 19.2 percentage point increase in the share of episodes in the "less functional" categories of the Improvement in Ambulation-Locomotion measure at the SOC between the pre- and post-periods compared to a 14.6 percentage point increase at the median agency among non-HHVBP states. We also found that a larger share of agencies in HHVBP states than non-HHVBP states showed growth in episodes for patients in the lower functional status categories in the post-HHVBP period (last two columns of Exhibit 52), but note that the shift began prior to HHVBP (see Exhibit 50).

Exhibit 52. Increased Agency Reporting of "Less Functional" Patients between Pre-HHVBP (2013-2015) and Post-HHVBP (2016-2018) Periods, HHVBP and Non-HHVBP States

	Median Agency Percentage Point Change Between Pre- and Post-HHVBP Periods in Episodes for "Less Functional" Patients		Percentage of Agencies with an Increasing Share of Episodes For "Less Functional" Patients Between Pre- And Post-HHVBP Periods	
	HHVBP Agencies (N=1,080)	Non-HHVBP Agencies (N=4,025)	HHVBP Agencies (N=1,080)	Non-HHVBP Agencies (N=4,025)
Improvement in Ambulation-Locomotion	19.2	14.6	91%	87%
Improvement in Dyspnea	7.8	5.0	77%	71%
Improvement in Management of Oral Medications	16.3	8.2	87%	77%
Improvement in Grooming	12.5	9.2	88%	81%
Improvement in Toilet Transferring	14.1	11.1	94%	90%

[16] The decline in functional status showed similar patterns for all agencies as those that met our inclusion criteria (not shown).

To examine the characteristics of agencies with the largest changes in SOC assessments, we classified agencies as *consistent changers* that were above the median percentage point change for all five measures. That is, the consistent changers represent agencies with a larger increase in "less functional" patients at the SOC than the median agency, for all five OASIS measures that we examined.

We found a higher share of consistent changers among agencies in HHVBP states than non-HHVBP states (22.1% vs. 12.4%; Exhibit 53). Agencies classified as consistent changers had several distinguishing characteristics. In both HHVBP and non-HHVBP states, agencies with a low share of episodes with a prior inpatient stay and a high share of Medicaid episodes were less likely to be classified as consistent changers. Large and chain-affiliated agencies were more likely to be classified as consistent changers (Exhibit 53).

Exhibit 53. Characteristics of HHAs with Larger Increases in "Less Functional" Patients at the Start of Care than the Median Agency ("Consistent Changers") between 2013-2015 and 2016-2018, HHVBP and Non-HHVBP States

	HHVBP Agencies				Non-HHVBP Agencies			
	Total		Consistent Changers		Total		Consistent Changers	
			No	Yes			No	Yes
	N	%	%	%	N	%	%	%
Total	**1,080**	**100**	**77.9**	**22.1**	**4,025**	**100**	**87.6**	**12.4**
Share of episodes with Prior Inpatient Stay								
Low (1-25th percentile)	229	21.2	86.9	13.1	1,047	26.0	93.1	6.9
Middle (26-75th percentile)	565	52.3	74.3	25.7	1,988	49.4	86.5	13.5
High (76-100th percentile)	286	26.5	77.6	22.4	990	24.6	83.7	16.3
Share of Medicare FFS episodes								
Below the median	429	39.7	76.5	23.5	2,123	52.7	86.1	13.9
Above the median	651	60.3	78.8	21.2	1,902	47.3	89.2	10.8
Agency with high share of Medicaid episodes								
No (<20% of episodes)	1017	94.2	77.1	22.9	3,711	92.2	87.0	13.0
Yes (>20% of episodes)	63	5.8	90.5	9.5	314	7.8	93.9	6.1
Profit status								
Non-profit in all years	278	25.7	79.9	20.1	1,030	25.6	85.7	14.3
For-profit in all years	733	67.9	77.5	22.5	2,716	67.5	88.8	11.2
Mixed status	69	6.4	73.9	26.1	279	6.9	82.1	17.9
Provider type								
Freestanding	927	85.8	77.9	22.1	3,351	83.3	87.9	12.1
Hospital-based	103	9.5	80.6	19.4	458	11.4	89.3	10.7
Mixed status	50	4.6	72.0	28.0	216	5.4	79.2	20.8
Chain status								
Non-chain	484	44.8	83.5	16.5	2,371	58.9	89.1	10.9
Chain	493	45.6	73.4	26.6	1,283	31.9	85.0	15.0
Mixed status	100	9.3	72.0	28.0	350	8.7	86.0	14.0
Agency size (episodes)								
101 to 250	131	12.1	88.5	11.5	775	19.3	90.8	9.2

	HHVBP Agencies				Non-HHVBP Agencies			
	Total		Consistent Changers		Total		Consistent Changers	
			No	Yes			No	Yes
	N	%	%	%	N	%	%	%
251 to 500	288	26.7	81.3	18.8	1,189	29.5	89.7	10.3
501 to 1,000	276	25.6	76.4	23.6	957	23.8	86.2	13.8
Greater than 1,000	385	35.6	72.7	27.3	1,104	27.4	84.1	15.9

Notes: Agency size is defined as the average annual number of OASIS episodes from 2013-2015. The share of episodes with prior inpatient stay is the percent of OASIS episodes from 2013-2018 associated with beneficiaries having an inpatient stay within 14 days prior to the beginning of the episode; percentiles are based on national ranking. The share of Medicare FFS episodes is the percent of OASIS episodes from 2013-2018 for which the home health user was a Medicare FFS beneficiary. The Medicaid share is the percent of OASIS episodes from 2013-2018 for which the home health users was on Medicaid.

7.3 Modest Improvements for OASIS-Based Outcome Impact Measures

Our findings for the eight OASIS-based outcome measures for the first three years following the implementation of the HHVBP Model are presented in Exhibit 54. We observed relative gains over the first three 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 in 2016-2018 (Exhibit 54). 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 of approximately 0.5 percentage points, and a relative increase of nearly 0.9 percentage points in the third year of HHVBP (and the first year in which HHAs in HHVBP states received a payment adjustment).

Among the improvement measures used to calculate the TPS, we found cumulative D-in-D effects to be statistically significant and positive for all six measures with the exception of Improvement in Dyspnea (Exhibit 54). The magnitude of the estimated increase in the percentage of patients showing improvement for the other HHVBP measures ranged from 0.79 percentage points for ambulation-locomotion to 2.86 percentage points for management of oral medications for 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, 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 15.6 percentage points between the baseline period and post-HHVBP implementation (i.e., from 51.5% to 67.1% of patients; Exhibit 48).

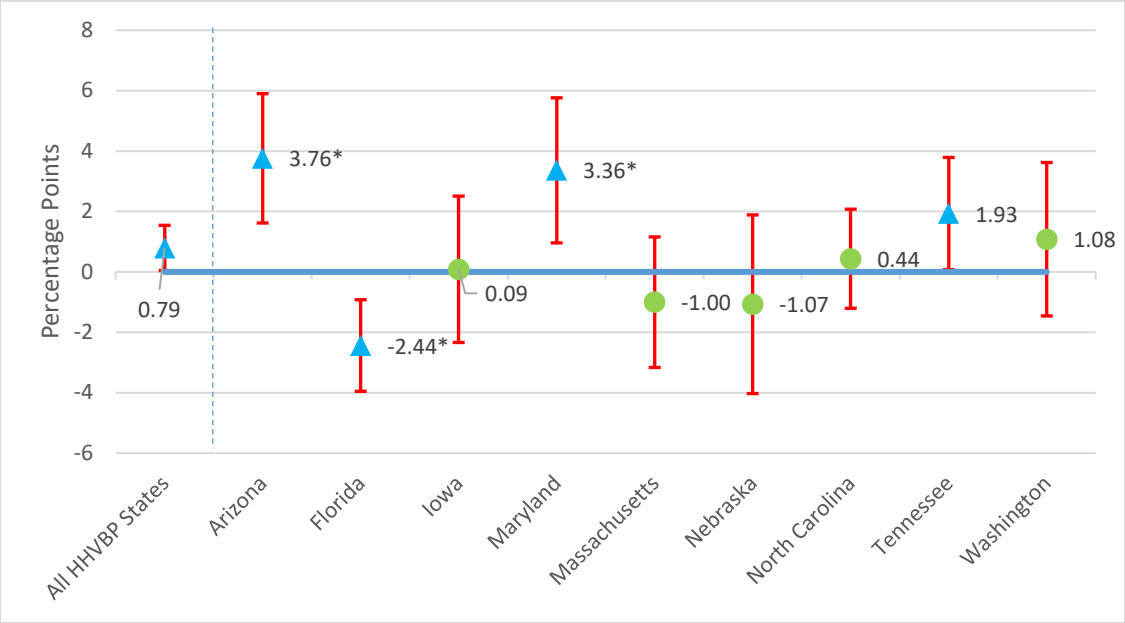
Exhibit 54. Impact of the HHVBP Model on OASIS Outcome Measures

Measure	Model Estimates				Average in HHVBP States, Baseline (2013-2015)	% Relative Change
	D-in-D[a]	p-value	Lower 90% CI[a]	Upper 90% CI[a]		
Discharged to Community						
2016	0.51	<0.01	0.23	0.78	72.8%	0.7%
2017	0.56	0.03	0.13	1.00		0.8%
2018	0.86	0.01	0.29	1.44		1.2%
Cumulative	0.65	<0.01	0.24	1.06		0.9%
Improvement in Ambulation-Locomotion						
2016	0.75	0.03	0.19	1.31	65.2%	1.2%
2017	0.72	0.14	-0.08	1.51		1.1%
2018	0.88	0.16	-0.14	1.89		1.3%
Cumulative	0.79	0.08	0.04	1.54		1.2%
Improvement in Bathing						
2016	0.84	0.02	0.23	1.46	70.5%	1.2%
2017	1.34	<0.01	0.50	2.17		1.9%
2018	1.60	0.01	0.57	2.63		2.3%
Cumulative	1.28	<0.01	0.50	2.05		1.8%
Improvement in Bed Transferring						
2016	1.10	<0.01	0.53	1.66	61.1%	1.8%
2017	1.29	0.01	0.43	2.15		2.1%
2018	1.39	0.04	0.27	2.50		2.3%
Cumulative	1.30	<0.01	0.49	2.10		2.1%
Improvement in Dyspnea						
2016	0.79	0.05	0.12	1.46	66.7%	1.2%
2017	0.68	0.29	-0.38	1.74		1.0%
2018	-0.07	0.94	-1.48	1.35		-0.1%
Cumulative	0.46	0.46	-0.56	1.48		0.7%
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%
2018	3.36	<0.01	1.66	5.05		6.5%
Cumulative	2.86	<0.001	1.58	4.14		5.6%
Improvement in Pain Interfering with Activity						
2016	1.18	<0.01	0.58	1.78	70.7%	1.7%
2017	1.68	<0.01	0.76	2.60		2.4%
2018	1.89	<0.01	0.71	3.06		2.7%
Cumulative	1.61	<0.01	0.75	2.47		2.3%
Improvement in Status of Surgical Wounds						
2016	0.22	0.42	-0.23	0.67	90.3%	0.2%
2017	0.67	0.12	-0.04	1.39		0.7%
2018	0.77	0.20	-0.23	1.76		0.9%
Cumulative	0.56	0.18	-0.13	1.24		0.6%

[a] Values represent percentage point changes. | 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.1.5 [Page 21] in the Technical Appendix for more details). See Exhibit 54n (Page 141) in the Technical Appendix for each measure's sample size.

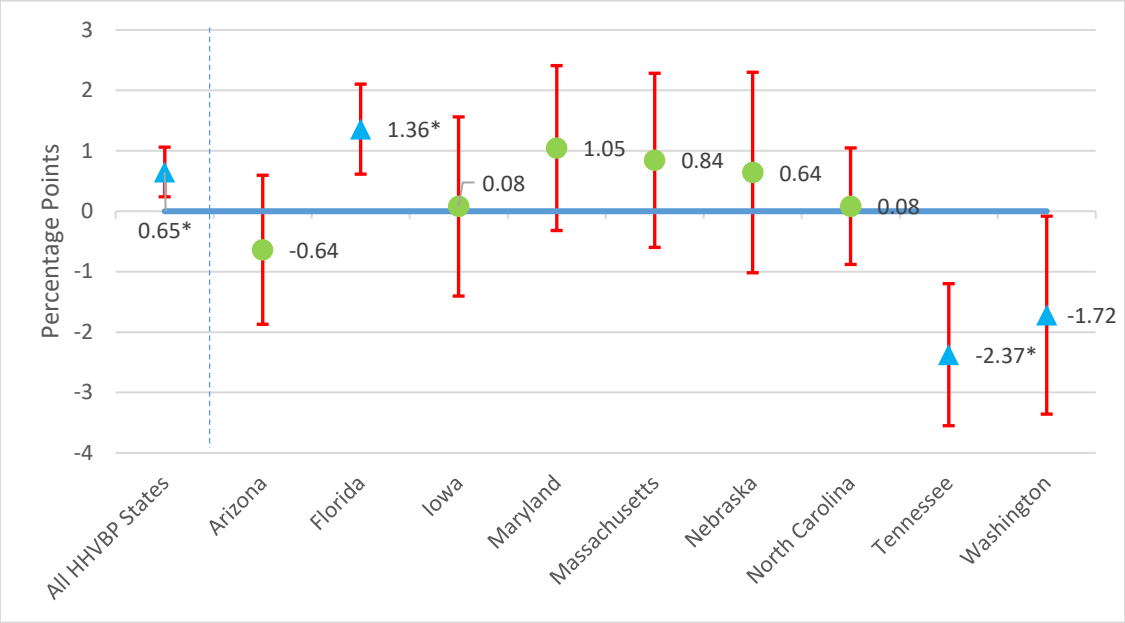
In our analysis of state-specific impacts among HHVBP states, we found that Arizona, Maryland, and Tennessee were consistent drivers of the overall HHVBP findings for the seven OASIS-based improvement measures, with positive, significant D-in-D cumulative results for four of the measures. In contrast, Florida's D-in-D estimates were mostly negative, and statistically significant for three of the improvement measures (see Exhibit C-46 [Page 182] in the Technical Appendix for the state-level D-in-D cumulative results for the OASIS-based outcome measures). Across the improvement measures, the magnitude of the estimated increase in the percentage of patients showing improvement was larger for these four states than the overall estimate for all HHVBP states combined; this can be seen for the cumulative estimate for the Improvement to Ambulation-Locomotion measure across states compared to 0.79 reported for all HHVBP states (Exhibit 55). In contrast to our findings for the Improvement to Ambulation-Locomotion measure, we found *positive*, statistically significant D-in-D cumulative results for Florida with regard to discharge to community (Exhibit 56), suggesting that the HHVBP Model resulted in an increase in beneficiaries being discharged to the community in Florida relative to the states in its regional grouping after the first three years of HHVBP. For this measure, we found lower rates of discharge to community in Tennessee and Washington relative to the states in each of their respective regional groupings (Exhibit 56).

