

# Should There Be a Spell-Based Unit of Payment for Medicare Home Health?

*A report by the Urban Institute for the Medicare Payment  
Advisory Commission*

Doug Wissoker

Bowen Garrett

**Urban Institute**

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**MedPAC**

425 I Street, NW

Suite 701

Washington, DC 20001

(202) 220-3700

Fax: (202) 220-3759

[www.medpac.gov](http://www.medpac.gov)

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**September 2018**



# Should There Be a Spell-Based Unit of Payment for Medicare Home Health?

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*August 2017*

**Medicare beneficiaries who need intermittent skilled care to treat their illnesses or injuries and cannot leave their homes without considerable effort are eligible for home health care benefits. Medicare pays for home health services using a 60-day-episode unit of payment under the Home Health Prospective Payment System (HHPPS), which took effect in October 2000. Each additional 60-day episode triggers an additional provider payment, which could create an incentive for agencies to increase the number of episodes for a patient beyond what is necessary or appropriate. Unlike most Medicare services, beneficiaries do not need to make copayments or pay deductibles for home health services.**

Under the HHPPS, the number of home health episodes per user increased 19 percent, indicating that individuals are staying on service longer (MedPAC 2017). Home health services are frequently used after a hospital stay to treat an acute health condition. But home health has shifted away from being a postacute service over time. The share of patients admitted to home health directly from the community increased from 53 percent of episodes in 2002 to 68 percent in 2015 (MedPAC 2017). Though it still serves a postacute care function, the home health benefit may also serve as long-term care in many instances.

A potential alternative to the 60-day-episode unit of payment is a spell-based unit of payment that would make a single payment based on the expected cost of a spell (which may last one or more episodes) when it is initiated. A spell-based unit of payment, adjusted for patient characteristics but not spell length, would provide a strong incentive to provide shorter spells. In this report, we conduct analyses to help inform whether switching to a spell-based unit of payment would be advisable. Using

data on Medicare home spells that started in 2011 and ran potentially through the end of 2013, we describe the distribution of spell lengths and the how payments, estimated costs, and margins vary by spell length. In our analysis, a spell is defined as a series of back-to-back home health episodes that are separated by fewer than 11 days. We examine the extent to which long spells contribute to Medicare spending on home health, and whether payment system incentives appear to drive the use of long spells.

We also examine the degree to which patient factors and geography are associated with spell length. We consulted with home health experts on the factors thought to affect the provision of longer or shorter home health spells, and we examine patterns of use in our data. The stronger the associations between patient factors and spell length, the better such factors would be able to explain total costs per spell in a spell-based case mix adjustment model. Understanding which factors lead to longer or shorter spells also provides an indication of the appropriateness of patterns of use of long spells. Our main findings are as follows:

- Nearly 78 percent of spells, but 53 percent of episodes, are associated with single-episode home health spells. Ten percent of total Medicare home health payments are associated with spells lasting more than 5 episodes.
- Though both short and long spells had substantial financial profit, these spell types differed in their financial incentives. Total dollar margins for a spell generally increase with spell length, but the percent margin is higher for single-episode spells.
- Patients with longer spells are more likely to be admitted from the community and enrolled in Medicaid, and they typically use relatively few therapy visits.
- The experts we consulted cited a range of clinical, functional, and social factors thought to be associated with spell length. Patients with well-controlled conditions, conditions expected to improve quickly such as joint replacement, and the ability to perform self-care were considered likely to have shorter spells. Patients with poorly controlled or uncontrolled chronic diseases, invasive surgical procedures, dementia, severe wounds or pressure ulcers, difficulty with activities of daily living, lower socioeconomic status, less caretaker support, or a history of hospitalization were considered likely to have longer spells.
- Patient characteristics have very limited ability to predict spell length in our data. Regression models using spell length as the dependent variable and a detailed set of explanatory variables including patient medical condition, functioning status, and other characteristics (244 predictors in all) could explain only 10 to 11 percent of variation in spell length. The ability to predict cost per spell for a spell-based prospective payment system (PPS) using patient characteristics is likely to be even lower. The number of visits per episode have even less explainable variation than spell length. As a result, predictions of cost per spell—a combination of length of spell and number of visits—are expected to be worse than predictions of spell length. A spell-based unit of payment likely would have worse payment accuracy than the current 60-day-episode unit of payment.

- Because patient characteristics had limited ability to explain spell length, this analysis examined the role of geographic variation, which past research and the experts consulted for this study suggested was potentially important. To better understand how patients vary across regions, a classification and regression trees (CART) model of home health spells was developed that yielded 10 easy-to-interpret patient groups that show sensible patterns, with higher functioning associated with shorter spells and community-admitted patients and patients with difficulty breathing associated with longer spells. The model explained 6.4 percent of the variation in spell length. Mean length of spell ranges from around 31 days in the lowest group to 105 days in the highest group, but there is still considerable variation within each group.
- We find substantial geographic variability in spell length within these patient groups. Across the 10 groups, average spell length in the five states with the longest average spells was two to three times higher than the spell length for similar patients in the five states with shorter spell lengths. These findings suggest that the state a patient resides in can have a significant effect on their home health spell length, even after controlling for patient conditions.
- This study also mapped actual and expected geographic variation to identify areas with higher-than-predicted spell lengths. Even after controlling for detailed patient characteristics, we find substantial geographic variation in length of spell across states, with a strong regional pattern of inexplicably high use running through a band of south central and southern states.

A spell-based unit of payment would create a strong financial incentive to reduce spell length. The high degree of geographic variability in the use of long spells after controlling for observed patient factors may indicate substantial inefficiency in patterns of use, and a spell-based unit of payment could reduce those inefficiencies. But it would also create an incentive to further reduce spell length in areas where they are already relatively short. This suggests that a more targeted policy aimed at limiting long spells where they are a problem could be warranted, such as utilization review of long spells. Further inquiry should seek to understand the underlying reasons for long spells in high-use areas, which may be related to local labor market conditions, the supply or cost of long-term-care services, fraud and abuse, or state Medicaid policies.

## Introduction

Medicare beneficiaries who need intermittent skilled care to treat their illnesses or injuries and cannot leave their homes without considerable effort are eligible for home health care benefits. Medicare's home health care benefit began with the start of the Medicare program in 1965. In 2015, 12,346 home health agencies provided services to 3.5 million Medicare enrollees (MedPAC 2017). These services cost the Medicare program \$18.1 billion in 2015, accounting for about 5 percent of fee-for-service (FFS) spending. Nearly one in ten Medicare FFS beneficiaries (9 percent) used home health services.

Eligibility for the home health benefit has two requirements, which are intended to establish service need for the service and limit over-use. First, beneficiaries must need part-time or intermittent skilled

care to treat their illnesses or injuries. Second, beneficiaries must be unable to leave their homes without considerable effort. Medicare requires that physicians certify that home health patients meet these two conditions, and patients must remain under the care of a physician for the duration of a spell of home health use. Concerns about the adequacy of oversight led to a new Medicare requirement in 2011 that beneficiaries have a face-to-face encounter with the physician ordering home health service.

Since October 2000, when the home health prospective payment system went into effect, Medicare has paid for home health services with a 60-day-episode unit of payment. In general, agencies receive a fixed payment covering the full 60-day episode that is equal to a base rate adjusted for patient clinical conditions, functional status, and the number of therapy visits provided during the episode. If patients are certified to need additional home health services after the initial episode, a new 60-day episode begins and another payment is made to the agency for the subsequent episode(s).

Overall margins under the HHPPS were 15.6 percent in 2015, providing an incentive for agencies to serve additional patients. The majority (61 percent) of home health episodes were served by the most profitable 20 percent of agencies with overall margins of 17.6 percent. Beneficiaries do not need to make copayments or pay deductibles for home health services, as they do for most Medicare services. The lack of patient cost-sharing for this benefit means that patients do not face financial incentives to limit their use of additional home health care when it is no longer necessary.

