



Medicare Spending and
Rehospitalization for Chronically Ill
Medicare Beneficiaries: Home
Health Use Compared to Other
Post-Acute Care Settings

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Introduction

Under the Medicare home health benefit, home health agencies provide post-acute care services such as skilled nursing care, therapy, and aide services to beneficiaries who are unable to leave their homes.

The Alliance for Home Health Quality and Innovation commissioned Avalere Health in October 2008 to evaluate the relationship between post-hospital home health use and Medicare spending and hospital readmissions. The following slides describe our study methodology and findings.



Executive Summary



The intersection of business
strategy and public policy

Early Home Health Users Had Lower Medicare Usage and Costs

- We compared beneficiaries with early post-acute care (PAC) home health use to beneficiaries using other non-home health PAC for the following conditions – diabetes, chronic obstructive pulmonary disease (COPD), and congestive heart failure (CHF).^{*,**}
- The study examined post-hospital period-of-care costs and odds of readmission for two years – 2005 and 2006 – using Medicare claims data.^{***}
- Over the 2005-2006 period, post-hospital period-of-care costs and odds of hospital readmission were significantly lower for beneficiaries with early post-acute home health utilization versus beneficiaries with non-home health PAC use.
- The differences in Medicare spending between the early home health users and other PAC users by condition across severity of illness (SOI) levels were:
 - » Diabetes \$6,120 – \$9,441
 - » COPD \$5,453 – \$10,725
 - » CHF \$4,588 – \$8,010
- By multiplying the above spending reductions for each condition by the number of periods of care in the early home health group, we estimate that early home health use was associated with a \$1.71 billion reduction in Medicare post-hospitalization spending over the 2005-2006 period. This figure controls for differences in beneficiaries' age, sex, race, urban/rural residence, SOI, dual-eligibility status, and hospice utilization.

* Early home health is defined as home health utilization in the same quarter as the first hospitalization stay that initiated the period of care.

** Beneficiaries identified based on primary or secondary diagnosis of diabetes, COPD, or CHF in the hospital claim.

*** Post-hospital period of care begins with an initial hospitalization and ends after a one-quarter break in post-acute care or hospital utilization. All post-hospital Medicare claims payments were included in the period-of-care cost calculation.



Study Methodology and Findings

Study Purpose and Research Question

Study Purpose

- To better understand Medicare post-hospital spending and hospital readmissions for chronically ill beneficiaries who use early home healthcare compared to beneficiaries who use post-acute care (PAC) services other than home health.*

Principal Research Question

- How do Medicare post-hospitalization spending and readmissions vary for beneficiaries with a primary or secondary diagnosis of diabetes, chronic obstructive pulmonary disease (COPD), or congestive heart failure (CHF) who receive early home healthcare versus non-home health PAC?

* Early home health is defined as home health utilization in the same quarter as the first hospitalization stay that initiated the period of care. These beneficiaries may use other PAC in addition to their home health.

Methodology*

Study Design

- Avalere compared early home health PAC users to non-home health PAC users on two outcome measures: total Medicare post-hospital claims payments and odds of hospital readmissions.
- Study was conducted using Medicare claims data for 2005 and 2006.

Population

- Restricted to fee-for-service beneficiaries with a hospital primary or secondary diagnosis of diabetes, COPD, or CHF.
- Early home health defined as utilization of home health services within the same quarter as the acute hospital discharge. These beneficiaries may also have used other PAC services in addition to home health.
- The comparison group used any PAC services other than home health (e.g., skilled nursing facilities, long-term care hospitals, inpatient rehabilitation facilities, or hospice) during their period of care.
- This analysis does not include the following: beneficiaries whose home health utilization was not initiated by a hospital stay, beneficiaries who used no PAC services, and beneficiaries who used home health services later in their period of care.
- The Medicare claims data sets we used include quarters of service rather than dates of service; therefore, we assumed that in the initial quarter of the period of care, the hospital stay preceded the home health stay or any other PAC utilization.

* Please see Appendix for more a detailed description of the methodology.

Methodology (continued)

Analysis

- Comparison of early home health PAC users and non-home health PAC users on two outcome measures:
 - » Post-hospital period-of-care costs
 - Periods of care began with an initial hospitalization and ended after a one-quarter break in PAC or hospital utilization.
 - All post-hospital Medicare claims payments were included in the period-of-care cost calculation.
 - » Odds of hospital readmission
 - Odds ratio measures the odds of hospital readmission for early home health users divided by the odds of hospital readmission for non-home health users.
 - A ratio of less than 1 means early home health users are less likely to be readmitted.