Exhibit 55. Cumulative D-in-D Estimates for Improvement in Ambulation-Locomotion, Overall and for each HHVBP State



▲ *signifies statistical significance of p < 0.1; * p < 0.05*

Exhibit 56. Cumulative D-in-D Estimates for Discharge to Community, Overall and for each HHVBP State



▲ *signifies statistical significance of p < 0.1; * p < 0.05*

7.4 No Improvement for Most OASIS-Based Process Impact Measures

Broadly, we did not find a strong pattern in the impact of HHVBP during the first three years of the model for the OASIS-based process measures. The results of our D-in-D analyses indicate no cumulative impact after the first three years of the HHVBP Model for either of the HHVBP OASIS-based process measures, although we did find a *negative* impact (-3.0 percentage points) of HHVBP in 2018—the first year that HHAs in HHVBP states received a payment adjustment—on the Influenza Immunization measure (Exhibit 57).

Among the other OASIS-based process measures, HHVBP had a cumulative impact on Timely Initiation of Care, where we found a modest increase (1.0 percentage point) in HHVBP states relative to non-HHVBP states, and on Conducting a Fall Risk Assessment, where we found a very small relative *decrease* (-0.36 percentage points) in HHVBP states relative to non-HHVBP states (Exhibit 57). The performance rates on these non-HHVBP process measures were already high prior to implementation of HHVBP, exceeding 92% for all four measures (Exhibit 48). The D-in-D estimates for most of these measures were smaller, and with the exception of timely initiation of care, were generally not statistically significant at the cumulative or yearly level, which may reflect limited opportunities for improvement given the already high levels of baseline performance.

Similar to our overall findings, we did not find strong or consistent patterns at the state level for the OASIS-based process measures. For example, most states had non-significant findings for each of the six measures, and all states had both positive and negative impacts across the measures. See Exhibit C-47 (Page 184) in the Technical Appendix for the state-level D-in-D cumulative results for the OASIS-based process measures.

Exhibit 57. Impact of the HHVBP Model on OASIS Process Measures

Measure	Model Estimates				Average in HHVBP States, Baseline (2013-2015)	% Relative Change
	D-in-D[a]	p-value	Lower 90% CI [a]	Upper 90% CI [a]		
Influenza Immunization Received for Current Flu Season						
2016	0.47	0.44	-0.53	1.48	61.8%	0.8%
2017	-1.20	0.20	-2.73	0.33		-1.9%
2018	-3.00	0.01	-5.00	-1.00		-4.9%
Cumulative	-1.19	0.17	-2.62	0.25		-1.9%
Pneumococcal Polysaccharide Vaccine Ever Received						
2016	1.13	0.06	0.13	2.12	66.1%	1.7%
2017	0.26	0.78	-1.29	1.81		0.4%
2018	-0.37	0.77	-2.43	1.69		-0.6%
Cumulative	0.44	0.62	-1.03	1.90		0.7%
Depression Assessment Conducted						
2016	0.18	0.48	-0.24	0.61	95.8%	0.2%
2017	0.41	0.31	-0.25	1.08		0.4%
2018	0.13	0.80	-0.74	1.01		0.1%
Cumulative	0.25	0.50	-0.36	0.87		0.3%
Diabetic Foot Care and Patient/Caregiver Education Implemented during All Episodes of Care						
2016	0.08	0.81	-0.49	0.66	92.5%	0.1%
2017	0.38	0.45	-0.46	1.22		0.4%
2018	0.07	0.92	-1.04	1.18		0.1%
Cumulative	0.18	0.71	-0.62	0.98		0.2%
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%
2018	-0.66	0.02	-1.11	-0.21		-0.7%
Cumulative	-0.36	0.06	-0.67	-0.05		-0.4%
Timely Initiation of Care						
2016	0.60	0.02	0.19	1.01	92.6%	0.6%
2017	1.04	<0.01	0.46	1.62		1.1%
2018	1.30	<0.01	0.55	2.04		1.4%
Cumulative	1.01	<0.01	0.47	1.54		1.1%

[a] Values represent percentage point changes. | 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 [Page 12] in the Technical Appendix for more details). See Exhibit 57n (Page 141) in the Technical Appendix or each measure's sample size.

7.5 Discussion

Our findings for most of the OASIS-based outcome measures show a modest, positive impact of HHVBP, reflecting a relative increase in discharge to the community and improvement in functional status measures in HHVBP states compared to non-HHVBP states, with cumulative impacts typically ranging from 0.7 to 1.3 percentage points. These relative gains occurred in a context where average measure achievement rates exceeded 65% 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. This aligns with findings from our previous qualitative work discussed in our previous two reports that found quality improvement efforts for OASIS assessment to be a central focus of agencies (Arbor Research, 2018, 2019). A focus on Star Ratings and other public reporting may be especially salient to agencies operating in locations with a high concentration of managed care and alternative payment models (see Section 9.4 below). At the state level, the D-in-D estimates for Arizona, Maryland, and Tennessee followed the sign of the overall HHVBP impact estimates for most of the OASIS-based outcome measures, while Florida's D-in-D estimates across the measures were usually in the opposite direction. Similar to the state-level findings discussed above around the other measures, we plan to look further into state-specific events that may be driving these differences observed across the HHVBP states.

We did not find a strong pattern in the impact of HHVBP during the first three years of the model for the OASIS-based process measures examined. As discussed above, the performance rates on the non-HHVBP process measures were already high prior to implementation of HHVBP. As such, any effects of HHVBP in improving agency performance on these measures are likely to be small.

Our results suggest a trend towards agencies reporting lower functional status at SOC OASIS assessments for home health beneficiaries in both HHVBP and non-HHVBP states, and is supported by analyses of patient acuity derived from non-OASIS data. We found this trend occurred with both the HHVBP and non-HHVBP OASIS measures. Future work that examines how the HHVBP Model affects the performance of agencies on other OASIS-based measures that are not used in the HHVBP Model will provide a more complete look into the overall response of agencies to the HHVBP Model.

We also found that improvement occurs across all levels of patient acuity reported at the SOC on the OASIS assessment, which suggests that agencies are effective at improving the functional status of their patients regardless of level of impairment. Further research can explore whether the improvement reported by agencies is associated with a change in their care delivery such as examining whether agencies change their frequency and/or mix of visits across time for patients with different functional status at the SOC.

These changes in the OASIS SOC trending towards lower functional status appear to be fairly widespread across agencies, which is supported by results from our interviews with agencies that found that some HHAs who receive referrals from providers participating in alternative payment models may be treating patients who were formerly cared for in a more intensive post-acute care setting (see Section 9.4 for additional detail). In addition, agencies may be paying closer attention to the OASIS SOC values due to Star Ratings and other quality measurement programs. The variation in the magnitude of the changes in the reported functional status at the SOC across the OASIS measure categories (Exhibit 51) suggests that the SOC assessment (and therefore, the potential for showing improvement on OASIS measures) may be sensitive to the number of categories for each measure.

8. Results: No Evidence of an Impact of HHVBP on Patient Experience with Care

8.1 Introduction

This chapter examines the impact of HHVBP on five measures of the experience of home health patients with their care that are derived from the HHCAHPS survey and used to calculate agency TPS scores. Based on D-in-D analyses of these five HHCAHPS-based performance measures, we found ***no impact of HHVBP on patient experience with care***. Based on our analyses of the HHCAHPS survey responses among beneficiaries receiving care from small agencies in the post-implementation period, we did not find evidence that the exclusion of the HHCAHPS-based measures from their quality performance incentives under HHVBP had large unintended consequences for patient experience with care at small agencies. This chapter also examines the impact of HHVBP on beneficiary access to higher-quality home health care. Overall, we found evidence of ***improved access to higher-quality HHAs in HHVBP states***, based on growth in the share of home health episodes delivered by higher-quality HHAs. The larger increases over time in utilization of higher-quality HHAs in HHVBP states compared to non-HHVBP states were driven primarily by the increased size among higher-quality agencies rather than growth in the number of higher-quality HHAs.

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

Performance scores for the five HHCAHPS-based measures have remained stable over time in both HHVBP states and non-HHVBP states (Exhibit 58). The unadjusted values for these measures remained similar between the HHVBP states and non-HHVBP states during the baseline period, and were also similar between the two groups post-implementation (Exhibit 58).

Exhibit 58. Baseline and Post-HHVBP 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, Baseline (2013-2015)	Non-HHVBP States, Baseline (2013-2015)	HHVBP States, Post-HHVBP (2016-2018)	Non-HHVBP States, Post-HHVBP (2016-2018)
How often the home health team gave care in a professional way	88.8%	88.2%	88.5%	88.0%
How well did the home health team communicate with patients	85.9%	85.3%	85.5%	85.1%
Did the home health team discuss medicines, pain, and home safety with patients	82.8%	83.8%	82.4%	83.5%
How do patients rate the overall care from the home health agency	84.4%	83.7%	84.2%	83.5%
Would patients recommend the home health agency to friends and family	79.6%	78.4%	79.0%	77.7%

HHVBP Measures indicated by italic text. | See Exhibit 58n (Page 141) in the Technical Appendix for each measure's sample size.

8.3 No Impact on Patient Experience with Care

None of the five HHVBP measures of patient experience based on HHCAHPS data showed changes over time among all HHVBP states relative to the non-HHVBP states during the first three years of the HHVBP Model (Exhibit 59). We also did not observe meaningful changes over time in HHVBP states relative to

non-HHVBP states from 2016 through 2018. Underlying the D-in-D findings, performance rates for the five patient experience measures remained relatively stable over the entire period from 2013 to 2018, in both the HHVBP and non-HHVBP states (See Exhibits C-7 [Page 124] and C-8 [Page 126] in the Technical Appendix). Together, our D-in-D findings and underlying trends in the HHCAHPS measures suggest no effects of HHVBP on patient experience with home health care through the first three performance years of the model.

Exhibit 59. Impact of the HHVBP Model on HHCAHPS-Based Measures

Measure	Model Estimates				Average in HHVBP States, Baseline (2013-2015)	% Relative Change
	D-in-D[a]	p-value	Lower 90% CI[a]	Upper 90% CI[a]		
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%
2018	-0.06	0.70	-0.32	0.20		-0.1%
Cumulative	-0.04	0.70	-0.23	0.15		-0.05%
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%
2018	-0.28	0.12	-0.58	0.01		-0.3%
Cumulative	-0.18	0.18	-0.40	0.04		-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%
2018	-0.19	0.36	-0.54	0.15		-0.2%
Cumulative	-0.10	0.52	-0.34	0.15		-0.1%
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%
2018	0.26	0.28	-0.14	0.67		0.3%
Cumulative	0.07	0.71	-0.23	0.37		0.1%
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	0.27	-0.15	0.77		0.4%
2018	0.41	0.17	-0.08	0.91		0.5%
Cumulative	0.24	0.26	-0.11	0.60		0.3%

[a] Values represent percentage point changes. | HHVBP Measures indicated by italic text. | CI= Confidence Interval. See Exhibit 59n (Page 141) in the Technical Appendix for each measure's sample size.

8.3.1 Modest Differences in Patient Experience with Care at Small Home Health Agencies

HHAs with fewer than 60 eligible patients are exempt from administering the HHCAHPS (HHCAHPS, 2019), leaving a gap in systematically collected data about the home health experience of beneficiaries receiving care from these "small" HHAs. Within the HHVBP Model, performance scores for small agencies in HHVBP states do not reflect patient experience such that there is no means to monitor patient experience at small HHAs or assess the potential impact of the model with publicly available

data. Therefore, to capture a fuller picture of care and enhance our analysis of beneficiary experience under the HHVBP, we fielded the 34-item HHCAHPS survey to beneficiaries who received care from a small HHA in 2018 ("small HHA HHCAHPS"), the third performance year of the model.

Among the 16,969 surveys administered, 4,068 were complete and therefore able to be used in our analyses.[17] There were differences in some of the underlying beneficiary characteristics between the 716 HHVBP patients and 3,352 non-HHVBP patients that completed the small HHA HHCAHPS survey (Exhibit 60). Relative to patients in non-HHVBP states, patients in HHVBP states were more likely to be older and white and less likely to be dual eligible. The characteristics of small agencies providing care were similar for patients in HHVBP and non-HHVBP states.

Exhibit 60. Beneficiary and Agency Characteristics of Small HHA HHCAHPS Survey Respondents in 2018, All HHVBP States and Non-HHVBP States

Beneficiary and HHA Characteristics	HHVBP (N=716)	Non-HHVBP (N=3,352)
Age Categories		
% age 0-64**	17.6%	25.7%
% age 65-84	55.3%	55.1%
% age 85 and Older**	27.1%	19.2%
% Female	61.3%	64.5%
Race/Ethnicity		
Hispanic (regardless of race)**	12.9%	9.0%
Black, non-Hispanic**	12.6%	35.0%
White, non-Hispanic**	73.2%	51.1%
Other, non-Hispanic**	1.3%	4.6%
Insurance (not mutually exclusive)		
% Dual Eligible**	49.0%	62.7%
% Medicaid Only	1.4%	1.4%
% Medicare FFS	69.0%	70.6%
% Medicare Advantage**	12.7%	9.0%
% Medicaid (HMO + FFS)	26.3%	26.5%
Ownership*		
Non-profit	11.3%	9.3%
Other (for-profit or government-owned)	88.7%	90.7%
Setting		
Hospital-based	2.4%	1.9%
Freestanding	97.6%	98.1%
Chain Status**		
Affiliated	1.1%	3.4%
Not affiliated	98.9%	96.6%

** p-value ≤0.10, ** p-value ≤0.001 for difference between HHVBP and non-HHVBP.*
Exhibit reflects responses across complete HHCAHPS surveys.[17]

Measure rates reflecting patient experience at small agencies in 2018 were similar between HHVBP and non-HHVBP states for each of the HHCAHPS-based measures, with values being slightly lower in the HHVBP states across the measures (Exhibit 61). For both HHVBP and non-HHVBP groups, measure values

[17] A survey was considered to be "complete" if at least 50% of the questions were answered among HHCAHPS survey questions 1-11, 15-21, and 24-25. See Section A.3.16 (Page 81) in the Technical Appendix for more detail.

for patients receiving care from small agencies were slightly lower than the performance scores for the five HHCAHPS-based measures reported above (Exhibit 58).

Exhibit 61. Average HHCAHPS-Based Patient Experience Measures among Beneficiaries Who Receive Care from Small HHAs in 2018, All HHVBP States and Non-HHVBP States

HHCAHPS-Based Patient Experience Impact Measures among sampled beneficiaries who receive care at small HHAs in 2018	HHVBP States (N=716)	Non-HHVBP States (N=3,352)
How often the home health team gave care in a professional way	83.1%	83.7%
How well did the home health team communicate with patients	78.1%	79.6%
Did the home health team discuss medicines, pain, and home safety with patients	75.1%	82.5%
How do patients rate the overall care from the home health agency	74.0%	75.6%
Would patients recommend the home health agency to friends and family	66.4%	69.5%

Exhibit reflects responses across complete small HHA HHCAHPS surveys.[17]

We used linear regression analysis to examine the HHCAHPS-based impact measures derived from the HHCAHPS survey fielded to patients receiving care from small agencies, while accounting for the beneficiary and agency characteristics. Across the five examined measures, we did not find a pattern of large differences in patient experience with care for small agencies in HHVBP versus non-HHVBP states. For the specific care issues measure (i.e., patients who reported that their home health team discussed medicines, pain, and home safety with them), our model results indicated that beneficiaries in HHVBP states had values approximately 7.1 percentage points lower than beneficiaries in non-HHVBP states (Exhibit 62). For the communication and likely to recommend measures, we found relatively small differences that suggest slightly better patient experience at small agencies in non-HHVBP states compared to HHVBP states (corresponding to measure scores that were 2.4 percentage points lower and 3.5 percentage points lower, respectively). We found no differences between patient experience at small agencies in HHVBP and non-HHVBP states for the other two HHCAHPS-based measures.