Observers and policymakers have long questioned the appropriate role of home health in Medicare and in the delivery of care more broadly (Benjamin 1993; Fishman, Penrod, Vladeck 2003). Ensuring appropriate use has been difficult, and the benefit has a history of fraud, waste, and abuse (MedPAC 2017). Under the HHPPS, the number of episodes per user has increased by 19 percent, indicating that individuals are staying on service longer (MedPAC 2017). These long spells, with each 60-day episode triggering an additional payment, raise concerns that financial incentives may be driving care patterns. In addition, the increase in episodes per user coincides with a shift away from home health as a postacute care service. The share of 60-day episodes among individuals admitted directly from care in the community to home health—so-called community admits—has increased from 53 percent of episodes in 2002 to 68 percent in 2015 (MedPAC 2017). Though it serves a postacute care function, the home health benefit may also serve a need akin to long term care in many instances.

A potential alternative to the 60-day-episode unit of payment is a spell-based unit of payment that would make a single payment based on how long the home health spell, which may last one or more episodes, is expected to cost when it is initiated. In this project, we examine whether a spell-based unit of payment for home health services would be an improvement over the current 60-day-episode unit of payment. We study the extent to which long spells contribute to the costs of Medicare home health, whether payment system incentives drive the use of longer spells, and the degree to which patient factors or other factors are associated with spell length. Using data on home health spells starting in 2011, we describe the distribution of spell lengths and the variation of payments, estimated costs, and margins by spell length. We also examine how these measures and the number of therapy and nontherapy visits vary by spell length and episode number within spells of different lengths. Overall, we

find that both short and long spells are profitable, and that financial incentives do not encourage or discourage longer spells.

We describe findings from consultations with home health experts on the factors thought to be associated with the provision of longer or shorter home health spells. We then examine empirically how well patient characteristics explain variation in spell length and what potential factors are associated with long spells. We also examine geographic variability in spell length before and after adjusting for patient characteristics. We find that patient factors have very limited ability to explain variation in length of spell, but we observe patterns of strong regional variation in length of spell, even after controlling for patient characteristics.

## Data and Measures

The study population is all Medicare-covered home health agency spells that began in 2011, as recorded in the Home Health Datalink file. A spell is defined as a series of back-to-back episodes that are separated by fewer than 11 days. For this study, each episode must start in 2011 and can continue through the end of 2013. The data come from the 2011 through 2013 Datalink files, with spells constructed by staff at Social and Scientific Systems.

We use data from two episode-level subfiles: the home health claims file and the Outcome and Assessment Information Set (OASIS), the latter administered at the beginning of each payment episode. The claims file contains detailed information from the Standard Analytic Files and other sources about utilization, payment, and provider and beneficiary characteristics for each episode. The OASIS file contains the OASIS assessment instrument data for each home health episode, including detailed diagnoses, measures of functional status, and statuses of wounds and ulcers. In addition, we use agency-level data on costs per visit from the Healthcare Cost Report Information System (HCRIS) and individual hierarchical condition category (HCC) codes that are based on claims data from 2010.

The analytic file for this study begins with a population of 3,726,327 cases with a reported spell. Of these, 138,177 are excluded because they have a zero or missing length of spell. All the spells in our initial file can then be matched to the OASIS data using an ID placed on the file by S-3. Of these, 674,268 spells could not be matched to the HCRIS file, 6,947 spells had zero payments, and 3,901 were missing a component of costs. The resulting analysis sample had 2,902,952 spells from 6,933 agencies.

Specific analyses had smaller samples. For example, the comparison of costs and payments by episode number excluded about 18,000 spells with 13 or more episodes, for a final sample size of approximately 2.88 million spells. Multivariate regression and classification models and the maps based on them eliminated very long stays of more than 720 days, all recertification stays (because these were likely to be missing OASIS data for some predictors), and relatively few cases with missing data. The final sample sizes for such analyses were between 2.81 and 2.82 million spells.

For each spell, OASIS assessment data were based on the first episode of a spell. Measures of payments and costs were based on all episodes (up to 12) in a spell. Payments for an episode in 2012 and

2013 were adjusted to make them comparable to payments in 2011 dollars: 2012 payments were reduced by 2.45 percent and 2013 payments reduced by 2.49 percent. The adjustments account for both market basket changes and payment changes related to coding practices. Total payments for the spell are calculated as the sum of payments across episodes.

Costs for an episode were estimated by applying costs per visit for six resource types provided on the HCRIS to the reported number of visits of each type for each episode. The six resource types are physical therapy, occupational therapy, speech therapy, skilled nursing, home health aides, and medical social services. A maximum cost per visit for a labor category was set at the 95th percentile of the distribution of costs per visit across facilities; a minimum cost per visit was set at the 5th percentile; and missing costs were filled in using the median for the labor category for all facilities. Total costs for the spell are simply the sum of the costs of each episode in the spell.

## Length of Home Health Spells and Their Associated Medicare Payments

To gauge the frequency of long home health spells and place them in the context of overall use of Medicare home health services, we report the number of spells and Medicare payments by spell length in Table 1. Most spells (78 percent) last for only one episode. Almost 91 percent last no more than two episodes, and about 95 percent last no more than three episodes. There is a long tail of cases with four or more episodes, making up 5 percent of total spells. The majority (53 percent) of episodes are for patients with single-episode spells. Multi-episode spells use a disproportionate share of resources, making up 22 percent of spells but 47 percent of episodes and about 46 percent of total spending. Because mean Medicare payments per spell increase almost linearly with the number of episodes in a spell, the percentage of episodes for patients within each spell length approximates the corresponding percentage of total Medicare spending. The 5 percent of patients with spells longer than three episodes account for 18 percent of total Medicare payments. Payment policies that would discourage excessive use of long spells could substantially reduce Medicare home health spending.

TABLE 1

## Number of Home Health Spells and Medicare Payments by Spell Length in Episodes

Spell length (episodes)	Number of spells	Share of spells	Cumulative share of spells	Share of episodes	Cumulative share of episodes	Mean Medicare payment	Total Medicare payment (\$ millions)	Cumulative share of Medicare payments
1	2,245,410	77.8%	77.8%	53.4%	53.4%	\$2,775	\$6,230	53.9%
2	367,978	12.8%	90.6%	17.5%	70.9%	\$5,840	\$2,149	72.5%
3	125,436	4.3%	94.9%	8.9%	79.8%	\$8,350	\$1,047	81.5%
4	55,823	1.9%	96.9%	5.3%	85.2%	\$10,680	\$596	86.7%
5	30,082	1.0%	97.9%	3.6%	88.7%	\$12,915	\$389	90.0%
6	19,010	0.7%	98.6%	2.7%	91.4%	\$15,209	\$289	92.5%
7	12,844	0.4%	99.0%	2.1%	93.6%	\$17,231	\$221	94.4%
8	9,065	0.3%	99.3%	1.7%	95.3%	\$19,409	\$176	96.0%
9	6,710	0.2%	99.6%	1.4%	96.7%	\$21,624	\$145	97.2%
10	5,171	0.2%	99.7%	1.2%	98.0%	\$23,369	\$121	98.3%
11	4,191	0.1%	99.9%	1.1%	99.1%	\$26,010	\$109	99.2%
12	3,278	0.1%	100.0%	0.9%	100.0%	\$27,947	\$92	100.0%

Source: Urban Institute analysis for MedPAC, based on claims and OASIS data for home health spells begun in 2011.

## How Medicare Margins Vary by Spell Length

Because the episode-based home health prospective payment system provides additional revenue for additional episodes, providers may have an economic incentive to provide excessively long spells. We examine whether such incentives are present in Table 2, which reports average Medicare payments, costs, and margins for patients by spell length. In total dollars, margins increase as spell length increases. The margin for a single-episode spell is \$596, but it increases to \$729 in total for two-episode spells and to \$930 for three-episode spells, and generally continues to increase by a few hundred dollars for each additional episode thereafter.