Exhibit 62. Regression Analysis of HHCAHPS-Based Impact Measures among Beneficiaries Receiving Care from Small HHAs in HHVBP States Compared to Non-HHVBP States, 2018

HHCAHPS Measure	Estimated Coefficient for HHVBP[a]	p-value	90% CI Lower[a]	90% CI Upper[a]
How often the home health team gave care in a professional way	-0.1	0.96	-2.0	1.8
How well did the home health team communicate with patients	-2.4	0.03	-4.2	-0.6
Did the home health team discuss medicines, pain, and home safety with patients	-7.1	<0.0001	-9.0	-5.2
How do patients rate the overall care from the home health agency	-1.4	0.44	-4.4	1.6
Would patients recommend the home health agency to friends and family	-3.5	0.08	-6.7	-0.2

[a] *Values represent percentage point changes. | HHVBP Measures indicated by italic text. | CI= Confidence Interval. | Shading indicates significance at the p<0.05 level. | Exhibit reflects responses across complete small HHA HHCAHPS surveys.*[17]

8.4 Improvements in Beneficiary Access to Quality Home Health Care (Potential and Realized)

The HHVBP Model is intended to incentivize home health agencies to improve the quality of care delivered to beneficiaries. Facing altered incentives, as agencies change aspects of their operations and care delivery, it is important to observe not just whether overall quality increases but how the changes are diffused through agencies and how they affect different beneficiaries. We examined the impact of HHVBP on beneficiary access to high-quality home health care. We explored this impact by looking at changes in utilization of high-quality home health care before and after the launch of HHVBP, and whether this utilization differed between HHVBP and non-HHVBP states. We also investigated how growth in the number of higher-quality agencies versus growth in agency size has influenced changes in utilization, and which beneficiary communities are most affected.

8.4.1 Summary of Approach

Our agency-level analysis included all agencies in HHVBP and non-HHVBP states and assessed HHA quality through the Home Health Compare's Quality of Patient Care (QoPC) Star Ratings[18], ACH rates,[19] and TPS scores. Given that all measures reported in a given year reflect data from the previous year, our analysis utilized the quality measures reflective of the performance of agencies in the year in which care was delivered.[20]

We defined high quality HHAs as those with a 4- or 5-Star Rating.[21] We selected QoPC Star Ratings because they combine multiple dimensions of quality, are standardized on a national level, and are intended for making comparisons across agencies. In an alternate definition, we also examined agencies in the top third of a state's TPS scores and the top 40% of agencies with respect to low hospital admission rates.[22] We also examined TPS scores as measures of overall performance under HHVBP that determines payment changes, though they differ from Star Ratings in that they are calculated using state performance standards and are therefore not standardized on a national level.

To document any quality gains in HHVBP states after the model was launched, we examined temporal trends in utilization of high-quality agencies across a study period that spans the years preceding the model launch (2014-2015) as well as years since the HHVBP Model was implemented (2016-2017). We also looked at these trends across a number of beneficiary characteristics to assess whether any quality changes were evenly distributed to beneficiaries. Given that Florida contributes a substantial number of agencies and episodes to the overall sample—accounting for 48% of all HHVBP agencies (see Exhibit C-

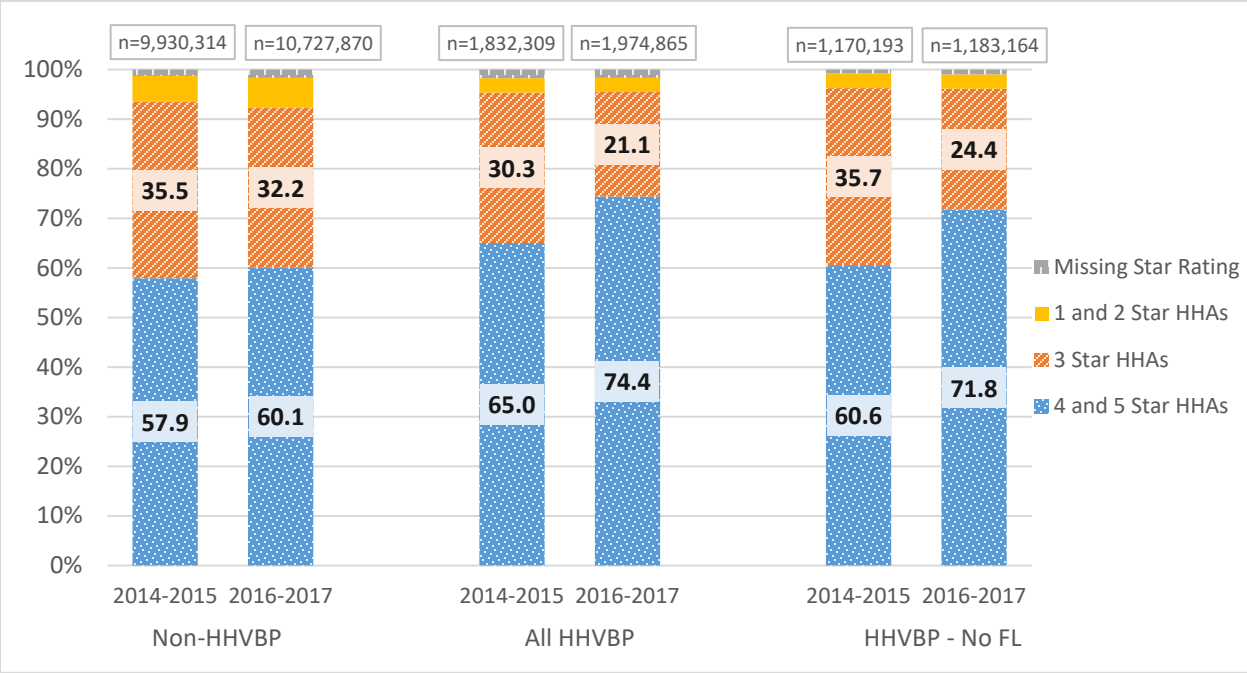
[18] These ratings can be used to assess changes over time, as the methodology on which they are based has remained essentially constant. The only change in the methodology for calculating the QoPC Star Ratings in the assessed period is the removal of the "Influenza Vaccination Ever Received" measure from the algorithm for the ratings in 2017. The effect of that change on ratings was negligible (Levitt, 2017).
[19] The risk-adjusted percentage of home health stays in which patients were admitted to an acute care hospital during the 60 days following the start of the home health stay.
[20] The only exception is ACH for 2014 and 2015. Episodes of care in 2014 were matched to the performance of the agencies between October 1, 2013 and September 30, 2014 while episodes of care in 2015 were matched to the performance of the agencies between October 1, 2014 and September 30, 2015.
[21] We rounded the Star Ratings and, therefore, the 4- or 5-star category includes ratings between 3.5 and 5.
[22] The 40% cutoff corresponds to the proportion of agencies accounted for by our definition of quality using QoPC Star Ratings. In that categorization, we included 4 of 10 (or 40% of) Star Ratings categories, roughly corresponding to ratings of 3.5, 4, 4.5, and 5 stars.

33 [Page 151] in the Technical Appendix) and 40.5% of all FFS episodes in HHVBP states in 2018 (Exhibit 9)—and a disproportionately high share of 4- and 5- star agencies, we show results for all HHVBP states with and without Florida to assess HHVBP impact, net of these dominant state characteristics.

8.4.2 Changes in Utilization of High-Quality Agencies in HHVBP and Non-HHVBP States

Across the study period, we observed increases in utilization of high-quality HHAs in both HHVBP and non-HHVBP states, although notably greater in HHVBP states. As shown in Exhibit 63, the proportion of episodes provided by agencies with 4- or 5-Star Ratings increased by 9.4 percentage points (from 65.0% to 74.4%) across all nine HHVBP states, and somewhat higher (11.2 percentage points) when Florida is excluded. This increase was much greater than the 2.2 percentage point increase (from 57.9% to 60.1%) observed in non-HHVBP states. In HHVBP and non-HHVBP states, the increase was accounted for by declines in the proportion of episodes delivered by 3-star agencies, as changes in the proportion of episodes delivered by 1- and 2-star agencies were minimal across HHVBP and non-HHVBP states.

Exhibit 63. Change in Distributions of OASIS Home Health Episodes by Agency Star Rating Category, 2014-2015 to 2016-2017



8.4.3 Changes in the Number of High-Quality Agencies versus Changes in Agency Average Size

To understand whether additional high-quality agencies or increased capacity at higher quality agencies was driving this change, we examined temporal changes in agency size and episode distributions by Star Rating, as shown in Exhibit 64. In non-HHVBP states, we observed a slight decline (1.6%) in the number of 4- and 5-star agencies from 2014-2015 to 2016-2017, accompanied by a substantial increase (15.9%) in the average number of episodes per high-quality agency. Similarly, episode volume in high-quality agencies outstripped the change in the number of agencies in HHVBP states, though the magnitude of change was greater compared to the non-HHVBP states. We observed a small increase in the number of 4- and 5-star agencies (3.7%) and an even larger increase in the average number of episodes per high-quality agency (21.8%). When Florida was removed, the remaining eight HHVBP states revealed a different pattern, in which increases in the number of 4- and 5-star agencies were driving the observed

increases in utilization of higher quality HHAs; the number of high-quality agencies increased by 23.2% compared to an increase in agency average size of 7.7%.

Exhibit 64. Change in Numbers and Sizes of Home Health Agencies by Star Ratings Category, 2014-2015 to 2016-2017

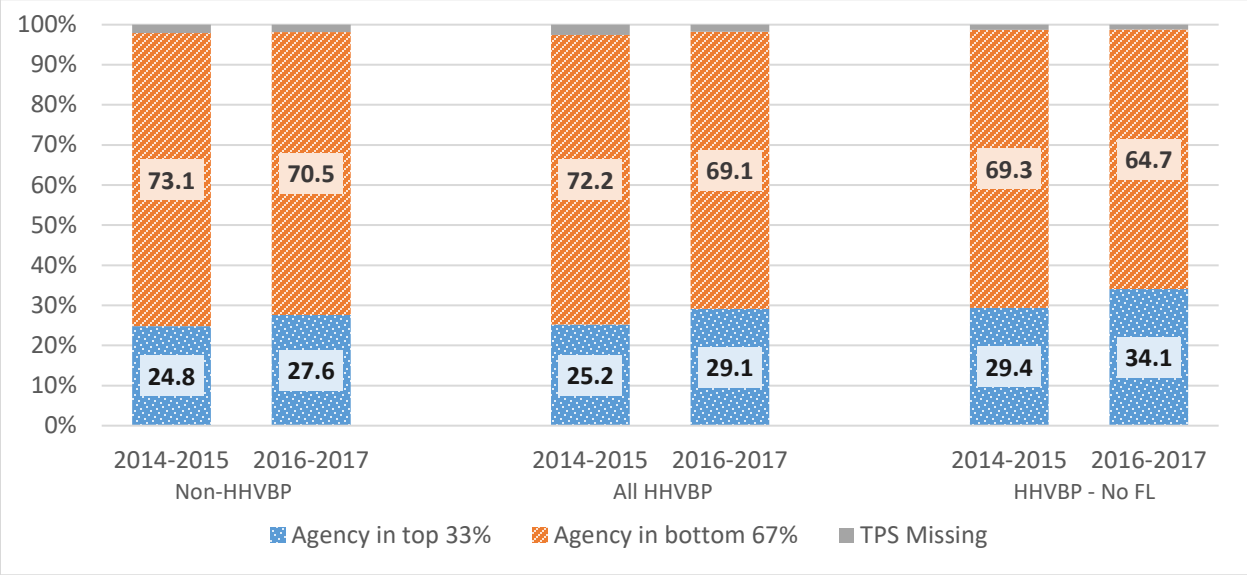
Agency Categories	Non-HHVBP			HHVBP					
	All Non-HHVBP States			All HHVBP States			HHVBP States, Excluding Florida		
	2014-2015	2016-2017	% Change	2014-2015	2016-2017	% Change	2014-2015	2016-2017	% Change
Number of Agencies									
1, 2, 3 stars or missing rating	6,694	6,420	-4.1%	1,370	1,129	-17.6%	686	624	-9.0%
4 or 5 stars	3,308	3,256	-1.6%	990	1,027	3.7%	367	452	23.2%
Average Number of Episodes per Agency									
1, 2, 3 stars or missing rating	359	381	6.0%	458	418	-8.6%	628	545	-13.2%
4 or 5 stars	772	895	15.9%	890	1084	21.8%	1,343	1,446	7.7%

8.4.4 Alternative Measures of Changes in Utilization of High-Quality Agencies, HHVBP and Non-HHVBP States

We examined two additional measures of quality—agency TPS scores and ACH rates[23]—to provide additional context to the Star Rating results. Using these measures, we still found an association between HHVBP and increases in the utilization of high-quality home health services (see Exhibit 65), though the changes were smaller than those observed in the Star Ratings analysis. With respect to TPS scores, the change between 2014-2015 and 2016-2017 in the percentage of episodes delivered in agencies in the top third of their state's ranking was slightly larger in HHVBP states than in non-HHVBP states (3.9 versus 2.8 percentage points). However, this difference was even greater when Florida was excluded from the pool of HHVBP states (4.7 percentage points).

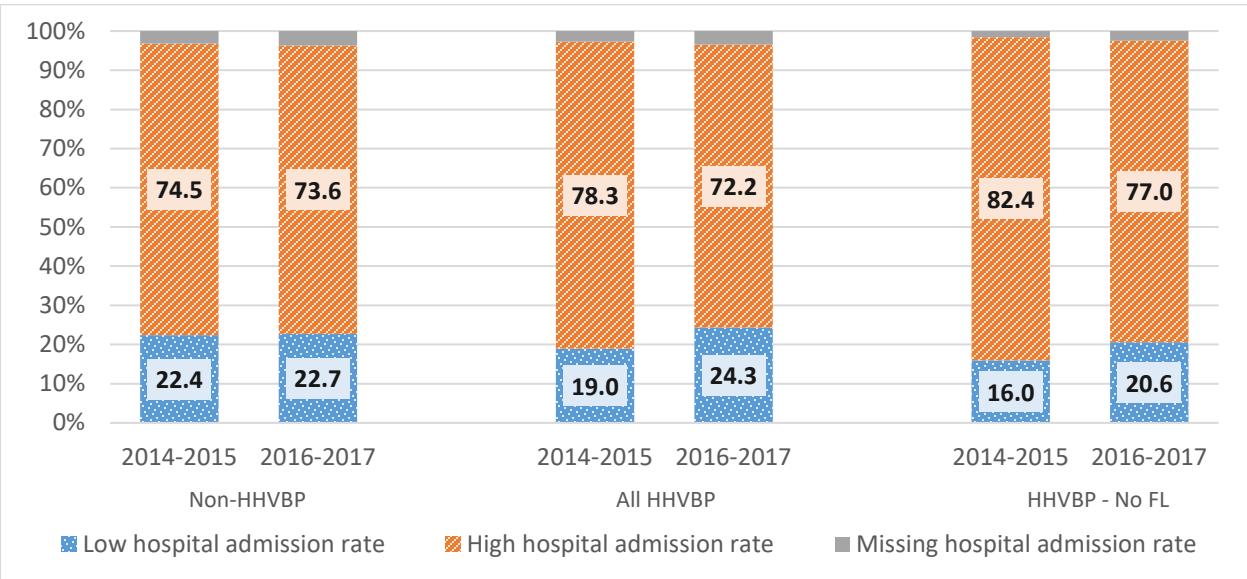
[23] AACH is the only claims-based in the QoPC Star Ratings. The other eight measures (seven in 2017) are based on OASIS assessments.