Percent margins are highest for single-episode spells (21.5 percent), followed by two-episode spells (12.5 percent). For longer spells, percent margins vary within a narrow range from 11.1 to 9.7 percent. These declining margins suggest that it is not generally advantageous for a home health provider to extend the length of spells beyond what is necessary, but it may be advantageous in some instances. An agency that has already maximized its opportunity to serve new patients, but has additional capacity, could grow its total revenues and absolute margins by encouraging longer spells. An agency facing a relatively fixed supply of patient-care staff would be more profitable by following one single-episode-spell patient with another if there is steady demand from new patients to enter home health. In the absence of steady demand from new patients, a provider could keep its patient-care staff productive by allowing spells already in their care to continue for additional episodes, until a new patient needs care.



TABLE 2

**Medicare Payments, Estimated Costs, and Margins, by Home Health Spell Length**

Spell length	Number of spells	Mean Medicare payment	Mean estimated cost	Margin	Percent margin
1	2,245,410	\$2,775	\$2,179	\$596	21.5%
2	367,978	\$5,840	\$5,111	\$729	12.5%
3	125,436	\$8,350	\$7,419	\$930	11.1%
4	55,823	\$10,680	\$9,538	\$1,142	10.7%
5	30,082	\$12,915	\$11,547	\$1,368	10.6%
6	19,010	\$15,209	\$13,569	\$1,639	10.8%
7	12,844	\$17,231	\$15,562	\$1,669	9.7%
8	9,065	\$19,409	\$17,260	\$2,149	11.1%
9	6,710	\$21,624	\$19,443	\$2,181	10.1%
10	5,171	\$23,369	\$21,034	\$2,335	10.0%
11	4,191	\$26,010	\$23,318	\$2,692	10.4%
12	3,278	\$27,947	\$25,014	\$2,933	10.5%

Source: Urban Institute analysis for MedPAC, based on claims and OASIS data for home health spells begun in 2011.

To understand how spell length affects profitability, we look at how margins vary by episode within spells of different lengths (Table 3). In multi-episode spells, margins are not evenly distributed across episodes. Margins in the first episodes of multi-episode spells are low and range from 0.6 percent to 2.9 percent, but margins are high (ranging from about 21 to 27 percent) for the last episode of a spell regardless of spell length. Margins of episodes that are not first or last episodes of a spell are fairly uniform, ranging from 9 to 12 percent. For patients of every spell length greater than one episode, low margins in the first episode are offset by high margins in the last episode. But we do not otherwise see margin rates increasing over the course of a spell. Adding an extra episode to a spell defers the final spell that generates the higher margin, with little effect on the percent margin of the spell overall. Total margins increase with the additional episode, but at the potential opportunity cost of not having staff capacity to take on new and more profitable single-episode patients.

The findings show mixed incentives for providers to encourage longer spells. Single-episode spells are most profitable, and multi-episode spells of varying lengths have comparable margins. But the profit pattern for multi-episode spells suggests, at a minimum, that agencies will not see significant profit margins until a second or even third episode is provided (Table 3). The agency cannot simply stop a spell that needs at least two episodes after the first episode and hope to make a large profit because all the longer spells show very small profits in the first episode.

TABLE 3

## Margin Rates for Episodes, by Spell Length and Episode Number in Spell

Episode in spell	Spell length											
	1	2	3	4	5	6	7	8	9	10	11	12
1	21.5	2.9	1.8	1.2	1.1	1.7	0.6	2.3	1.5	0.6	2.1	1.4
2		27.1	11.2	10.2	9.9	10.3	9.2	10.2	10.6	8.7	10.5	10.0
3			26.1	12.0	11.5	11.6	10.7	11.4	10.8	10.1	11.4	10.2
4				25.5	11.8	11.3	10.1	11.3	10.1	9.9	10.9	9.9
5					25.4	11.7	10.0	12.0	10.3	11.4	11.3	10.2
6						24.9	10.3	11.4	10.1	10.3	9.8	10.7
7							23.9	12.0	9.9	10.1	9.8	10.8
8								24.9	11.0	11.2	10.7	11.5
9									22.9	10.7	10.7	11.2
10										24.1	10.5	11.7
11											22.1	10.7
12												24.8
<b>Total</b>	<b>21.5</b>	<b>12.5</b>	<b>11.1</b>	<b>10.7</b>	<b>10.6</b>	<b>10.8</b>	<b>9.7</b>	<b>11.1</b>	<b>10.1</b>	<b>10.0</b>	<b>10.4</b>	<b>10.5</b>

Source: Urban Institute analysis for MedPAC, based on claims and OASIS data for home health spells begun in 2011.

A review of payments and costs corresponds with the patterns for margins (Table 4). Single-episode spells have the highest margins, with the lowest costs and average number of visits. The table findings also suggest that single-episode spells are different from longer spells, with longer spells appearing to require much more resources at the start of the spell. Though the payments for multi-episode spells are higher in the first episode, the increase is not commensurate with the increase in visits and costs observed in these spells, resulting in lower margins. Visits taper down as multi-episode spells continue to second and later episodes, leading to a decrease in episode cost. Payment also falls for later episodes, but slower than cost, which results in higher margins in second or later episodes for multi-episode spells.

For example, single-episode spells consist of 14.5 total visits on average resulting in an estimated cost of \$2,179. In contrast, the first episode of two-episode spells consists of 24 visits, of which 10 are therapy visits and 14 are nontherapy visits. Accordingly, the average cost of the first episode of two-episode spells is higher. Payments are also somewhat higher, but not in proportion to costs, and this results in a lower margin for two-episode spells (2.9 percent) than for single-episode spells (21.5 percent).

The second episode of a two-episode spell has fewer visits (12.3 total visits), and both costs and payments are lower for the second episode than for the first, but payments fall by relatively less to produce a higher margin of 27.1 percent. For spells of three or more episodes, first episodes have around 25 visits, and final episodes have around 12 visits. Though it is feasible that last episodes are purposefully planned to be low-use/high-margin to compensate for low-margin first episodes, the observed patterns likely reflect a natural tapering-off in the number of visits coincident with the end of a spell.

An earlier study found that Medicare’s prospective payment system creates an incentive for home health agencies to overprovide therapy visits and substitute therapy visits for nontherapy visits (Wissoker and Garrett 2015). In Table 4, we find that the provision of therapy visits generally declines over the course of a spell in multi-episode spells. We also find that the ratio of therapy to nontherapy visits is lower for multi-episode spells than for single-episode spells and tends to decline over the course of long spells. These patterns suggest that long spells are not, on the whole, being used to take advantage of incentives in the HHPPS to favor therapy visits. Instead, it appears that patients with longer spells are the type of patients that require ongoing nursing services more than therapy services.