Exhibit 65. Change in Distribution of OASIS Home Health Episodes by Agency TPS Score, 2014-2015 to 2016-2017



When examining quality based on ACH admission rates, we observed a more substantial difference between HHVBP and non-HHVBP states in the share of episodes delivered by agencies with lower hospital admission rates: 5.3 versus 0.3 percentage points (Exhibit 66). In this case, the difference between the eight HHVBP states without Florida and non-HHVBP states narrowed slightly rather than widening, as observed with TPS scores and Star Ratings.

Exhibit 66. Change in Distribution of OASIS Home Health Episodes by Hospital Admission Rate, 2014-2015 to 2016-2017



8.4.5 Changes in Utilization of High-Quality Agencies by Beneficiary Characteristics

To understand whether increases in the utilization of higher quality facilities in HHVBP states accrued similarly across all home health patients, we analyzed the distribution of these episodes by selected beneficiary characteristics. This is particularly important to observe whether communities that have

historically faced quality lags were increasing in their use of higher quality agencies. Exhibit 67 presents the distribution of episodes pre- and post-HHVBP implementation by beneficiary characteristic, and documents which populations had the lowest utilization of high-quality agencies in 2014-2015 and which groups experienced the smallest and largest gains.

Exhibit 67. Changes in the Percentage of Home Health Episodes Delivered by 4- and 5-Star Rated Agencies, by Beneficiary Characteristics, 2014-2015 to 2016-2017

	Non-HHVBP			HHVBP					
	All Non-HHVBP States			All HHVBP States			HHVBP States, Excluding Florida		
	2014-2015	2016-2017	Change	2014-2015	2016-2017	Change	2014-2015	2016-2017	Change
	%	%	Ppt	%	%	Ppt	%	%	Ppt
All	57.9%	60.1%	2.2%	65.0%	74.4%	9.4%	60.6%	71.8%	11.2%
Gender									
Male	58.0%	60.0%	2.0%	65.4%	74.5%	9.1%	60.7%	71.6%	10.9%
Female	57.9%	60.3%	2.4%	64.8%	74.3%	9.5%	60.5%	71.9%	11.4%
Age group									
0 to 64 years	54.1%	56.9%	2.7%	58.5%	68.0%	9.5%	55.3%	65.8%	10.5%
65 to 84 years	58.5%	60.9%	2.4%	65.9%	75.2%	9.3%	61.5%	72.7%	11.2%
>85 years	59.6%	61.1%	1.6%	67.2%	76.6%	9.3%	62.5%	74.1%	11.5%
Race/Ethnicity									
Black	52.6%	56.3%	3.7%	60.4%	72.1%	11.7%	59.2%	72.7%	13.5%
Hispanic	42.4%	46.2%	3.8%	58.8%	57.2%	-1.6%	47.0%	55.2%	8.2%
Other	58.9%	55.9%	-3.0%	55.0%	67.4%	12.4%	51.0%	64.3%	13.4%
White	60.5%	62.5%	2.0%	66.5%	76.5%	10.0%	61.5%	72.5%	11.0%
FFS Medicare enrollment									
No	57.1%	58.2%	1.1%	56.9%	66.0%	9.1%	55.9%	67.3%	11.4%
Yes	58.4%	61.4%	3.0%	67.9%	78.1%	10.2%	62.8%	74.2%	11.4%
Medicaid enrollment									
No	58.8%	61.1%	2.2%	66.3%	76.0%	9.7%	62.0%	73.9%	11.9%
Yes	49.9%	51.1%	1.3%	50.0%	55.7%	5.7%	50.0%	56.4%	6.4%
Dual eligibility									
No	59.8%	61.4%	1.6%	66.9%	76.1%	9.2%	62.5%	73.1%	10.6%
Yes	52.8%	56.5%	3.7%	59.6%	69.0%	9.4%	54.7%	67.5%	12.7%
Beneficiary residence									
Urban	58.2%	59.9%	1.8%	65.7%	74.6%	8.9%	61.4%	72.1%	10.7%
Rural	54.6%	62.4%	7.8%	49.7%	69.1%	19.5%	47.5%	65.8%	18.3%
Prior inpatient stay (within 14 days)									
No	55.4%	58.8%	3.4%	64.4%	74.3%	9.9%	57.7%	70.7%	13.1%
Yes	59.0%	60.9%	1.9%	65.4%	74.5%	9.1%	61.6%	72.1%	10.6%
Assessed Health status in OASIS assessment*									
Better health	56.4%	58.5%	2.2%	62.9%	72.0%	9.0%	58.8%	70.3%	11.5%
Worse health	60.6%	62.9%	2.3%	68.3%	77.6%	9.3%	63.2%	73.5%	10.4%

** The health status indicator is based on the OASIS item "Overall status: Which description best fits the patient's overall status?" "Worse health" combines the response categories indicating the patient is likely to remain in fragile health or that the patient has a serious progressive condition while "Better health" combines the remaining categories. Ppt = percentage point*

Overall, different populations experienced similar benefits from the increased quality utilization in HHVBP states, with a few small but critical differences. Compared to the overall 9.4 percentage point increase in the number of episodes delivered in 4- or 5-star agencies in HHVBP states, three beneficiary groups had persistent, though mitigated, disparities.

- ***Medicaid enrollees*.** The change for Medicaid enrollees was only 5.7 percentage points; given that the initial level (2014-2015) was low relative to non-Medicaid enrollees, with only half of Medicaid enrollees' episodes in higher-rated agencies, the gap in quality utilization between the two groups increased.
- ***Hispanics*.** Compared to whites, all other racial and ethnic groups shown in Exhibit 67 had a lower rate of quality utilization in 2014-2015. For Hispanics, however, the decrease in the utilization of high-quality agencies led to an even greater disparity. This decrease in high-quality utilization was driven by changes in Florida, as can be seen by the increase of 8.2% for Hispanics when Florida is removed from the calculations.
- ***Rural residents*.** A different pattern was seen in rural and urban areas. In 2014-2015, the percentage of home health episodes delivered by high-quality agencies was substantially smaller for beneficiaries residing in rural areas compared to urban areas (49.7% vs. 65.7%), but the change over time was over twice as large for the former group, with an increase of 19.5 percentage points for rural areas versus 8.9 percentage points for urban areas. The large differential change did not close the gap, but narrowed it considerably.

While the magnitude of the changes differ, the pattern for HHVBP states did not change substantially after removing the effect of Florida (with the exception of Hispanic beneficiaries, as noted above). Additionally, dual eligible beneficiaries and Medicare Advantage enrolled beneficiaries experienced average or higher-than-average gains in quality, but still faced a sizeable disparity in utilization of high-quality home health care in 2016-2017.

8.5 Discussion

As part of the ongoing development of quality measurement and quality incentive programs, there have been growing efforts to incorporate patient perspectives on their care. This is reflected in the design of the HHVBP Model, as 5 of the original 17 performance measures included in the agency TPS score calculation reflected measures of patient experience with care based on the HHCAHPS survey. As part of our evaluation of the HHVBP Model, we used HHCAHPS survey data to examine measures of patient experience with care for both large and small HHAs.

Overall, measures of patient experience have remained relatively stable over time among beneficiaries in both HHVBP and non-HHVBP states. Based on D-in-D analyses of the survey responses of beneficiaries receiving care from HHAs with at least 60 eligible patients, there is no evidence through 2018 of an impact of HHVBP on patient experience with care. While our interviews with representatives of HHAs in HHVBP states since the implementation of the model have suggested that many agencies are making changes to improve their performance on the HHCAHPS measures, we did not observe a trend towards higher HHCAHPS measure scores for beneficiaries in HHVBP states.

Similarly, we did not find evidence of a large unintended impact of HHVBP on patient experience among small agencies. Given the small differences between HHVBP and non-HHVBP groups during the post-implementation period, there was not strong, consistent evidence of poorer patient experience at small

agencies in HHVBP states which may have resulted from the exemption of small agencies from HHCAHPS, and in turn from the HHVBP performance incentives for HHCAHPS measures.

Using multiple approaches for measuring agency quality of care that include Star Ratings, hospitalization rates, and TPS scores, we found evidence of an impact of HHVBP on beneficiary access to higher quality home health care. Our findings suggest improved access to higher quality agencies, with a greater increase over time in measured quality in HHVBP states compared to non-HHVBP states. More home health episodes were delivered by higher quality HHAs; the change is driven in large part by increased size among the higher quality agencies rather than growth in the number of high-quality HHAs. These benefits did not accrue uniformly across beneficiaries, such that disparities for some beneficiary subgroups remain.

These findings need to be viewed and the implications assessed within the broader set of findings from this evaluation. In Section 7.2.1, we showed that the percentage point change in the number of episodes shifting from *more functional* to *less functional* categories on OASIS SOC assessments over roughly the same time period was greater in HHVBP states than in non-HHVBP states. With few changes in final OASIS assessments, this contributed to an increase in Star Ratings in HHVBP states. This general trend is consistent with, and may be a partial explanation of, the increased number of HHVBP agencies with high Star Ratings between 2016 and 2018 described above. As a result, the observed growth in the use of HHVBP agencies with high Star Ratings may, in part, reflect increasing acuity among home health patients (i.e., reflecting lower levels of functioning at SOC) or potential changes in OASIS reporting, either of which may leave greater room for improvements in functioning among home health patients.

While our descriptive analysis found that utilization of high-quality home health care increased to a greater extent in HHVBP compared to non-HHVBP states, a multivariate analytic approach would confirm the findings and provide additional information on the factors contributing to variation. In further exploring changes in access to high-quality care and, in particular, the disparate effects on different population subgroups, future work will explore whether and to what extent different patient groups have differential access to high-quality home health care based on where they live and how that variation in availability affects utilization.

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

9.1 Introduction

This chapter presents our analyses that examine how agencies are responding to the HHVBP Model. We first discuss results from our primary data collection activities for the third performance year of the evaluation, which focused on three separate topics (Exhibit 68). The information collected through interviews with key informants at home health chain organizations and HHAs provide insight into agency operations. They also provide important context about broader payment and other policies that HHAs are navigating contemporaneous with HHVBP and how those policies may affect agency performance on and response to HHVBP. Findings from our interviews are not representative of all organizations, but rather, provide context for evaluation results and can inform hypotheses for future data collection activities and analyses. In addition to interview summaries, we also 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.

Exhibit 68. Overview of Interview Topics in Evaluation Year Three

Topic	Motivation	Main Research Questions
Home health chains and the potential for spillover effects of HHVBP (see Section 9.2)	In evaluating the model impact using agencies in non-HHVBP states as the comparison group, it is important to accurately assess which operational changes made by HHAs are a direct consequence of HHVBP, which are an indirect consequence (through spillover), and which are unrelated (e.g., other initiatives).	Have chain organizations made changes to operations in response to HHVBP? Are quality improvement activities that are geared toward performance under HHVBP similar across all agencies?
Agency response to changes in the weighting of claims-based TPS measures (see Section 9.3)	Starting in year four, the two claims-based TPS measures, ACH: unplanned hospitalization during first 60 days of home health (ACH measure) and ED use without hospitalization (ED measure), have been more heavily-weighted in the TPS. This adjustment to the TPS presents an opportunity to ask agencies about their reaction to the change.	What types of initiatives have agencies used to address ACH and ED rates? Had they made operational changes to affect ACH and ED rates prior to 2019? Are they planning changes due to the increased weighting of these measures? What types of efforts are they planning?
Effects of alternative payment models (APMs) on provision of home health care (see Section 9.4)	Given the array of initiatives and incentives that can directly and indirectly impact the home health market, it is important to understand drivers of HHAs' behavior/reactions in order to appropriately interpret the marginal impact of HHVBP.	What are the effects of CMS and other market/industry alternative payment models (e.g., ACOs, BPCI)) on the delivery of home health care? How might this affect HHA performance on quality and patient experience measures?

In summary, our findings from the interviews with representatives from home health chain organizations indicated that their approach to quality improvement did not vary by an agency's location in an HHVBP versus non-HHVBP state. To the extent that chain organizations engage in operational changes in response to HHVBP, this suggests some spillover of HHVBP activities in chain-affiliated agencies in non-HHVBP states, which could reduce the measured effects of the HHVBP Model relative to the comparison group.

Our interviews with HHAs in HHVBP states regarding the reweighting of the claims-based unplanned hospitalization and ED measures in the TPS suggest that agencies are responsive to CMS' changes to the

weighting. Most agencies perceived that the weighting change will negatively impact them due, in part, to their patient case-mix. Many HHVBP agencies reported reinforcing existing strategies, initiating new practices, or planning future changes in response to the changes, including patient education, frontloading visits, educating and adding staff, improving care coordination, and communicating with patients via telephone.

In our interviews with agencies in both HHVBP and non-HHVBP states regarding the effects of APMs on providing home health care, agencies reported that working with CMS payment and delivery initiatives, such as managed care plans and ACOs, presented challenges to their operations and care delivery, including restrictions on the number of visits and time-consuming authorization and appeals processes. Despite these challenges, agencies continue to work with managed care plans and ACOs in order to maintain good relationships with referrers and stay competitive in their respective markets.

9.2 Interviews with Home Health Chain Organizations Operating in Both HHVBP and Non-HHVBP states: Investigating Potential for Spillover into Non-HHVBP States

The randomized selection of nine HHVBP states and mandatory participation of all HHAs in these states provides safeguards against selection bias in the HHVBP Model. Even with this model design, however, spillover is still possible, through the regional and national ownership of many HHAs by chains that operate in both HHVBP and non-HHVBP states. The presence of chain-affiliated agencies has continued to grow in both HHVBP and non-HHVBP states, comprising 34% of agencies in HHVBP states and 22% of agencies in non-HHVBP states in 2018 (see Exhibit C-1 [Page 113] in Technical Appendix for more detail).