TABLE 4

**Medicare Payments, Estimated Costs, Margin, and Number of Visits by Spell Length and Episode Number in Spell**

Spell length	Episode in spell	Number of spells	Mean Medicare payment	Mean estimated cost	Overall margin	Total visits	Therapy visits	Nontherapy visits
1	1	2,245,410	\$2,775	\$2,179	21.5%	14.5	6.9	7.6
	Total	2,245,410	\$2,775	\$2,179	21.5%	14.5	6.9	7.6
2	1	367,978	\$3,529	\$3,425	2.9%	24.4	10.0	14.3
	2	367,978	\$2,312	\$1,686	27.1%	12.3	4.4	7.9
	Total	367,978	\$5,840	\$5,111	12.5%	36.6	14.4	22.3
3	1	125,436	\$3,431	\$3,371	1.8%	24.6	9.2	15.4
	2	125,436	\$2,793	\$2,479	11.2%	18.7	5.5	13.2
	3	125,436	\$2,126	\$1,570	26.1%	11.9	3.2	8.7
	Total	125,436	\$8,350	\$7,419	11.1%	55.1	17.9	37.3
4	1	55,823	\$3,393	\$3,351	1.2%	25.0	8.9	16.1
	2	55,823	\$2,724	\$2,447	10.2%	19.0	5.0	14.1
	3	55,823	\$2,531	\$2,226	12.0%	17.5	4.1	13.4
	4	55,823	\$2,032	\$1,514	25.5%	11.9	2.7	9.2
	Total	55,823	\$10,680	\$9,538	10.7%	73.5	20.7	52.8
5	1	30,082	\$3,378	\$3,340	1.1%	25.3	8.9	16.4
	2	30,082	\$2,695	\$2,428	9.9%	19.2	4.8	14.4
	3	30,082	\$2,477	\$2,193	11.5%	17.6	3.8	13.9
	4	30,082	\$2,425	\$2,139	11.8%	17.2	3.6	13.6
	5	30,082	\$1,940	\$1,447	25.4%	11.7	2.4	9.3
	Total	30,082	\$12,915	\$11,547	10.6%	91.0	23.5	67.5
6	1	19,010	\$3,384	\$3,328	1.7%	25.4	8.9	16.6
	2	19,010	\$2,697	\$2,420	10.3%	19.4	4.8	14.6
	3	19,010	\$2,465	\$2,179	11.6%	17.8	3.7	14.1
	4	19,010	\$2,395	\$2,123	11.3%	17.4	3.4	14.0
	5	19,010	\$2,366	\$2,090	11.7%	17.2	3.4	13.8
	6	19,010	\$1,901	\$1,428	24.9%	11.7	2.3	9.4
	Total	19,010	\$15,209	\$13,569	10.8%	109.0	26.4	82.5
7	1	12,844	\$3,333	\$3,314	0.6%	25.5	8.6	16.9
	2	12,844	\$2,645	\$2,402	9.2%	19.4	4.5	15.0
	3	12,844	\$2,422	\$2,164	10.7%	17.9	3.4	14.5
	4	12,844	\$2,372	\$2,132	10.1%	17.7	3.3	14.5
	5	12,844	\$2,320	\$2,088	10.0%	17.4	3.1	14.3
	6	12,844	\$2,284	\$2,049	10.3%	17.0	3.0	14.0
	7	12,844	\$1,856	\$1,413	23.9%	11.7	2.1	9.6
	Total	12,844	\$17,231	\$15,562	9.7%	126.6	27.8	98.8

Source: Urban Institute analysis for MedPAC, based on claims and OASIS data for home health spells begun in 2011.

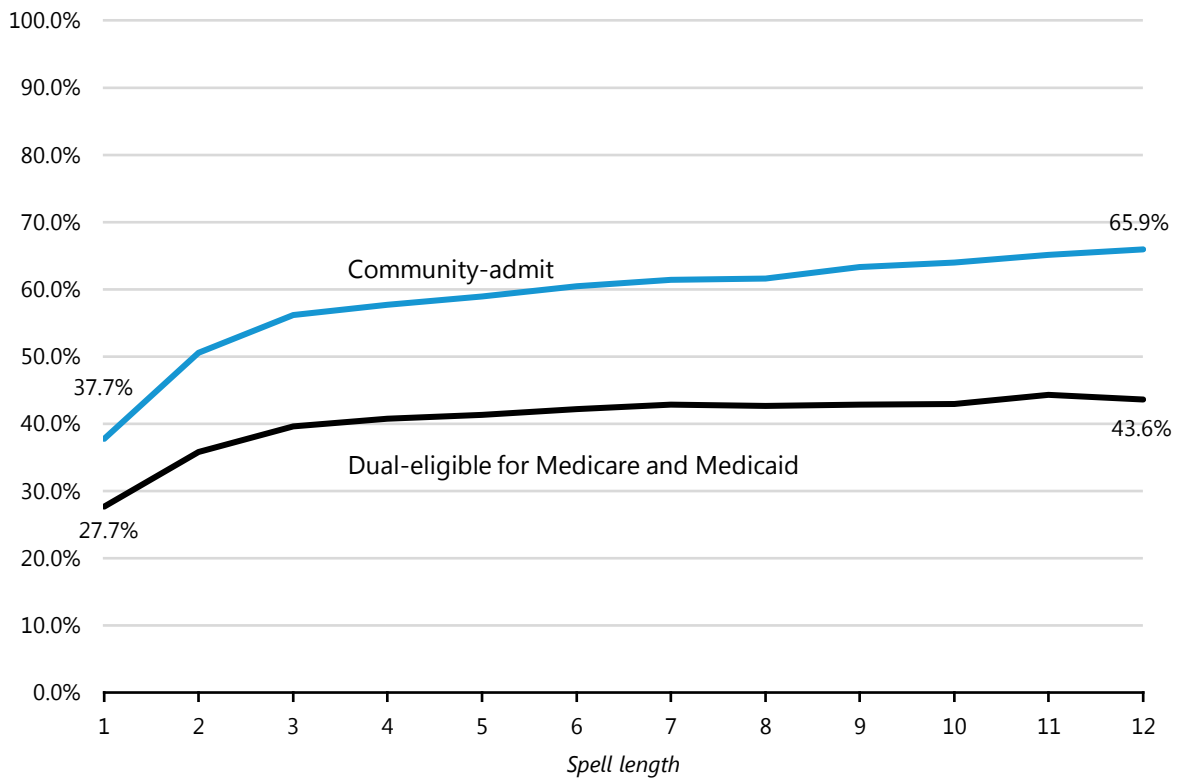
Note: Spells comprising more than 7 episodes are not shown, but patterns for spells of 8 to 12 episodes are similar to those for spells of 7 episodes.

The pattern of visits in Table 4 suggests that patients with long spells may include some patients who need long-term care services not typically covered by Medicare or who are transitioning to long-term care. And short-spell patients may disproportionately be patients who need short-term rehabilitation after hospitalization. Figure 1 examines this possibility further by plotting how the share of patients who are dual-eligible for Medicare and Medicaid and are admitted to home health directly from the community varies with spell length. Medicare does not cover long-term care services, which are largely financed by Medicaid for low-income elderly people. Among single-episode spells, 28 percent of home health patients are dual-eligible and 38 percent are community-admit patients. These percentages increase substantially as spell length increases. In spells lasting three episodes, approximately 40 percent of patients are dual-eligible and 57 percent are community-admit. These patterns suggest that long-spell patients are indeed more likely to be patients who have longer-term health needs or are transitioning to long-term care.

These findings also align with the comments of several key informants, who suggested that patients with long home health spells may include patients who are using Medicare-covered care as a bridge while they seek Medicaid coverage for long-term care.

**FIGURE 1**

**Dual-Eligible and Community-Admit Shares of Home Health Spells, by Spell Length**



Source: Urban Institute analysis for MedPAC, based on claims and OASIS data for home health spells begun in 2011.

# Consultations with Home Health Care Experts

Medicare beneficiaries served by home health care can have a range of ailments that affect the length of their home health spell. The Urban Institute and MedPAC consulted with health services researchers who have studied Medicare home health, a home health agency executive, and practicing home-care physicians to learn their views on the patient attributes that contribute to longer and shorter lengths of home health spells. The experts cited a range of clinical, functional, and social factors associated with the length of a patient's home health spell.

## Clinical Factors

In general, interview subjects reported that patients with relatively well-controlled conditions and strong self-care ability (because of patient or caregiver ability and health literacy) tended to have shorter stays, and those without these attributes were likely to have longer stays. Short-stay patients often had conditions that were expected to improve quickly (e.g., patients recovering after a joint replacement). Longer-stay patients generally had more severe clinical conditions, such as poorly controlled or uncontrolled chronic diseases, invasive surgical procedures (e.g., coronary artery bypass grafting), or neurodegenerative conditions (e.g., dementia, amyotrophic lateral sclerosis). Patients with a history of hospitalization were also considered likely to have longer stays.

Experts also cited wounds and pressure ulcers as frequent contributors to longer lengths of stay. More severe wounds, including those noted as stage 4 in the OASIS assessment, could be particularly significant; experts reported that these often increased the risk of patient morbidity and mortality.