In an evaluation design that measures the impact of the model using agencies in non-HHVBP states as the comparison group, it is important to understand the potential for operational changes in chain agencies related to HHVBP that may be occurring in non-HHVBP states as a result of chain ownership spanning both HHVBP and non-HHVBP states. If spillover occurs (i.e., if responses to HHVBP in an intervention state improve performance in comparison states), then measurement of the performance gap between HHVBP and non-HHVBP agencies may understate the impact of HHVBP. In addition, understanding how chains approach quality improvement is a key component to understanding HHAs' responses to HHVBP. Through interviews with key corporate leaders at home health chains, we addressed the following questions:

1. Have chain organizations implemented HHVBP-specific staffing, activities, trainings, or other operational changes specifically in response to HHVBP?
2. Are changes in operations geared toward performance under HHVBP similar among chain HHAs in HHVBP and non-HHVBP states?

9.2.1 Data Collection and Analysis

This analysis was based upon the findings of 25 telephone interviews conducted from May through July 2019 with representatives from 14 large chains and 11 non-large chains. We used a chain indicator that allowed us to identify chain-affiliated agencies and to calculate the number of agencies and OASIS episodes for each agency during our study period. We selected an initial target sample of large chains by evaluating organizations in descending order of 2017 episodes, until the sample contained 15 potential interviewees. We excluded chains identified in the analytic file that were part of a hospital system or operated by a management services organization, chains operating only in one state or having no HHVBP-state presence, and chains that merged with or were acquired by another large chain. We also

selected a sample of 15 "non-large" chains, by applying the same exclusion criteria. See Section B.1 (Page 104) in the Technical Appendix for additional detail on methods for selection, outreach, data collection and analysis.

9.2.2 Results

Primary findings from the chain interviews are as follows:

- Multiple interviewees spoke of an increased focus on HHVBP metrics across all of their agencies following the introduction of HHVBP, regardless of whether the agency operated in an HHVBP state.
- Many chain executives mentioned significant overlap between HHVBP requirements and other requirements (e.g., for Star Ratings, Conditions of Participation).
- Executives from large chains said they generally applied the same approach to quality improvement throughout the organization rather than vary corporate strategies by HHVBP and non-HHVBP agency status, though some noted that their approach allowed for agency-to-agency variation in specific measure focus depending on agency performance.
- Similarly, most of the small chain organizations we interviewed did not have separate strategies for agencies in HHVBP versus non-HHVBP states, although there were some that noted that HHVBP had an effect on their operations.

We provide more detail on these findings below.

9.2.3 To what extent did chain organizations implement staffing, activities, trainings, or other operational changes in response to HHVBP?

While the approach to implementing HHVBP-oriented initiatives was typically similar to implementing other quality improvement initiatives, multiple interviewees spoke of an increased focus on HHVBP metrics across all of their agencies following the model's introduction. As one executive noted:

> *"Everybody's more engaged; we know it's the way of the future, and all that is a result of VBP."*

Chain leaders gave examples of new processes implemented in HHVBP states to improve TPS scores. For example, several interviewees mentioned initiating 'care calls' or 'tuck ins,' which are calls between visits to determine whether patients need additional information or attention before the next visit. Initially introduced in HHVBP states to reduce their rehospitalization rates, these calls were eventually rolled out to all agencies in the chains. Multiple interviewees mentioned increasing efforts to improve HHCAHPS-based measures following the introduction of HHVBP, such as sending patients a letter to encourage survey participation and training staff to use language with patients similar to that used in the surveys so that it would be familiar to them when they receive the survey. An interviewee from a large chain provided training to all agency staff around talking to patients about HHCAHPS, as well as offering in-person training and practice sessions to agency staff in HHVBP states.

The majority of chain interviewees reported that performance improvement activities were generally either initiated at the corporate level, or were made up of directives from corporate combined with regional and individual agency input. This latter combined approach allowed agencies some autonomy in setting performance goals and structuring activities to address their specific challenges while maintaining a broad framework established at the corporate level. Corporate performance goals were

then supported by standardized training materials and tools as well as data reporting, analysis, and monitoring systems. In most instances when chains developed training materials related to HHVBP, they made the training available to all of their agencies via the intranet or chain portals. Interviewees from the large chains more frequently mentioned using established infrastructure to share quality improvement and training resources than their smaller chain counterparts.

Some chain leaders reported requiring all of their agencies to have the same core set of indicators, while others allowed individual agency administrators to focus on both key corporate indicators and additional indicators of specific concern to their agency. Some chain leaders reported giving each agency administrator a menu of indicators to choose from and requiring the agency administrators to commit to achieving certain targets as part of their improvement activities. Many interviewees described working closely within regions and localities to identify specific improvement goals as well as to test innovations. If successful, they then rolled out best practices across the organization.

As heard in earlier rounds of interviews with HHAs, many chain executives mentioned the significant overlap between HHVBP requirements and the Star Ratings as well as other requirements such as those related to Conditions of Participation. One chain interviewee spoke of the overlapping metrics this way:

> *"The VBP items for the initiative are not that much different than the items that we look at for Home Health Compare and all of the other things that we're doing. Those all relate across the board… honestly, most of the stuff I've seen with HHVBP, and most of the things we see other agencies sharing, the processes being shared, we are often are already doing those things."*

Representatives from two organizations noted that they initially intended to develop HHVBP-specific strategies when the model first began, but soon realized that was not necessary because there was so much overlap with Star Ratings and their existing quality improvement efforts.

> *"I think everyone is acutely aware because the Star Ratings affect our relationships with hospitals and referral sources. I think that in all states, there is still that focus. However, it may be just a little bit more in the value-based purchasing states, because they realized that there is the financial impact. I'll be honest with you: they really focus on the Star Ratings just as much, because it does impact your relationships with referral sources."*

9.2.4 Were changes in operations geared toward quality improvement on HHVBP measures similar among chain HHAs in HHVBP and non-HHVBP states?

To understand the potential for spillover of HHA activity into agencies in non-HHVBP states, we asked interviewees about activity roll out in non-HHVBP state agencies in response to HHVBP. The executives in the 14 large chains said they generally applied the same approach to quality improvement throughout the organization and that their corporate strategies did not vary by HHVBP and non-HHVBP status, though some noted that their approach allowed for agency-to-agency variation in specific measure focus depending on agency performance. Several agency leaders noted that they first worked with staff

in HHVBP states to identify best practices before rolling out those practices and similar training to agencies in non-HHVBP states.

Some interviewees noted that all agencies, regardless of whether they were in HHVBP states, could benefit from those practices because all agencies participate in Star Ratings. Another factor influencing the organization-wide roll out of quality improvement activities is that, because quality improvement activities are often related to software or systems that are used organization-wide, organizations implement them in all agencies, not just their HHVBP agencies (see text box for additional detail on organization-wide data systems):

"We don't have a special hospitalization avoidance program just in six states. If we learn a good idea, we implement it across our entire footprint so that we try to treat everyone the same, very standardized, and we are striving for the very best outcomes across the entire country."

Among the eleven small chain organizations interviewed, most interviewees said that they did not have separate strategies for agencies in HHVBP versus non-HHVBP states. As one chain representative described it:

"We felt all along that while VBP is called a pilot program, we feel it is here to stay. We treated our non-VBP agencies like they're in the program. We might not have the same CMS data, but we use a third-party vendor that shows us where they would stand if they were in the program. We made them [non-VBP agencies] play along."

Four chain leaders from non-large chains reported that their corporate offices were not typically involved in setting goals for individual agencies or closely monitoring performance improvement activities at the local level. Three of the interviewees took a more decentralized approach and also played a compliance role within their chain. These leaders reported that their central offices could be involved in encouraging appropriate documentation and the sharing of best practices – but they do not dictate the structure of Quality Assurance and Performance Improvement (QAPI) plans or individual agency improvement strategies. Instead, planning around quality improvement within these chains reportedly occurs mostly at the local level.

Organization-wide data systems contribute to uniform approaches and roll-out of quality improvement

Many interviewees mentioned using national vendors for benchmarking and data analytics. The vendor most frequently mentioned developed HHVBP-specific reports following HHVBP's introduction and provides "real-time" data on performance across their entire organization, at each location, and at the individual clinician level. Several chain leaders with agencies in HHVBP and non-HHVBP states noted they carefully monitor how agencies in non-HHVBP states would be performing in HHVBP should the Model be expanded nationwide, while other interviewees mentioned only tracking HHVBP-specific metrics for HHVBP agencies.

Several chain executives noted an increased focus on staffing analytics and performance tracking activities since the introduction of HHVBP and a variety of other initiatives (e.g., Star Ratings, Conditions of Participation). Strategies to improve performance included starting a business intelligence unit, increasing the number of corporate QAPI staff, and creating a position for a "quality driver" who focuses on analyzing and "drilling down" on the data to identify opportunities for improvement from the top level to the individual agency level.

9.2.5 Discussion

From our interviews with representatives from large and non-large home health chain organizations, we found that both generally take a consistent approach to quality improvement throughout the organization and that their corporate strategies did not vary by HHVBP and non-HHVBP state. This suggests that, to the extent that organizations engage in operational changes in response to HHVBP, we would expect some spillover of those activities in chain agencies in non-HHVBP states. While the model has been designed to facilitate evaluation using agencies in non-HHVBP states as a comparison group for the evaluation, these interviews provide evidence that we should expect some effects of HHVBP in chain agencies in non-HHVBP states, which could reduce measured effects of the HHVBP Model relative to the comparison group.

9.3 HHA Interviews: TPS Weighting Changes to the Two HHVBP Claims-Based Measures

In the CY 2019 home health final rule, CMS announced that it would more heavily weight the two claims-based measures of the TPS effective January 1, 2019 (HHS, 2018). As discussed in Chapter 5 above, these two measures are unplanned hospitalization ("ACH measure") and ED use without hospitalization ("ED measure"). With the change, the ACH measure now contributed 26.25% of the TPS and the ED measure now contributed 8.75% of the TPS among agencies with all measure categories present (HHS, 2018; See Table 39). This reweighting presented an opportunity to study how agencies consider changing their operations in response to TPS changes and how agency performance and characteristics may affect responsiveness to reweighting of HHVBP measures.

We sought to answer the following research questions:

1. What types of initiatives have agencies used to improve their unplanned hospitalization and ED use measures or achieve low rates of use?

2. Had agencies made operational changes to affect these rates prior to 2019?
3. Are agencies planning changes given greater weight to the claims-based measures? What specific types of efforts are they planning?

Additionally, in order to contextualize our conversations, we asked respondents to discuss general background information on their HHA, their awareness and perception of the reweighting, and external factors that might impact their agency's approach to or performance on the ACH and ED measures.

9.3.1 Data Collection and Analysis

Between July and October of 2019, we conducted 53 interviews with key informants at HHAs in the nine HHVBP states. To select interview participants, we stratified all HHAs within each intervention state by three performance groups of interest: 1) high achievers, 2) high improvers, and 3) low achievers. These groups were determined based upon agencies' 2017 achievement and improvement scores on the ACH and ED measures. We defined the three groups as follows:

1. High achievers: High ACH measure or ED measure achievement (i.e., achievement score of 10 on at least one of the measures)
2. High improvers: High ACH measure or ED measure improvement (i.e., improvement score >8 on at least one of the measures; agencies with a score of 10 are high achievers and thus were excluded)
3. Low achievers: Low ACH measure or ED measure achievement (i.e., achievement score of 0 on both measures, improvement score <5 on both measures)

When analyzing the data, we identified common themes across respondents from all agencies interviewed, and also compared responses across performance categories to determine if there were any meaningful distinctions between the three groups. Additionally, we compared responses according to other agency characteristics (i.e., location type, ownership status, setting, chain status) to evaluate if there were any meaningful distinctions. See Section B.2 (Page 106) in the Technical Appendix for additional detail on methods for selection, outreach, data collection and analysis.

9.3.2 Results

Primary findings from the HHA interviews in response to the TPS weighting changes to the ACH and ED measures are as follows:

- Respondents largely reported the same types of strategies to mitigate ACH and ED use. Most commonly mentioned were patient education, frontloading visits, educating and adding staff, improving care coordination, and communicating with patients via telephone.
- Many agencies made operational changes prior to 2019 to improve ACH and ED rates.
- Many respondents reported that the weighting change had reinforced or motivated new agency strategies, or had led them to plan changes in operations going forward.
- Most respondents perceived that the weighting change would negatively impact their agencies since they viewed their patient populations as particularly susceptible to ACH and ED use due to specific clinical and social characteristics.

We provide more detail on our findings below, noting any meaningful distinctions across performance groups and agency characteristics, where applicable.

9.3.3 What Types of Initiatives have Agencies used to Improve their Unplanned Hospitalization and ED Measures or Achieve Low Rates of Use?

Overall, respondents referred to a common set of activities to prevent ACH and ED use. Most often mentioned were patient education, frontloading visits, staff education, adding staff to meet patient demand, improving care coordination, and communicating with patients via telephone. This suggests that there are certain industry-accepted practices that most agencies draw upon. Nearly all respondents reported using the same strategic approaches to reduce both ACH and ED use because they often see these measures as linked, with ED visits as a gateway to hospitalization.

Most respondents reported using resources external to their agency when developing their strategies to reduce ACH measure and ED measure rates. This includes information from state and national home health industry associations, consultants, information from CMS (e.g., HHVBP Connect, the Home Health Quality Improvement National Campaign), conferences, and webinars. Some interviewees, particularly from high achieving agencies and those affiliated with chains, also mentioned using internal resources, such as quality improvement resources that home health chain corporate offices share with local offices. Below, we provide further detail on the types of strategies that agencies use to prevent ACH and ED use.

9.3.3.1 Agencies Focus on Patient and Caregiver Education

Nearly all respondents reported a strong focus on educational outreach activities to help patients avoid going to the ED. These activities primarily focused on patient education but also included caregiver education. Respondents frequently mentioned a resource called a 'stoplight' or 'zone' tool, which provides guidelines for patients on when to call the HHA versus going to the ED. A respondent from a high achieving agency described the tool as follows:

> *"Red symptoms—they need to stop, call 911 immediately. That would be your chest pain, severe shortness of breath, bleeding they can't control. Yellow—caution items. This is when they would need to call the home health agency. And then green—they're good to go, symptom free."*

In addition, many respondents reported that their agencies used "call us first" messaging to encourage patients to call HHAs during non-emergencies and placed this messaging and the stoplight tool in places where patients can easily see them (e.g., on refrigerator magnets).

9.3.3.2 Agencies Rely on Patient Monitoring: Frontloading Visits, Communication via Telephone and Patient Self-Monitoring

Agencies reported that they monitored patients in a number of ways, including by frontloading visits, communicating with them via telephone, and encouraging patients to self-monitor. Most respondents reported that their agencies 'frontload' visits, which includes both timely initiation of care and scheduling frequent visits early in the episode of care. They see these initial days as "crucial" to help patients understand how to take their medications and learn to identify symptoms that are warning signs, and also to prevent fall risks in the home. When asked to describe frontloading, a respondent from a low achieving agency said:

"We realize that we have 48 hours to admit a patient, but we typically almost always [admit them] within 24 hours… and then we obviously try to get our therapist out there in that same timeframe… if skilled nursing is ordered, then we're trying to see them more often at first based on what their condition is… and then you can reassess as you go and maybe you spread your visits out."