## Functional Factors

Cognitive and physical functioning, particularly the ability to complete activities of daily living such as toileting, bathing, and walking, were also cited as important. Experts noted that the ease or difficulty with which a beneficiary could complete these actions could indicate the patient's frailty and the length of time for which they need assistance from home health care. Beneficiaries with better functioning at home health admission were generally expected to leave service sooner, and those with worse functioning could be expected to stay longer.

## Social Factors

Patients of lower socioeconomic status were frequently cited as likely to have longer stays because they may lack health literacy, caregiver support, and financial security, which can help with recovery. Some experts noted that home health care is sometimes provided as an interim solution while beneficiaries are awaiting approval for other long-term-care services, such as Medicaid's home and community-based services.

Respondents also noted that patients with longer stays frequently had a cumulative burden of several complicating factors. In practice, a patient may have one or more poorly controlled chronic

diseases, diminished cognitive function, and other factors complicating their treatment. Experts said that patients with frailty and multiple comorbidities required a higher level of clinical management and may need more time to stabilize their conditions or establish self-care abilities commensurate with their needs.

Some respondents noted that patient severity likely did not explain all the variation in home health lengths of stay, citing the geographic variation reported by MedPAC and others. Some experts said that variations in agency service patterns, in addition to patient attributes, accounted for a significant share of the variation in home health spell length. Experts noted that the amount and mix of home health care services in a given area may reflect local patterns of practice, and even agencies in the same market may provide a different amount of services to similar patients. Experts also suggested that geographic variation may be caused by market structure factors, such as agency ownership and the impact of agency supply on service use.

## How Well Do Patient Characteristics Explain Variation in Spell Length?

Understanding the relationship between patient severity and longer spells could yield a better understanding of the use of short and long spells by home health beneficiaries. Though longer spells do not appear to have better margins, the potential for inappropriate use exists as it does with any service. This appropriateness or medical necessity of a service can be challenging to determine from administrative data, but we take multiple approaches to better understand the drivers of long spells. Strong associations between spell length and measures of patient medical need and other patient characteristics in clinically sensible ways would provide evidence that additional episodes are well targeted to patients who need them. Alternatively, substantial area-level differences between actual and expected use patterns may indicate areas that need further scrutiny through research or policy reviews.

We use linear regression to estimate the relationships between spell length (in days) and a range of patient characteristics. Spells of greater than 720 days were excluded from this analysis. The patient characteristics include

- patient age;
- primary diagnosis (CCS categories);
- cognitive function (speech, confusion, behavioral problems);
- vision and hearing ability;
- HCC;
- depression;
- Medicaid status;
- Barthel score;

- stage and number of pressure ulcers;
- presence and severity of surgical wounds;
- past function (waking, transferring, self-care);
- oral medication management (current and past);
- past management of injection medications;
- need for assistance in medication, activities of daily living, and daily supervision;
- frequency of anxiety;
- difficulty breathing; and
- caretaker type.

The goal of this regression analysis is to include a detailed and extensive set of potential predictors to understand what percentage of the variation in spell length can be explained by patient factors. A detailed discussion of individual regression coefficients is outside the scope of this study. A linear regression model with 244 potential predictors (model degrees of freedom) estimated with more than 2.81 million observations had an R-squared of 10.3 percent. A Poisson regression model (generalized regression model with a log link) with the same predictor variables had a slightly higher R-squared of 10.7 percent. The detailed regression results generally indicate that greater clinical severity and frailty was associated with longer stays. Taken together, patient-level characteristics have very limited ability to explain variation in spell length.

The average length of spell (LOS) in the estimation sample was approximately 60 days, but relatively few variables in the model could independently explain a difference of 10 days or more. Primary diagnosis indicators had the largest effects. Endocrine/metabolic diseases, anemia, and mental illness had the largest positive effects, and complications of pregnancy, perinatal period conditions, and injury/poisoning had negative effects. Shortness of breath with minimal exertion (or at rest), presence of stage 3 and 4 pressure or other ulcers, and paraplegia (HCC 68) had large positive effects. Being a hospital inpatient in the past 14 days had a large negative effect, as did cystic fibrosis (HCC 107). The reported amount of therapy need was strongly associated with LOS, with higher/lower amounts corresponding to longer/shorter spells. The Barthel score, a summary measure of patient activity of daily living functioning, was also a strong predictor, with higher functioning associated with shorter spells.

Surprisingly, some factors identified as important in determining spell length from our consultations with home health experts did not have strong associations with spell length in a multivariate regression context. Cognitive functioning measures and caregiver-type measures had statistically significant effects, but they were modest in magnitude (affecting LOS by fewer than 10 days in either direction).

It is doubtful that a risk-adjustment model for a home health prospective payment system with a spell-based unit of payment, based only on patient clinical factors, would achieve an R-squared even as high as 10 to 11 percent. Our earlier work found R-squared statistics of cost per episode at around 8 percent (Wissoker and Garrett 2015). Thus, predictions of cost per spell—a combination of number of episodes and cost per episode—would be expected to predict even worse than number of episodes

would. Such a system would create very strong incentives to reduce length of spell and likely create savings to the Medicare program. Whether such a system would be desirable depends critically on whether the variation in spell length that cannot be explained by observable patient factors is clinically appropriate in some way that cannot be observed, or represents inappropriate variation or excessive use. We examine the nature of variation in spell length in more detail in the next sections.

## What Patient Factors Are Associated with Long Spells?

To better understand the top factors associated with longer stays, we estimate a classification and regression trees model. The CART procedure differs from a typical regression by searching sequentially for splits on variables in the set of potential predictors that explain the most variation in the outcome of interest. Within each split, the procedure then searches for the next split that can contribute most to the explained variance, stopping when further splitting will no longer add much additional explanatory power. The result is a set of mutually exclusive groups that are easy to understand and explain a relatively large share of the variation in length of stay.

Regression tree model results using CART that predict home health spell length were estimated using half of the full sample and are presented in Table 5. The procedure resulted in 10 patient groups based on patient characteristics. The first split grouped patients by whether they had a primary diagnosis in one of three condition groups (infectious diseases, pregnancy, injury poisoning). In many instances, the conditions underlying these groups are likely to be acute. Patients who have a condition in one of the three groups are further divided in a second split by their Barthel score, and in a third split among those with higher functioning by whether a surgical wound is present, forming CART groups 1, 2, and 3. Among patients with all other conditions, the second split is whether the patient is entering home health after a hospital stay or directly from the community. These are divided in a third split by the Barthel score, and in a fourth split among those with lower functioning by difficulty breathing, forming CART groups 4, 5, and 6. Community-admit patients are divided in a third split by whether they have difficulty breathing, and in a fourth split by condition group, forming CART groups 7, 8, 9, and 10. The condition groups are listed in panel B of Table 5.

The CART model predicts length of spell with an R-squared of 0.064, less than that for the full regression model, but the CART model captures most the predictable variation with only 10 comprehensible groups (compared with 244 variables in the regression model).



TABLE 5

Panel A. Regression Tree (CART) Model of Home Health Spell Length

CART group	Split 1	Split 2	Split 3	Split 4	N	Mean days	Median	
1	Infectious diseases, pregnancy, injury/ poisoning	Barthel ≥ 52.5	Surgical wound present		181,314	31.2	22	
2			Surgical wound not present		98,277	41.0	29	
3		Barthel < 52.5				123,368	48.3	32
4	All other conditions	Posthospital	Barthel ≥ 57.5		265,246	50.3	34	
5			Barthel < 57.5	Little or no difficulty breathing		118,049	57.8	39
6				Moderate to severe difficulty breathing		176,244	70.6	46
7			Community admit	Little or no difficulty breathing	Condition group 1		106,533	58.6
8		Condition group 2			116,177	77.0	49	
9		Moderate to severe difficulty breathing		Condition group 3		124,528	82.5	53
10				Condition group 4		100,131	105.3	57

Panel B. Definition of Condition Groups Used in CART Groups 7, 8, 9, and 10

Condition group	1	2	3	4
Neoplasms	X		X	
Endocrine/metabolic diseases		X		X
Anemia		X		X
Mental illness		X		X
Nervous system and sense organs	X		X	
Circulatory system		X		X
Respiratory system	X		X	
Digestive system	X		X	
Genitourinary system		X	X	
Diseases of the skin and subcutaneous tissue		X	X	
Musculoskeletal system and connective tissue	X		X	
Congenital anomalies		X		X
Perinatal period	X		X	
Symptoms; signs; and ill-defined conditions and factors influencing health status	X		X	
Residual codes; unclassified; all E codes	X		X	

Source: Urban Institute analysis for MedPAC, based on claims and OASIS data for home health spells begun in 2011.

We examine patient-level variation in length of spell by CART group in Table 6. The overall mean LOS across groups is 59.7 days. The mean LOS by CART group ranges from 31.2 days in CART group 1 to 105 days in CART group 10. Except for group 7, which shows a lower mean than group 6, mean LOS increases with the CART group number. The standard deviation of LOS over all spells is 77.9. The coefficient of variation, or ratio of standard deviation to mean, is 1.31 overall, which indicates considerable variation in mean LOS overall. If we look within each CART group, the coefficients of variation are lower, but only slightly. The coefficients of variation within CART groups range from 1.12 in group 10 to 1.25 in group 4. Overall and within each CART group, the median LOS is lower than the corresponding mean, which indicates that the distribution of LOS across patients is positively skewed. Ranked by median LOS, CART groups show the same rank order from low to high as when ranked by mean LOS, so the rank order is not driven by outliers. The findings in Table 6 indicate that the degree of variability of mean LOS across patients is substantial overall. The degree of variability, measured by coefficients of variation, is only modestly reduced when looking within CART group.

TABLE 6

Summary of Patient-Level Variation in Length of Stay by CART Group

CART group	Mean	SD	CV	Median	N
1	31.2	37.8	1.21	22	363,310
2	41.0	47.4	1.16	29	196,574
3	48.5	58.9	1.21	32	247,364
4	50.3	62.9	1.25	34	530,278
5	57.6	69.9	1.21	39	235,805
6	70.7	87.4	1.24	46	352,169
7	58.2	69.8	1.20	40	213,240
8	76.8	94.7	1.23	49	232,028
9	82.3	98.0	1.19	53	248,217
10	105.1	117.4	1.12	57	200,174
All	59.7	77.9	1.31	37	2,819,159

Source: CV = coefficient of variation. Urban Institute analysis for MedPAC, based on claims and OASIS data for home health spells begun in 2011.

## Variability in Length of Home Health Spells across States

Given the limited ability of patient characteristics to explain the length of home health spells, we examine what role geography plays in explaining the variability we observe. Past research has shown substantial geographic variability in the use of postacute care services (MedPAC 2011) and particularly in the use of home health (FitzGerald, Boscardin, and Ettner 2009; Kenney and Dubay 1992; Welch, Wennberg, and Welch 1996), but we are not aware of research that has focused on geographic variability in spell length. Identifying areas with actual LOS that varies substantially from predicted LOS could help focus other policy interventions. For example, Medicare could target areas with high rates of unexplained usage for additional study or targeted medical reviews.

In Table 7, we examine the relative contributions of patient factors as summarized by CART group and state factors in explaining the variation in mean length of spell within state and CART group level. We collapse the data to the state and CART group level and then estimate regression models using mean LOS as the dependent variable and alternative sets of explanatory variables. A constant-only regression model (i.e., a regression model with no explanatory variables aside from an intercept term) shows that the standard deviation of LOS is 24.7. A regression model including indicator variables for each CART group as explanatory factors explains 35 percent of the variance according to the R-squared statistic. After controlling for CART group, the standard deviation of unexplained LOS falls to 20.2 days. A regression model that controls instead for indicator variables for each state (but not CART group) obtains an R-squared of nearly 55 percent. The standard deviation of unexplained variation in this model is reduced to 17.6 days. These findings indicate that state factors are more strongly associated with LOS than the patient factors captured by the CART groups. The two sources of variability are largely independent. When CART group and state are both included in a regression as explanatory variables, R-squared increases to 89 percent (and the standard deviation of unexplained variability of LOS is reduced to 8.6 days). The marginal increase in R-squared from adding state factors to the model that controlled for CART is  $89.4 - 34.9 = 54.5$ , which is about the same as the R-squared in the state-only model. Thus, state factors are not simply picking up state-level differences in observable patient mix captured by the CART groups.

**TABLE 7**

**Share of Variation in State-by-CART-Group-Level Length of Spell Explained by State and CART Group**

<b>Explanatory factors</b>	<b>R<sup>2</sup></b>	<b>Standard deviation of unexplained variation in length of stay</b>
Constant-only model	0.000	24.7
CART group	0.349	20.2
State	0.546	17.6
CART group and state	0.894	8.6

Source: Urban Institute analysis for MedPAC, based on claims and OASIS data for home health spells begun in 2011.

Table 8 examines state-level variability in LOS in more detail by showing the mean spell length by CART group for states with the highest and lowest overall length of stay. The five states with the longest LOS are Louisiana, Mississippi, Texas, Oklahoma, and Alabama, with overall LOS ranging from 84 to 127 days. The five states with the shortest LOS are Delaware, Minnesota, South Dakota, Hawaii, and North Dakota, with overall LOS ranging from 33 to 37 days.

Within the states with the longest LOS, we find that LOS generally increases from CART group 1 to CART group 10 with increased severity. In Louisiana, the state with the highest overall LOS, mean LOS is about 55 days in group 1, 116 days in group 5, and 183 days in group 10. Averaging over the top five states, the mean LOS in group 10 (161 days) is more than three times the mean LOS in group 1 (50 days).

We also find that LOS generally increases from CART group 1 to CART group 10 with increased severity within states with the shortest LOS, but at much lower levels. In North Dakota, the state with the lowest overall LOS, mean LOS is 26.2 days in group 1, 40 days in group 5, and 50 days in group 10. Averaging over the bottom five states, the mean LOS in group 10 (48 days) is about twice that in group 1 (24 days).

Across all CART groups, the overall mean LOS in the top five states is about 110 days and in the bottom five states 35 days, a difference of nearly 75 days. Length of home health spells in the top five states is more than three times that in the bottom five states (the ratio of 3.13 is reported in the bottom section of Table 8). Part of the very large difference in mean LOS is because of state differences in the mix of patients across CART groups. An average of 58 percent of patients in the top five states are in CART groups 6 to 10, but only 28 percent of patients in the bottom five states are in those groups (patient percentages not shown in table). But even when we look within CART groups, we find that the ratios of the mean LOS in the top five states relative to the bottom five states range from 2.1 to 3.4. In other words, even for similar patients, mean LOS is two to three times higher in the states with the longest LOS than in states with the shortest LOS.

We can estimate the portion of the 75-day difference in overall LOS in the two groups of states that stems from state differences in CART-group composition by weighting up the within CART-group differences by a fixed CART-group distribution. We use the national average distribution of patient spells across CART groups shown in Table 6 for this purpose. The within CART-group differences in LOS between the longest-spell and shortest-spell states are shown in the bottom section of Table 8. When these differences are weighted by the national CART-group distribution, we find that the overall difference in LOS between the two groups of states is reduced to 63 days. This suggests that the portion of the 75-day difference attributable to patient group differences is 12 days ( $75 - 63$ ), or 16 percent of the gross difference. The remaining 84 percent of the gross difference (63 days) is unrelated to patient group.