In addition to in-person home visits, staff conducted remote monitoring by calling patients to check on them and may also use telehealth monitoring. Additionally, many reported that they staff telephone lines 24 hours, 7 days a week and urge patients to call them when they need help. Agencies also encouraged patients to self-monitor (e.g., check weight and blood pressure, measure abdominal or leg circumference to assess swelling).

9.3.3.3 Staffing Strategies are Important to Agencies

Agencies used a number of staffing strategies to reduce ACH and ED use, most commonly reporting that they educate and add staff. Staff education included general trainings on how to help patients avoid ACH and the ED, and specialized trainings to certify nurses as specialists (e.g., in heart failure or wound care). Agencies hired staff to meet patient demand, such as nurses, home aides, and physical therapists. Notably, one respondent from a low achieving agency found it highly effective to work with a community health worker who facilitates care for patients with social risk factors.

A number of agencies reported that they change staff roles to accommodate varying demands, such as those placed on them by quality improvement initiatives. This strategy was mentioned more frequently from non-chain agencies than chain agencies. This might reflect that non-chain agencies have fewer staff and resources dedicated to policy changes and quality improvement initiatives than chain agencies, and thus need to shift staff responsibilities to adapt to changes. As discussed above in Section 9.2, interviews with home health chain organizations suggest that chains' quality improvement activities were initiated at the corporate level and supported by a variety of resources, including training materials and data analytic tools.

9.3.3.4 Care Coordination and Care Transitions Management are Key Strategies

Many respondents mentioned care coordination, including with physicians and therapists, as a key strategy to reduce ACH and ED rates. For example, agencies worked with physicians to get standing orders for medications and visits and urged them not to send their patients unnecessarily to the ED. Some agencies encouraged patients to use other provider options, such as walk-in clinics or mobile urgent care.

Many agencies reported using care transitions management to help patients transition smoothly into and out of home health, such as by admitting patients in a timely manner and reconciling medications. When home health is no longer the best option for a patient, agencies helped them to transition to places such as hospice, SNFs, and assisted living. Staff would have conversations with patients on their patient-centered goals to determine if they may want to transition to hospice.

One reported challenge to care coordination is physician shortages in both primary care and specialty care. These shortages can elevate ACH and ED rates when patients cannot get the care that they need.

Additionally, some agencies serve areas with no urgent care facilities, making it more likely that a patient will go to the ED.

9.3.4 Had Agencies Made Operational Changes to Affect ACH and ED Rates Prior to 2019?

Many agencies indicated that they made operational changes prior to 2019 to affect ACH and ED rates. When asked to discuss if the weighting change had motivated practices and strategies to reduce ACH and ED use, approximately half of all agency staff reported that the weighting change had either reinforced existing strategies or motivated new ones. When looking across performance categories, over half of high improvers and low achievers said the change had either reinforced existing strategies or motivated new ones. Conversely, over half of high achieving agencies indicated that the weighting change had no impact. This suggests that more high achievers feel that the strategies that they had in place prior to 2019 were sufficient.

9.3.5 Are Agencies Planning Changes Given Greater Weight to the Claims-based Measures? What Specific Types of Efforts are they Planning?

Over half of interviewees reported that they were aware of the weighting changes and thus have had the opportunity to consider changing operations in response. Among those respondents who discussed if their agency had future plans, over half said that their agency planned to change their operations in response to the weighting change. Examples of future plans included plans to frontload visits with more patients, increase case conferencing, improve care coordination, and develop transitions of care plans for all patients.

A respondent from a low achieving agency did not have specific plans, but said that the weighting change might lead some agencies to decline patients who they perceive as high-risk:

> *"We all look at our patients before we accept them, and these kind of weight factors put us in a difficult position [for] a patient who has a history of non-compliance, or a history of high utilization of the hospital. You could get to the point where home health agencies maybe don't want to take the patient on."*

This comment speaks to broader concerns that an unintended consequence of the HHVBP Model could be reduced access to home health care among vulnerable patients.

A number of respondents commented that other CMS initiatives and policy changes compete for their attention and prevent them from prioritizing the ACH and ED measures. They mentioned PDGM most frequently, but also the new conditions of participation (CoPs), elimination of the Request for Anticipated Payment (RAP) reimbursement, pre-claims review from the Review Choice Demonstration, OASIS-D, and other CMS payment models (e.g., ACOs, BPCI). A respondent from a low achieving agency did not realize the weights were changing so significantly because they had turned their attention to PDGM:

> *"I think we're feeling the regulatory burden… we're trying to figure out VBP, and then we have to pivot because VBP is not as "dangerous" as PDGM. So we had to make a decision with the limited resources that we have, which area we needed to choose to focus on, and we chose PDGM…To be honest with you VBP kind of took a backseat."*

Some respondents felt confused because they see the action steps needed to meet the goals of one CMS policy as contradictory to steps needed to perform well in the HHVBP Model. For example, based on their understanding of PDGM, a low achieving agency believed that they will be subject to a LUPA if they have too few visits in a second 30-day episode and are therefore considering spreading more visits out across two 30-day episodes of care instead of continuing their current practice of frontloading. For agencies that see other policy initiatives as contradictory to practices needed to perform well in HHVBP, this can interfere with future plans to address reweighting of the ACH and ED measures.

9.3.6 Other Findings: Most Agencies Anticipate That the Weighting Changes Will Negatively Impact Them, Often due to Clinical and Social Characteristics That They Perceive Elevate Risk of ACH and ED Use among Their Patients

Among respondents who commented on the potential impact of the reweighting, most anticipated a negative effect on their agency. This was especially true for respondents from low achieving agencies, suggesting they are least confident in their ability to improve ACH and ED scores.

When asked to describe why they believed the change would have a negative impact on their operations, agency staff most frequently commented that that they serve a high-risk patient population that is at greater risk of being hospitalized or visiting the ED. They attributed this risk to clinical factors, patient age (i.e., very elderly), and, more broadly, social determinants of health.

Among the few respondents who viewed the weighting change as positive, two saw the claims-based measures as a more accurate indicator of performance than self-reported OASIS measures. This speaks to concerns that stakeholders in the home health industry have expressed in previous years—that some agencies might manipulate OASIS measures to improve their scores.

9.3.6.1 Agencies Serve Many Clinically High-risk Patients

Commonly mentioned clinical risk factors that impact ACH and ED rates were congestive heart failure, chronic obstructive pulmonary disease (COPD), diabetes, behavioral health issues, and cancer. Many interviewees felt that they were receiving more clinically severe patients because hospitals were sending more patients home prematurely than in previous years. A participant from a low achieving agency said:

> *"It honestly, a lot of times, feels like they are dumping these people on us who should be at the hospital getting more wound care or better at this or that. Sometimes it makes it very difficult to keep people from going back to the hospital because they shouldn't have come home anyway."*

Respondents attributed premature hospital releases to limitations imposed by insurance carriers on care and efforts by hospitals to reduce costs. Many respondents also felt that their agencies were being held responsible for ACH and ED outcomes among patients who would derive greater benefit from other services (e.g., palliative care, hospice).

9.3.6.2 Agencies Serve Many Patients Impacted by Social Determinants of Health

Many respondents spoke extensively about ways in which social determinants of health elevate risk of ACH and ED use among their patient populations. They most frequently discussed low-income that limit patients' ability to afford resources critical to helping them stay out of the hospital (e.g., medications, food), social isolation that leaves patients with less caregiver support, and transportation barriers that make it difficult to access care. Over half of respondents from high- and low- achieving agencies reported that social determinants of health impact patient risk, while very few high improvers mentioned this issue. Notably, high achieving agencies were still able to perform well, even though social determinants of health impact many patients. This might suggest that they have identified strategies effective in the vulnerable populations they serve, or that there were other factors that facilitated their success.

Many respondents from agencies serving rural locations spoke about the ways in which poverty, social isolation, and transportation barriers intertwine in rural areas that escalate the risk of ACH and ED use (see text box for related quantitative analyses). For example, one respondent from a high achieving agency who serves many rural patients noted that the patients with the highest ACH and ED rates are those without strong social support networks and who live in the most remote areas. Another respondent from a low achieving agency described how the long distances between patients and providers in rural areas, compounded by financial barriers, make it difficult to access care:

Data integration: confirming HHAs' perceptions of high ACH and ED risk among rural patients
Using 2018 measure rates, we found that the average ED rate was significantly higher among HHVBP agencies with a larger share of rural patients compared to HHVBP agencies with a smaller share of rural patients (14.1% vs. 12.2%, respectively). We did not find a difference in ACH rates between the two groups. See Section C.9 (Page 149) in the Technical Appendix for further detail.

> *"We find that those patients often times… will skip doctor's appointments because they don't want to make the drive or they can't afford… the gas money to make the drive and so their conditions worsen. They don't actually go anywhere until they call 911 and have an ambulance take them to the hospital. So it does impact us probably more so than some places that are not as rural."*

9.3.6.3 Agency Characteristics May Also Affect Patient Severity

Respondents from not-for-profit and hospital-based agencies more frequently reported having high-risk patients, as compared to their for-profit and freestanding counterparts.[24] As noted above, agencies referred to several primary factors that influence patient risk – including clinical conditions, advanced age, and social determinants of health – that can contribute to poor health outcomes. A number of agencies that were both hospital-based and non-profit explained that they take on more high-risk patients due to their status (e.g., from the hospital's cancer center) and cannot "cherry-pick" patients with lower acuity (see text box for related quantitative analyses).

> *Data integration: Confirming HHAs' perceptions of severity of patient case-mix*
> Using two measures of case-mix (HCC scores and percent of patients with poor overall health status), we found that hospital-based and non-profit agencies had significantly higher patient severity than freestanding and for-profit agencies. See Section C.9 (Page 149) in the Technical Appendix for additional detail, and Section 3.4 above for related analyses on HCC scores and poor overall health status.

9.3.7 Discussion

Our interviews indicate that agencies were responsive to the reweighting of the acute care hospitalization and ED measures, particularly if they were in the low achievement or high improvement performance categories. The weighting changes have led many agencies to reinforce existing strategies, develop new strategies, and consider changes going forward to prevent unplanned hospitalization and ED use. For the most part, agencies used a common set of strategies in their efforts. Most respondents perceived that the weighting change would negatively impact their agency. Many attributed this to high percentages of patients with clinical, demographic, and social characteristics that elevated their risk of unplanned hospitalizations and ED use. Based on these agency interviews, we have identified several topics to continue exploring or potentially add to our evaluation. These include examining unintended consequences of the HHVBP Model among vulnerable populations and identifying effective strategies that might enable agencies to reduce unplanned hospitalizations and ED use in vulnerable populations.

9.4 HHA Interviews: Alternative Payment Models

9.4.1 Impact of APMs/MA on Home Health Delivery

Many external factors can impact HHA operations and, in turn, home health care delivery. Learning about the managed care and APM environment in which agencies operate is important in order to better understand the multiplicity of factors that drive agency behavior and to appropriately interpret the marginal impact of HHVBP. We investigated the role of APMs and their associated influence on agency operations by conducting interviews with key HHA staff to address the following research questions:

1. What are the effects of CMS and other market/industry initiatives, particularly the BPCI initiative, CJR model, ACOs, and Medicare Advantage (MA), on the delivery of home health care?
    a. Do preferred networks and contracting arrangements provide added incentives for performance improvement activities? Do they impose additional constraints on how home health services are delivered?

[24] Since there were only four government agencies in our sample, we did not include them in this comparison.

   b. How do these initiatives affect agencies' ability to retain and expand their client bases and, relatedly, revenues?
2. How might this affect HHA performance on quality and patient experience measures?

9.4.2 Data Collection and Analysis

Between June and October 2019, we conducted 30 telephone interviews with HHAs in 12 counties with a high concentration of managed care and APM activity in HHVBP and non-HHVBP states. For selection purposes, we defined a high concentration of activity by the presence of MA plans, BPCI, CJR, and ACOs.[25] The HHAs interviewed generally had similar characteristics compared to the population of HHAs in those counties.[26] See Section B.3 (Page 110) in the Technical Appendix for additional detail on methods for selection, outreach, data collection and analysis.

9.4.3 Results

Primary findings from interviews about the impact of APMs/MA on home health care are as follows:

- Working with various payment and delivery plans presented challenges to agency operations and care delivery. Interviewees reported that these organizations often placed restrictions on the number of visits agencies can provide, required time-consuming authorization and appeals processes, and provided low reimbursement for HHA service that reduces profitability and, in some instances, the financial viability of an HHA.
- Despite these challenges and concerns many interviewees reported about their impact on outcomes, agencies continued working with managed care plans and ACOs in order to maintain good relationships with referrers and to stay competitive in their respective markets.

We found that responses to the research questions were generally similar across the counties and markets selected regardless of participation in HHVBP. Therefore, we present the findings from HHVBP states and non-HHVBP states together. We provide more detail on these and other findings below.

9.4.4 What are the Effects of CMS and Other Market/Industry Initiatives, Particularly BPCI, CJR, ACOs, and MA, on the Delivery of Home Health Care?

All of the interviewees were aware of the presence of managed care plans in their markets and most were familiar with ACOs. However, a number of interviewees were less familiar or unfamiliar with other APMs such as bundled payment arrangements. Since very few interviewees reported working with bundled payment arrangements, the majority of the findings pertain to the experiences of HHA staff working with managed care plans (Medicare managed care, and in some cases, Medicaid and commercial managed care) and ACOs. Several agencies also described working primarily with a large share of Medicaid and/or Veterans Administration patients and the challenges associated with serving those populations, including the need for additional HHA resources and behavioral health support.

Most interviewees described working with managed care plans, ACOs, and other APMs as essential to remaining viable and competitive in their markets, given the significant volume of patients covered by these payers. Due to the visit limitations and reimbursement challenges posed by some managed care

[25] The data available for the ranking includes raw counts of initiatives rather than number of participating Medicare beneficiaries.
[26] Smaller agencies were less responsive to outreach attempts, and the limited pool of agencies in certain selected counties made it difficult to select replacements of similar size.

plans, some of the interviewees expressed that their HHA was selective in developing managed care relationships and may limit the total number of managed care patients, the number of patients from a particular payer, or the clinical conditions treated. Respondents indicated that such controls were needed in order to deliver appropriate clinical care, protect finances, and maintain good performance ratings.

Numerous interviewees reported that regulators, hospitals, managed care plans, and ACOs have increasingly emphasized performance measurement in the home health industry over the last several years. This has posed challenges to agencies when managing a multitude of quality measurement and reporting requirements, while at the same time complying with multiple regulatory changes. Many interviewees noted that managing these reporting and documentation demands was both burdensome and costly. One agency's director of nursing stated it had become increasingly difficult for the agency to operate due to performance pressure from Medicare managed care plans, increased scrutiny from the state, the new Conditions of Participation, and Medicare audits. Another interviewee echoed these concerns regarding increasing challenges associated with the expectations of referring hospital providers:

> *"There is definitely a push on outcomes and those key metrics from referral sources, like hospitals and short-term rehab facilities. They continually review outcomes and rehospitalization rates and look from agency to agency. They have their preferred provider network. There is a push toward that and sort of the collaboration to avoid rehospitalizations—like sometimes looking at putting patients in short-term rehab facilities instead of back to the hospital."*

Interviewees stated that the increased emphasis by plans and ACOs on performance scores based on improvement put them at a distinct disadvantage when working with patients for whom the goal is stabilizing or maintaining current clinical and functional status, rather than improvement. Agencies that serve a large share of patients with multiple complex, chronic conditions or who are at the end of life may receive poor performance scores. MA plans', ACOs', and other APMs' emphasis on performance improvement compounds the disincentive for agencies to provide care to these complex patients.