The main implications we draw from Table 8 are the following. First, length of spell increases with patient severity, as captured by the CART groups, within both long-spell states and short-spell states. Within each state, spell length is responsive to patient need. States with the longest LOS tend to be more responsive in absolute and percentage terms. Mean LOS in group 10 is about three times that in group 1 in long-spell states, but the increase is a factor of 2 in short-spell states. Second, even when focusing on subsets of patients (within CART group) who are similar in their clinical characteristics, spell length varies widely across states. Within patient group, mean LOS in long-spell states is two or more times higher than that in short-spell states, depending on the group. The findings are inconsistent with a potential alternative scenario in which patients in the relatively low-need groups (e.g., CART group 1) receive similar levels of service across states but patients in high-need groups receive different levels of service (perhaps because of some unobserved characteristics of higher-need patients). Finally, the finding that differences in patient mix across states as captured by the CART groups can explain only a fraction (16 percent) of the overall difference between long-spell and short-spell states suggests that large system-level factors are likely responsible for the substantial state-level variation in spell length.

TABLE 8

## Mean Length of Stay by Cart Group in States with Highest and Lowest Overall LOS

CART group	1	2	3	4	5	6	7	8	9	10	All
<b>States with longest length of stay</b>											
LA	54.7	77.2	81.2	106.8	115.5	137.4	106.9	151.3	145.9	183.2	126.6
MS	52.0	70.9	90.6	100.0	110.7	130.8	99.2	137.1	137.8	170.0	117.9
TX	47.7	67.4	72.5	90.2	99.0	122.4	99.2	128.9	135.6	167.3	112.5
OK	47.2	72.5	76.6	87.1	103.6	120.9	99.0	128.6	142.9	170.2	107.1
AL	47.3	53.7	68.0	78.2	84.9	95.7	77.3	97.6	101.2	113.3	84.1
Mean	49.8	68.3	77.8	92.5	102.7	121.5	96.3	128.7	132.7	160.8	109.6
<b>States with shortest length of stay</b>											
DE	20.8	29.2	33.2	36.0	45.8	44.2	43.9	52.6	54.6	57.2	37.0
MN	24.4	31.1	33.9	34.7	43.8	42.8	39.7	52.5	48.2	49.4	36.7
SD	24.7	28.3	32.1	36.7	34.1	42.4	38.2	53.3	43.4	42.2	34.7
HI	23.0	18.7	24.4	41.7	40.5	39.2	35.8	44.3	48.0	39.5	33.8
ND	26.2	29.4	29.1	34.1	40.2	36.8	37.8	44.8	35.4	50.3	33.0
Mean	23.8	27.3	30.5	36.6	40.9	41.1	39.1	49.5	45.9	47.7	35.1
<i>Ratio of longest-stay and shortest-stay state means</i>											
	2.09	2.50	2.55	2.52	2.51	2.96	2.46	2.60	2.89	3.37	3.13
<i>Difference in longest-stay and shortest-stay state means</i>											
	25.9	41.0	47.2	55.8	61.8	80.4	57.2	79.2	86.8	113.1	74.6
<b>Overall difference adjusted for differences in CART group distributions across states</b>											
											62.6

Source: Urban Institute analysis for MedPAC, based on claims and OASIS data for home health spells begun in 2011.

## Further Findings on Geographic Variability in Home Health Length of Spell

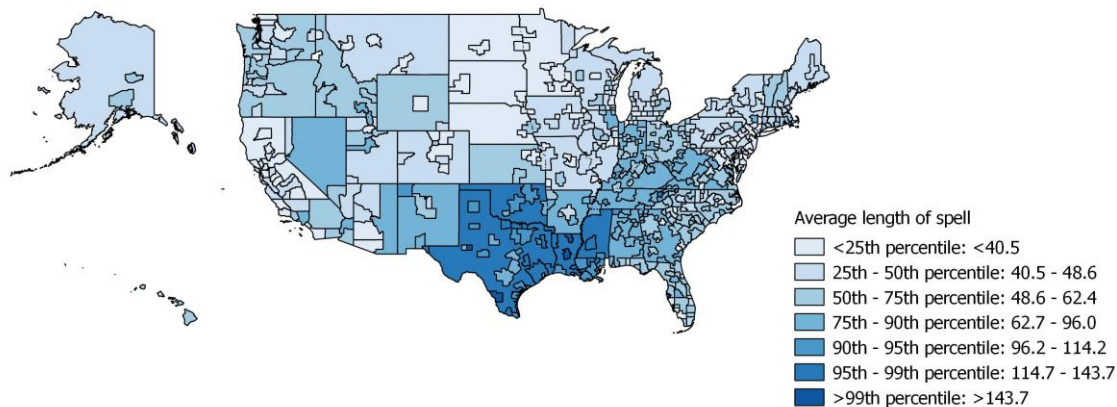
By design, the CART model creates a manageable number of comprehensible groups that maximize the model's predictability given the set of candidate variables and number of splits. Some of the geographic variability seen in Table 8 even after controlling for CART group could include variation that is predictable with observed patient measures not included in the CART model. In this section, we show that even after controlling for the 244 measures included in the full regression model, we continue to find substantial geographic variability in length of spell that cannot be explained by the extensive set of measured patient factors. We also illustrate the degree of variation in length of spell at the substate level.

The regression model includes a set of clinical covariates identified as having a statistical relationship between patient characteristics and LOS. Using this model, we can compute the expected LOS for each patient in an area. This represents how long the model would expect patients to receive home health in an area if the care patterns reflected the typical (national average) relationship between the patient characteristics and LOS. The actual LOS in the area should reflect patient severity and other factors, such as local care patterns. By comparing the expected LOS to the actual LOS for an area, we can observe whether an area's pattern of care results in spells that are longer or shorter than would be predicted based on patient characteristics.

Figure 2 maps area variation by mean length of home health spell, before adjusting for any patient characteristics, at the core-based statistical area (CBSA) level. The Office of Management and Budget defines a CBSA as a geographic area consisting of one or more counties (or equivalents) with an urban center of at least 10,000 people, along with adjacent counties that are socially or economically tied to the urban center (e.g., by commuting). For rural areas that are not part of a CBSA, we use the average length of spell for the remainder of the state that is not within a CBSA. The pattern of state-by-state variation in Table 8 is also clearly evident in the national map. A band through the south central states shows high spell lengths, denoted by darker colors. Areas with particularly low spell lengths (lighter colors) are more scattered and include north central states, northern California, and areas along the northeast coast.

**FIGURE 2**

**Geographic Variation in Length of Home Health Spells**



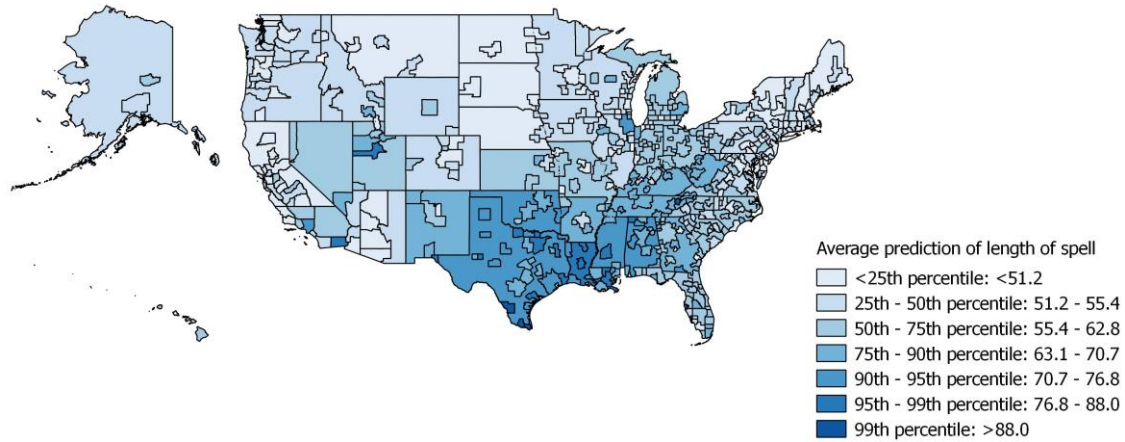
**Source:** Urban Institute analysis for MedPAC, based on claims and OASIS data for home health spells begun in 2011.

**Note:** Geographic units are CBSAs for counties that belong to a CBSA. The remaining counties within a state that are not part of a CBSA (i.e., balance of the state) are combined into one geographic unit.