In the following sections, we describe the relationships between agency staff and managed care plans and ACOs, the challenges associated with these relationships, and other market and regulatory pressures that impact agency operations.

9.4.4.1 Why HHAs Establish Relationships and Contract with Managed Care Plans and ACOs

Many interviewees noted that contracting with multiple managed care plans is necessary to stay competitive and maintain a sufficient referral base. Most interviewees reported working with managed care plans, though the number of plans, the nature of those relationships and the proportion of payer mix made up by managed care and APMs varies greatly.

Generally, interviewees whose agencies were part of a chain reported that contracting decisions were made at the national or corporate level and that agency-level staff were not involved in the decision-making process. Many non-chain interviewees reported choosing to contract with multiple managed

care plans that may or may not include Medicaid plans, while others tried to avoid working with any to the extent possible.

Many HHAs preferred working with plans that are more flexible and efficient in their authorization and claims payment processes. A couple of interviewees decided not to contract (or terminated contracts) with some managed care plans due to insufficient reimbursement or challenging authorization processes. Only a few interviewees reported no current managed care relationships.

9.4.5 Do Preferred Networks And Contracting Arrangements Provide Added Incentives for Performance Improvement Activities? Do They Impose Additional Constraints on How Home Health Services are Delivered?

9.4.5.1 Managed Care Plans and ACOs Magnify the Focus and Effects of Performance Ratings and Reporting

Interviewees reported that many managed care plans and APM partners have reporting and data sharing requirements. These requirements are intended to incentivize agencies to improve performance and outcomes so as to continue working with managed care plans, retain preferred provider status, and ultimately, maintain good referrer relationships. Examples of requirements included software models to monitor post-acute care (PAC) patients, score cards to report to ACOs, and Strategic Healthcare Programs (SHP) software to provide data to ACOs on patient status and agency performance which allows the ACOs to monitor individual patients as well as the agency's performance. Many interviewees also reported that Medicare managed care plans, ACOs, and health systems monitor the publicly reported Star Ratings as an indicator of the agency's performance and expect agencies to demonstrate a certain Star Rating to remain under contract or qualify as preferred providers.

9.4.5.2 Constraints Affecting Care Delivery: Visit Limitations and Authorization Processes

Numerous interviewees mentioned significant challenges when working with managed care plans and ACOs. Most interviewees who mentioned such concerns cited unrealistic visit limitations and difficult authorization processes (including delays in the start of care) as significantly and negatively impacting their agencies' care delivery and ability to help patients avoid hospitalizations. Interviewees said that, while some managed care plans have more lenient authorization processes, many payers initially only approve a small number of visits—typically three to five, depending on the plan. A few interviewees reported that some Medicare managed care plans use standardized, inflexible algorithms that do not accommodate individual patient needs or employ strict authorization processes that usually start by authorizing a small number of visits and then require agency staff to submit clinical notes and other documentation to prove that the patient needs subsequent visits. Interviewees report that such requirements sometimes disrupt the start of care and can negatively impact the course of care, including the ability to frontload visits. In addition, some managed care plans, ACOs, and APMs limit visit numbers for certain disciplines, such as therapy or nursing.

In two HHVBP states, interviewees reported that several of the ACOs use third-party PAC management companies to manage home health utilization. These PAC companies focus on cutting post-acute costs and add another layer to the authorization process, which can further decrease the number of approved visits. One interviewee described the significant strain this places on their agency:

HHA chain executives' and earlier HHA interviewees' perspectives on managed care and APMs

The findings from HHA interviews regarding their relationships with managed care plans and APMs were similar to those heard in this year's interviews with HHA chain executives and previous interviews with HHAs. Notably, in our sample of agency interviewees, chain-affiliated agencies more frequently reported being aware of and working with bundled payment arrangements than smaller, non-chain affiliated agencies.

Representatives from many chain-affiliated HHAs stated that managed care and APM limits on utilization sometimes negatively impact quality of care. Additionally, some chain leaders believed managed care plans and ACOs require agencies to provide care for higher acuity patients than were traditionally seen in a home health setting, while also imposing limits on the number of visits. One executive of a smaller chain noted:

> *"If we can't provide good quality care, our ratings and metrics go down and they [ACOs] don't refer to us as much. That's a spiral and sometimes we end up getting the really acute patients that are hard to care for."*

Another chain executive noted:

> *"The biggest challenge comes with some of the MA plans... most require prior authorization for our visits... they have put a limit on the amount of services we can provide those patients—and [we] sometimes don't exactly see how—[with MA plans] we don't have as much time with patients and we may have a harder time helping patients achieve their outcomes."*

"The authorization process is just grueling and requires so much more overhead and staffing and hours on the phone."

Multiple interviewees echoed the frustration that the process of getting authorization for visits requires significant agency staff time and effort and mentioned that clinical staff have to devote substantial time to the authorization process and provide associated documentation, which results in decreased time spent delivering services to patients.

Interviewees also reported feeling particularly constrained when caring for patients with degenerative conditions, or dual physical and behavioral health diagnoses due to pressures from payers to limit visits while also showing improvement. A few agencies said that they served primarily Medicaid or Veterans Administration patients with major behavioral health needs as well as patients who often lack caregiver or social support. Administrators and clinical staff from these agencies noted that visit limitations, as well as the delays in or denials of care and payment, are barriers to delivering adequate care to these patients and to remaining financially viable.

A few interviewees said they rarely experienced challenges working with managed care plans or ACOs. For example, one interviewee who has been working with managed care and Medicaid patients for many years reported that her agency had processes in place to maintain good documentation and had not experienced difficulties in obtaining authorizations.

9.4.6 How do MA and APMs affect Agencies' Ability to Retain and Expand their Client Bases and, Relatedly, Revenues?

9.4.6.1 HHAs Manage Multiple Revenue Streams While Maintaining Relationships with Referral Sources

While agencies indicated that they generally preferred Medicare FFS patients, interviewees explained that they need to satisfy referrers by accepting multiple payers and by working with challenging payers,

while also ensuring that they have a payer mix that allows them to remain financially viable, provide quality care, and maintain performance scores. Almost all interviewees reported that their agency must accept patients with managed care coverage to satisfy the needs of their referral sources and remain a preferred provider.

Interviewees describe this as a delicate balancing act. Some HHAs maintain a specific percentage of patients with Medicare FFS compared to other payer types. Others accept more managed care patients than is ideal or have stopped restricting the number of managed care referrals in order to accommodate the needs of their referrers and to maintain preferred relationships. Several interviewees expressed that they must take all patients with managed care or risk losing key referral sources altogether.

Aside from factors directly related to payment, interviewees indicated that caring for patients with certain payer types, diagnoses, or other patient characteristics impact the agency's Star Rating, which, as discussed above, is an important factor for referral sources. This is, therefore, a consideration when determining which patients to accept. One interviewee stated:

> *"We are looking, basically, at the type of the referrals we get in to see if they are appropriate for the services that we offer and if these are going to be effective referrals that we can show some improvement on. We do keep track of that quite a bit to make sure we are the appropriate agency to deal with whatever we're getting… because all of that affects our Star Ratings and we're trying to make sure that we are able to show improvement."*

Some interviewees cited high-acuity patients and patients who require daily visits as specific examples of referrals that they will not accept. Others will not take some patients based on behavioral characteristics or without sufficient caregiver support. Agencies wish to ensure appropriate care and avoid any negative impact on agency performance. In one illustrative case, an HHA leader shared that her agency refuses to take managed care patients who require total wound care because the payments provided do not cover the cost of providing care. These comments echo similar concerns that we heard during our interviews with HHAs about the TPS reweighting who said that the greater weight for the ACH and ED measures in the TPS might disincentivize care for vulnerable populations (see Section 9.3).

9.4.6.2 Working with Managed Care Plans Presents Financial Challenges for HHAs

The reimbursement practices of managed care plans pose a challenge to HHAs. HHAs reported revenue and cash flow impacts from delays and denials in payment and payments that reportedly do not cover the costs of services. Several interviewees mentioned that it may take months for managed care plans to reimburse them. Others noted that managed care plans slow claims processing by requesting documentation that requires substantial time and effort to compile. Sometimes, such requests include short submission deadlines that cannot be met by the HHA and the payment is then denied.

In addition to delays and insufficient payment amounts, several interviewees reported delivering clinically necessary services to patients but were then never reimbursed due to payment denials or a lack of authorization for visits. According to one interviewee, the significant administrative burden associated with working with managed care plans (i.e., authorization and appeal efforts) combined with the low reimbursement rates makes it difficult to work with them:

"They are more strict with authorization, plus there is a higher cost because there is extra time requesting the authorization, extra time getting on the phone and processing authorizations. It's not just that managed care pays us less but it is also more time and more costly on the back end."

When weighing whether to continue to work with managed care plans, administrators reported considering payment rates and the administrative costs of billing and appeals, the impact of visit limitations on agency performance scores, and how working with the plan would affect their relationship with referral sources. Interviewees indicated that many of the challenges posed by managed care plans and ACOs were particularly difficult to handle for smaller agencies with limited infrastructure, staff, and fewer resources to handle the increased documentation demands, authorization and reporting requirements, reduced payment rates, and delays and denials in payment.

9.4.7 How does the Presence of other Market Initiatives, Particularly BPCI, CJR, ACOs, and MA Affect Quality and Patient Experience Measures?

HHA representatives said that their agencies encounter significant challenges when working with managed care plans and ACOs that impact delivery of care. Many interviewees reported that visit limitations, authorization processes, and delayed starts of care have negatively affected patient satisfaction and performance metrics, including patient outcomes. Several interviewees reported that patient satisfaction has decreased as a result of receiving fewer visits. One interviewee noted that her agency's Star Rating dropped due to a decline in patient satisfaction, fueled in part by beneficiaries' lack of understanding about payers' requirements and authorization processes. Another interviewee emphasized similar concerns and said that the agency's staff had to spend significant time managing patient expectations regarding visit limitations set by PAC management companies and insurers:

"I get calls from consumers saying that when they switched to their MA plan, they were told they would get 35 hours of home health a week but then we get authorized for two visits. So, we could get the insurance company on the phone, the middleman [PAC management company] on the phone, and the patient on the phone, but not all together because they don't all speak the same language… so it puts us in a position where we provide five home health aide visits a week and then the MA plan reimburses us for two of the visits. And then the family is fighting saying we need more visits, then we have to appeal, and the appeal processes with the documentation and time spent on the phone, getting someone from the insurer to speak with the family—it causes a lot of havoc."

In addition to patient satisfaction, numerous interviewees reported that the decreased number of visits driven by managed care plan and ACO restrictions has negatively impacted patient outcomes and agency performance scores (or has the potential to do so). Administrators often reported having to manage the tension between payer visit limitations for individual cases with the need to achieve desired outcomes required to continue participating with an ACO or to achieve the needed Star Rating. Several interviewees also noted that some managed care plans' restrictions on the number of patient visits and delays in authorizations contribute to rehospitalizations.

While many interviewees felt that patient outcomes have worsened as managed care payers have increasingly denied visits, a few interviewees reported that, in response to these pressures, their agencies have learned to provide more efficient care without negatively impacting outcomes. Respondents also reported taking more effort to maintain outcomes, and that agencies are trying to do more with less.

9.4.8 Discussion

Interviews with home health agencies in areas of high managed care penetration indicate that working with MA plans and APMs can present challenges to HHAs' operations and care delivery. Interviewees reported that these organizations often place restrictions on the number of visits agencies can provide to each individual patient; require time-consuming authorization and appeals processes; and provide low reimbursement for service that reduces profitability and, in some instances, the financial viability of an HHA. In addition, many managed care plans and APMs require contracted HHAs to demonstrate the ability to support the plans' patient care management goals whether measured by Star Ratings, utilization monitoring, or through real-time access to agency software. A number of interviewees reported that visit limits and delays and denials in authorizations negatively affect clinical outcomes and performance scores, and reduce patient satisfaction. Some agencies serving patients with multiple, complex conditions or who are at the end of life reported that an increased focus on performance measurement and outcome improvement has made it difficult to maintain or improve quality ratings – either Star Ratings or HHVBP performance – given that the clinical objective for their patient population is stabilization rather than improvement. Despite these challenges and concerns, agencies continue to work with managed care plans and ACOs to remain viable and competitive in their marketplace. Further, participation in some or all of the alternative payment arrangements in a region supports efforts to maintain good relationships with referrers and thus allows agencies to maintain the appropriate mix of patients with different payer types which is essential to maintaining performance scores and financial stability.

9.5 HHVBP Connect

As part of our quantitative analyses, we examined the use of HHVBP Connect by HHAs in HHVBP states during the third performance year of the model (2018). HHVBP Connect is an interactive web-based platform for HHAs in HHVBP states designed to facilitate learning and collaboration on topics related to the HHVBP Model.

Overall, use of HHVBP Connect in 2018 by HHAs declined from the first two years of the model, including a lower number of unique logins and webinar participants and fewer downloads and online posts. This lower utilization may be reflective of agencies' increased familiarity with the HHVBP Model, translating to less need for technical assistance.

Content related to quality improvement activities and updates to the model continued to be the most frequently accessed (e.g., downloads and webinar participation) resources. Similar to prior years, the most frequently used HHVBP Connect resource type in 2018 was downloading resources, with 94 resources downloaded 5,942 times; this reflects a decrease in download volume from previous years (e.g., 48% and 21% fewer downloads than in 2016 and 2017, respectively). The second most frequently used HHVBP Connect resource type was attending live webinars, with 963 cumulative attendees participating in 14 different webinars; this reflects a 60% decrease from cumulative webinar attendees

in 2017. We provide further details of our analyses of HHVBP Connect in Section C.12 (Page 187) in the Technical Appendix.

9.6 HHVBP Self-Reported Measures

As part of our quantitative analyses through the third 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.[27]

In 2018, 90.2% of all agencies in HHVBP states reported both herpes zoster vaccination status of patients and whether an advance care plan was present, and 79.6% reported the influenza vaccination status of HHA personnel. Among agencies that reported influenza vaccination, all but one also reported the other two measures. As such, the agency reporting rate for all three measures was nearly the same as the rate at which agencies reported influenza vaccination (79.58%). Only 9.7% of agencies reported none of the measures. The 2018 reporting rates were slightly lower than 2017, when 83.4% of HHAs reported all three measures and 9.1% reported none of the measures. As we found in 2017, reporting rates were 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-32 [Page 150] in the Technical Appendix).

[27] 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).

10. Future Activities

This Annual Report presents findings of our evaluation for the first three performance years of the HHVBP Model. Moving forward, we will continue to address the goals and research questions identified for this evaluation (see Section 1.1). In doing so, our future evaluation activities will build on our findings from these first three years. Below, we conclude with an overview of some of the further analyses and data collection activities that are being considered and represent potential priorities for further evaluation of the impact of HHVBP.