In Figure 3, we map area variation in expected (predicted) length of spell, for which the expected value for each area is computed as the mean predicted value from the Poisson regression analysis. We find that areas with a high (low) actual length of spell tend to have a high (low) expected spell length based on patient characteristics. But the variation that can be explained by patient characteristics spans a much narrower range than the actual values.

FIGURE 3

Geographic Variation in Regression-Predicted Length of Home Health Spells



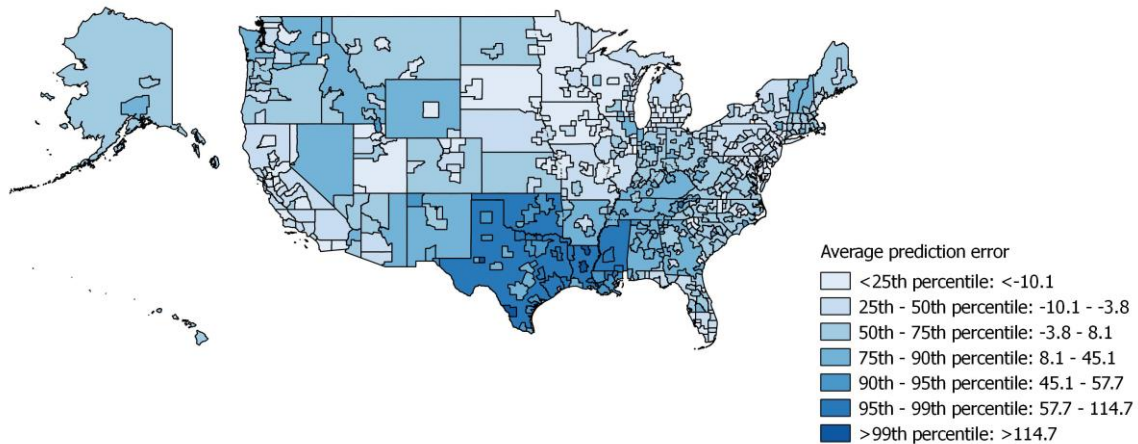
Source: Urban Institute analysis for MedPAC, based on claims and OASIS data for home health spells begun in 2011.

Note: Geographic units are CBSAs for counties that belong to a CBSA. The remaining counties within a state that are not part of a CBSA (i.e., balance of the state) are combined into one geographic unit.

The geographic variation in the unexplained (or residual) length of spell is shown in Figure 4. The value for each area is calculated as the mean prediction error from the regression analysis. The maps for total and unexplained variation in length of spell are very similar, especially in the states that stand out with very high spell length. Interestingly, some of the areas in southern California that have high spell length in Figure 2 do not stand out in Figure 4 after controlling for patient characteristics. Overall, the set of figures suggests that geographic variation is not driven primarily by variation in observable patient factors.

FIGURE 4

### Geographic Variation in Length of Home Health Spells Not Explained by Patient Factors



**Source:** Urban Institute analysis for MedPAC, based on claims and OASIS data for home health spells begun in 2011.

**Note:** Geographic units are CBSAs for counties that belong to a CBSA. The remaining counties within a state that are not part of a CBSA (i.e., balance of the state) are combined into one geographic unit.

## Discussion

The goal of this project was to consider whether the current episode-based unit of payment for Medicare home health services should be replaced with a spell-based unit of payment. A spell-based unit of payment would be risk-adjusted to reflect differences in patient clinical factors associated with longer and more costly spells. But conditional on those clinical factors, additional episodes within a spell would not generate additional revenues for providers. A spell-based unit of payment would create a strong incentive to reduce spell length. This incentive would apply to cases that may now be excessively long. But it would also create an incentive to reduce spell length for patients receiving appropriate and medically necessary amounts of care under the current system. A spell-based unit of payment would likely reduce Medicare spending for home health services over time by reducing spell length and thereby justifying a reduction in base rates. But patients who need longer spells could be disadvantaged under this system.

We find that both long and short spells are profitable, but short spells offer a higher rate of return. If an agency has no new patients waiting to start home health, it may have an incentive to extend the spell of existing patients beyond what is necessary to generate additional revenue with a positive margin. But if the agency has new patients ready to enter home health, taking new patients is generally more profitable. Local market factors may affect how an agency seeking to increase revenues responds to these incentives.



Patients with long spells are more likely to be admitted from the community and to be enrolled in Medicaid, and they typically need medical rather than therapy services. Thus, long spells do not appear to be used to exploit the way the current system encourages overuse of therapy visits. If long spells are being used as a bridge to Medicaid eligibility or as a substitute for long-term care services that are not covered by Medicare, a spell-based unit of payment would curb the incentive to use the service as a substitute for Medicaid or other long-term care services. Medicare policy explicitly does not cover long-term care service.

The patterns of use of long home health spells are a cause for concern. Observable patient characteristics, including clinical, functional, and social factors, have only limited ability to explain variation in spell length. Even characteristics such as caregiver type, which is not adjusted for under the current system but was hypothesized to have a strong independent association with length of spell, has only a small effect in our data. At the same time, there is substantial geographic variation in length of spell even after controlling for an extensive set of patient factors. This suggests that use of long spells is largely driven by factors other than patient need. These could include local market practice patterns, agency effects, local wage levels and other labor market characteristics, supply and cost of long-term care services, and state Medicaid policy (especially regarding long-term care).

The unexplained geographic variation in spell length could also result from aspects of patient need that are not captured by available measures (but the measures we could control for included a large set of relevant patient clinical and functional characteristics, as well as social factors). The use of long spells shows a strong regional pattern, with areas of inexplicably high use running through a band of south central and southern states. Adopting a spell-based unit of payment would alter incentives in such areas, but also in areas where spells are already relatively short. This suggests the need for a more targeted policy aimed at limiting long spells where they are a problem could be warranted, such as utilization review of long spells.

Further inquiry into the causes of long spells should seek to understand the underlying reasons for long spells in high-use areas. Are the patients in these areas different from patients nationally in systematic ways that go unmeasured in existing data sources? How does spell length vary by Medicaid policy, labor market factors, and provider characteristics across areas? Are there differences in what happens to patients in high-use and low-use areas that could explain the use patterns? Are patient outcomes any better or worse after home health spells in high-use areas relative to low-use areas? Answers to such questions are important to understanding whether policy responses to limit spell length are warranted and what types of policies would be most effective without causing unintended harm to patients.

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## About the Authors



**Bowen Garrett** is an economist and senior fellow in the Health Policy Center at the Urban Institute. His research focuses on health reform and health policy topics, combining rigorous empirical methods and economic thinking with an understanding of the policy landscape to better inform policymaking. He led the development of Urban's Health Insurance Policy Simulation Model and conducted numerous studies of the likely effects of alternative reform proposals for the Obama administration, the state of New York, and private foundations. He has written extensively on employer-sponsored insurance, Medicaid and the uninsured, and Medicare's prospective payment systems.



**Doug Wissoker** is a senior fellow with the Statistical Methods Group at the Urban Institute. He is a labor economist with expertise in statistical and survey methods. Since joining Urban in 1988, he has collaborated with researchers on a wide range of topics, including evaluation of welfare reform demonstrations and studies of survey nonresponse bias, the sample for a survey of coastal fishing households in Sierra Leone, and the design of weights for the new Health Reform Monitoring Survey.

## Acknowledgments

This brief was funded by the Medicare Payment Advisory Commission. We are grateful to them and to all our funders, who make it possible for Urban to advance its mission. We thank Evan Christman for his close collaboration and many contributions to this study, Mark Miller and Jim Mathews for their helpful comments, and the home health experts for their insights.

The views expressed are those of the authors and should not be attributed to the Urban Institute, its trustees, or its funders. Funders do not determine research findings or the insights and recommendations of Urban experts. Further information on the Urban Institute's funding principles is available at [www.urban.org/support](http://www.urban.org/support).



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