Evaluate the effects of applying larger payment adjustments and adopting changes to the HHVBP measure set. In this report, we conducted analyses of the impact of the HHVBP Model while the initial quality incentive payments to home health agencies were in effect. For future reports that use data for CY 2019 and later years, we will assess whether the observed effects of HHVBP on quality of care, utilization, and Medicare spending intensify in response to the application of a wider range of payment adjustments (i.e., of up to +/-5% in CY 2019). We will also ascertain whether the shift in incentives towards the claims-based quality measures through adjustments to the measure weights leads to a larger impact on claims-based outcomes for Medicare FFS beneficiaries, notably forms of utilization and spending. Instead of weighting individual OASIS-based, claims-based and HHCAHPS measures equally as done in the first three performance years, the new methodology being used starting in CY 2019 weights OASIS-based and claims-based measure categories at 35% and the HHCAHPS measure category at 30% (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 and responses to HHVBP have evolved, both as the magnitude of potential payment adjustments increase over time and as agencies gain experience operating in an environment that includes quality incentive payments.

Continue to examine potential changes in the utilization of home health services and the case-mix of beneficiaries receiving home health services. While there is no strong early evidence of an overall impact of HHVBP on either the utilization of home health services among Medicare FFS beneficiaries or the case-mix of beneficiaries who receive care, there is growing potential for patient selection by agencies as the financial incentives under the model become stronger over time. In addition, interviews with HHAs during 2019 revealed concerns about the impact of the change in TPS weighting in 2020 due in part to their patient case-mix. Changes in utilization and patient case-mix are important to monitor since they may have implications for the inferences made about the impacts of HHVBP on other outcomes of interest, namely quality of care, utilization, and Medicare spending. We will continue to conduct analyses overall among HHVBP states and for individual states, and potentially also within smaller geographic areas or markets.

Expand analyses of whether agencies respond to their payment adjustments under HHVBP. Much of the evaluation of HHVBP to date was based on the experience of home health beneficiaries and agencies prior to the initial payment adjustments taking effect. As of the end of CY 2018, agencies may have been in the early stages of responding to any changes in their Medicare payments under the HH PPS based on their quality performance. We will expand the analyses presented in this report that look for evidence of a differential response from agencies with lower overall performance under HHVBP. By simulating

payment adjustments for agencies in the comparison states, we can directly assess whether there is evidence of a differential response from agencies based on the magnitude of their adjustments. In addition to examining HHVBP performance measures for evidence of differential changes over time in quality, we will also examine whether agency payment adjustments affect other outcomes of interest, such as agency closures and beneficiary access to care.

Further evaluate impacts on hospitalization and ED use to identify mediating factors. Based on the analyses presented in this report, there is no early confirmation of specific agency practices or patient subgroups that account for the reductions in unplanned hospitalizations attributed to HHVBP. We will build on the descriptive analyses of utilization measures presented in this report by developing multivariate analyses of the impact of HHVBP on types of hospitalizations (identified by primary diagnoses), types of readmissions, and agency frontloading practices that are adjusted for beneficiary and agency characteristics. In the context of the distinct patterns and trends in hospitalization and ED rates we have observed based on beneficiary APM status, we will also use multivariate analyses to assess whether APMs mediate, enhance, or attenuate the effects of HHVBP. In addition, we will explore the contrasting effects of HHVBP on unplanned hospitalizations and ED use. In particular, while we currently find increases in outpatient ED use attributable to HHVBP, we will evaluate whether these may be offset by decreases in ED use that result in hospitalization. We will also examine outpatient observation stays to test for any unintended impact that may result from incentives to reduce hospitalizations and ED use.

Expand analyses of agency frontloading practices and the impact on utilization and spending. In this report, we observe that agencies in both HHVBP and non-HHVBP states provide more skilled nursing visits on average to post-acute patients relative to non-post-acute patients or relative to the number of visits by other home health professionals. Building on these analyses, we will explore alternative definitions of frontloading that vary based on timing within the first two weeks of episodes and with respect to primary diagnoses that may benefit most from frontloaded visits. Such analyses will provide insights into both the use of this practice by agencies as a quality strategy and the degree to which the impact of HHVBP on primary outcomes, such as utilization and spending, is attributable to agencies increasing or refining their use of this practice.

Examine potential spillover effects of HHVBP into non-HHVBP states using quantitative analyses. There is potential for spillover effects of the HHVBP Model into non-HHVBP states due to the affiliation of many HHAs with regional or national chains that operate in both HHVBP and non-HHVBP states. The HHA surveys that we fielded in 2018 found evidence of similar overall quality improvement initiatives between HHAs in HHVBP and non-HHVBP states. In 2019, we learned through our interviews with representatives from home health chain organizations that their approach to quality improvement did not vary by an agency's location in an HHVBP versus non-HHVBP state. In the presence of such spillover, our analyses may understate the positive impact of HHVBP. We will conduct analyses involving subgroups of HHAs defined based on their affiliation with a chain, involving comparisons such as (1) HHVBP versus non-HHVBP HHAs affiliated with a chain that operates in both HHVBP and non-HHVBP states; or (2) non-HHVBP HHAs affiliated with a chain having a strong presence in HHVBP states versus non-HHVBP HHAs affiliated with a chain having a weak or no presence in HHVBP states.

Evaluate the impact on vulnerable populations. Just as the progressively larger quality incentive payments may lead to larger impacts that are aligned with the goals of the HHVBP Model, there is also

potential for larger unintended impacts. This includes potential risks to both access to care and quality of care for vulnerable populations for whom higher quality performance levels may be more difficult or costly to achieve. Through interviews we conducted with HHAs during 2019, some agencies expressed concern that they will be negatively impacted by the change in TPS weighting in 2020 due to having high percentages of patients with clinical, demographic, and social characteristics that increase the risk of hospitalization and ED use. We will examine potential impacts of the model on home health utilization and quality of care for vulnerable subgroups of beneficiaries, such as those who are dual eligible for Medicare and Medicaid, those with high health needs, those who reside in rural areas, and those with other social risk factors. We will also explore factors associated with hospitalization and ED use among these beneficiary subgroups and the use of potential strategies by agencies to mitigate the risks for these populations (e.g., frontloading).

Explore impacts on the use of potential substitutes for home health care. Given a degree of discretion over whether and how home health care is provided as well as the availability of alternative forms of care that may be considered as substitutes for some beneficiaries (e.g., SNF or outpatient therapy services), there is potential for home health utilization patterns to change in response to the increasing payment incentives under the model. These changing incentives for home health services may therefore have implications for service utilization in health care settings beyond home health, whether as a) potential substitutes for home health services, or b) in geographic areas with low or decreasing availability of home health services. Accordingly, it will be important to assess how utilization of both home health services and care provided in other settings change in future years of the model.

Conduct targeted analyses of impacts in individual HHVBP states. In this report, we present initial analyses of the impact observed in each of the nine HHVBP states. Our findings for some states suggest a need for further investigation. For example, there are patterns in the impact of HHVBP in Florida, which contributes disproportionately to our findings for HHVBP overall, relative to its regional comparison group that are distinct from other states, including both lower agency TPS scores and lower rates of unplanned hospitalizations. We observe these findings for a state with relatively high use of home health care that has been declining over time, and a relatively high rate of agency closures. We will conduct targeted analyses of beneficiaries and agencies in Florida to better understand the impacts observed in that state, including patterns in the reasons for hospitalizations and trends in utilization and quality by beneficiary and agency subgroups. In this report, we also identified pre-HHVBP trends in spending and utilization in Maryland that merit further analysis due to their potential implications for our findings based on a D-in-D approach. We will further explore these trends and examine changes in components of spending and reasons for hospitalizations among beneficiaries in Maryland during both the pre- and post-HHVBP periods.

11. References

Arbor Research Collaborative for Health and L&M Policy Research. (2018) First HHVBP Annual Report. The Centers for Medicare & Medicaid Services, Center for Medicare and Medicaid Innovation. Accessed from: https://innovation.cms.gov/initiatives/home-health-value-based-purchasing-model.

Arbor Research Collaborative for Health and L&M Policy Research. (2019) Second HHVBP Evaluation Annual Report. The Centers for Medicare and Medicaid Services, Center for Medicare and Medicaid Innovation. Accessed from: https://innovation.cms.gov/initiatives/home-health-value-based-purchasing-model.

CMS (Centers for Medicare and Medicaid Services). (2012) Medicare Benefit Policy Manual. Accessed from: https://www.cms.gov/Regulations-and-Guidance/Guidance/Manuals/Downloads/bp102c07.pdf.

CMS (Centers for Medicare and Medicaid Services). (2016) Home Health Value-Based Purchasing Model. Accessed from: https://innovation.cms.gov/initiatives/home-health-value-based-purchasing-model.

CMS (Centers for Medicare and Medicaid Services). (2017) OASIS-C2 Guidance Manual: Effective January 1, 2018. Accessed from: https://www.cms.gov/Medicare/Quality-Initiatives-Patient-Assessment-Instruments/HomeHealthQualityInits/Downloads/OASIS-C2-Guidance-Manual-Effective_1_1_18.pdf.

CMS (Centers for Medicare and Medicaid Services). (2018a) Home Health Star Ratings. Accessed from: https://www.cms.gov/Medicare/Quality-Initiatives-Patient-Assessment-Instruments/HomeHealthQualityInits/HHQIHomeHealthStarRatings.

CMS (Centers for Medicare and Medicaid Services). (2018b) Modifications to the Quality of Patient Care Star Rating Algorithm for Home Health Agencies. Medicare Learning Network. Accessed from: https://www.cms.gov/Medicare/Quality-Initiatives-Patient-Assessment-Instruments/HomeHealthQualityInits/Downloads/MLN-QoPC-Star-Rating_508_20180924.pdf.

CMS (Centers for Medicare and Medicaid Services). (2019) Design and Development of the Diagnosis Related Group (DRG), PBL-038. Accessed from: https://www.cms.gov/icd10m/version37-fullcode-cms/fullcode_cms/Design_and_development_of_the_Diagnosis_Related_Group_(DRGs).pdf.

HHCAHPS (Home Health Care Consumer Assessment of Healthcare Providers and Systems). (2019) About Home Health Care CAHPS Survey. Accessed from: https://homehealthcahps.org/General-Information/About-Home-Health-Care-CAHPS-Survey.

HHS (US Department of Health and Human Services), CMS (Centers for Medicare and Medicaid Services). (2015) Medicare and Medicaid Programs; CY 2016 Home Health Prospective Payment System Rate Update; Home Health Value-Based Purchasing Model; and Home Health Quality Reporting Requirements. Final Rule. *Federal Register* 80 FR 68623. 42 CFR 409, 424, 484: 68623-68719. Accessed from: https://www.federalregister.gov/documents/2015/11/05/2015-27931/medicare-and-medicaid-programs-cy-2016-home-health-prospective-payment-system-rate-update-home.

HHS (US Department of Health and Human Services), CMS (Centers for Medicare and Medicaid Services). (2016) Medicare and Medicaid Programs; CY 2017 Home Health Prospective Payment System Rate Update; Home Health Value-Based Purchasing Model; and Home Health Quality Reporting Requirements. Final Rule. *Federal Register* 81 FR 76702. 42 CFR 409, 484: 76702-76797. Accessed from: https://www.federalregister.gov/documents/2016/11/03/2016-26290/medicare-and-medicaid-programs-cy-2017-home-health-prospective-payment-system-rate-update-home.

HHS (US Department of Health and Human Services), CMS (Centers for Medicare and Medicaid Services). (2017) Medicare and Medicaid Programs; CY 2018 Home Health Prospective Payment System Rate Update and CY 2019 Case-Mix Adjustment Methodology Refinements; Home Health Value-Based Purchasing Model; and Home Health Quality Reporting Requirements. Final Rule. *Federal Register* 82 FR 51676. 42 CFR 484: 51676-51752. Accessed from: https://www.federalregister.gov/documents/2017/11/07/2017-23935/medicare-and-medicaid-programs-cy-2018-home-health-prospective-payment-system-rate-update-and-cy.

HHS (US Department of Health and Human Services), CMS (Centers for Medicare and Medicaid Services). (2018) Medicare and Medicaid Programs; CY 2019 Home Health Prospective Payment System Rate Update and CY 2020 Case-Mix Adjustment Methodology Refinements; Home Health Value-Based Purchasing Model; Home Health Quality Reporting Requirements; Home Infusion Therapy Requirements; and Training Requirements for Surveyors of National Accrediting Organizations. Final Rule. *Federal Register* 83 FR 56406. 42 CFR 409, 424, 484, 486, & 488: 56406-56638. Accessed from: https://www.federalregister.gov/documents/2018/11/13/2018-24145/medicare-and-medicaid-programs-cy-2019-home-health-prospective-payment-system-rate-update-and-cy.

HHS (US Department of Health and Human Services), CMS (Centers for Medicare and Medicaid Services). (2019) Medicare and Medicaid Programs; CY 2020 Home Health Prospective Payment System Rate Update; Home Health Value-Based Purchasing Model; Home Health Quality Reporting Requirements; and Home Infusion Therapy Requirements. Final Rule. *Federal Register* 84 FR 60478. 42 CFR 409, 414, 484, and 486: 60478-60646. Accessed from: https://www.federalregister.gov/documents/2019/11/08/2019-24026/medicare-and-medicaid-programs-cy-2020-home-health-prospective-payment-system-rate-update-home.

Levitt A, Galantowicz S, Fout B, CMS (Centers for Medicare and Medicaid Services), Abt Associates. (2017) Modifications to the Quality of Patient Care Star Rating Algorithm for Home Health Agencies. Medicare Learning Network Events. Accessed from: https://www.cms.gov/Outreach-and-Education/Outreach/NPC/Downloads/2017-10-10-HHA-Quality-Presentation.pdf.

MedPAC (Medicare Payment Advisory Commission). (2019) Home Health Care Services. Report to the Congress: Medicare Payment Policy.

Murtaugh CM, Deb P, Zhu C, Peng TR, Barrón Y, Shah S, Moore SM, Bowles KH, Kalman J, Feldman PH, Siu AL. (2017) Reducing Readmissions Among Heart Failure Patients Discharged to Home Health Care: Effectiveness of Early and Intensive Nursing Services and Early Physician Follow-Up. *Health Services Research* 52(4): 1445-1472.

Rogers J, Perlic M, Madigan E. (2007) The Effect of Frontloading Visits on Patient Outcomes. *Home Healthcare Now* 25(2): 103-109.

RTI (RTI International). (2019) Evaluation of theMaryland All-Payer Model. Volume I: Final Report. Centers for Medicare & Medicaid Services; Center for Medicare and Medicaid Innovation. Accessed from: https://downloads.cms.gov/files/md-allpayer-finalevalrpt.pdf.

Wasserstein R, Schirm A, Lazar N. (2019) Moving to a World Beyond "p < 0.05". *The American Statistician* 73(Sup1): 1-19.

Wisdom J, Creswell J. (2013) Mixed Methods: Integrating Quantitative and Qualitative Data Collection and Analysis While Studying Patient-Centered Medical Home Models. Accessed from: https://pcmh.ahrq.gov/sites/default/files/attachments/MixedMethods_032513comp.pdf.