- Regression analysis controlled for certain factors that we expected to differ between the two groups.
 - » Controlled for severity of illness (SOI), age, sex, race, dual-eligibility status, geography based on beneficiaries' urban or rural designation, and hospice utilization.
 - » The SOI metric rates a patient's level of severity on a scale of 1-4 (the higher the score, the more severely ill the patient). SOI is derived based on the patients' hospital procedures and diagnosis codes and produced by running these data through the APR-DRG grouper.
 - » Results are presented by SOI because patients in higher SOIs are more clinically complex.

Study Results – Summary

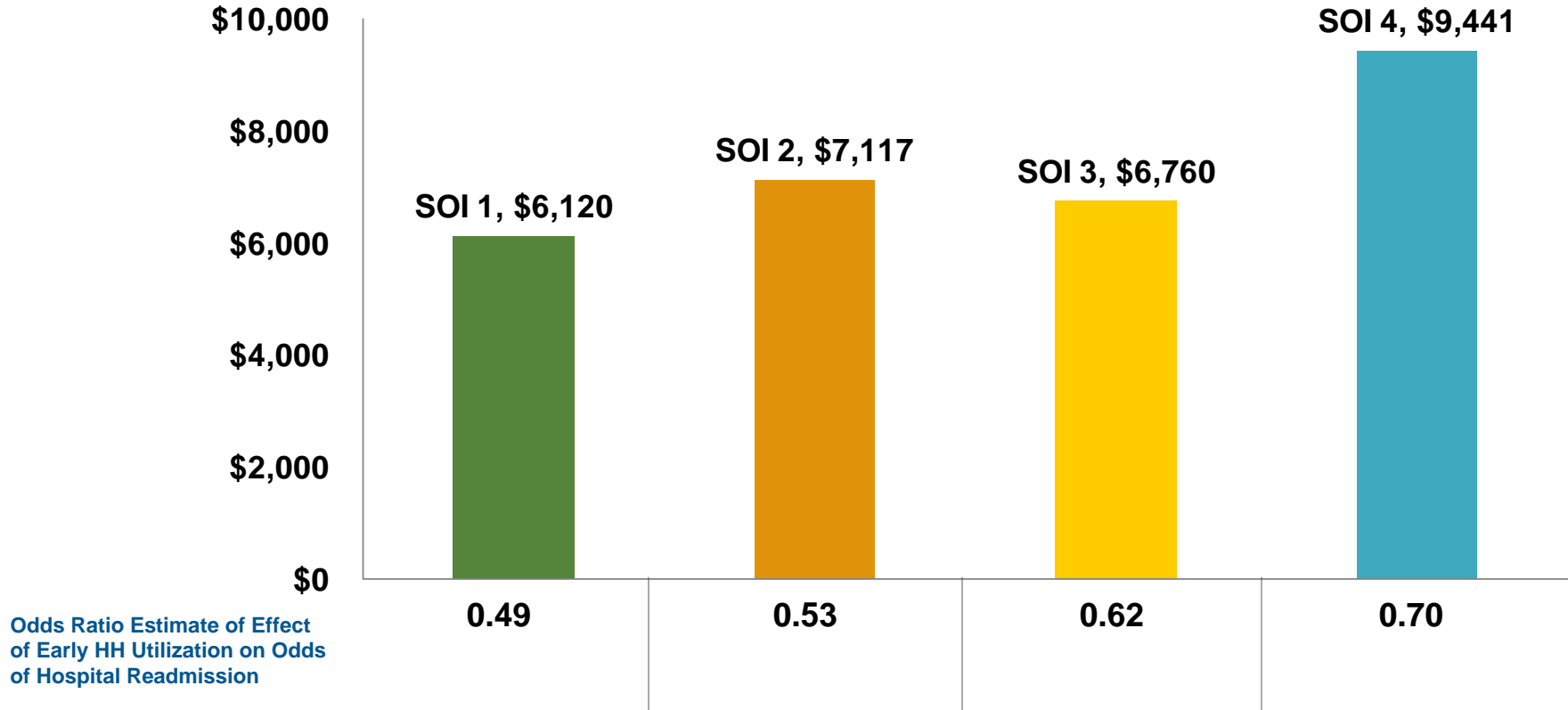
- Period-of-care costs for patients with diabetes, COPD, and CHF requiring PAC who receive home health services within the same quarter as the hospitalization are statistically significantly lower than patients using non-home health PAC across all SOI categories.
- The differences in Medicare post-hospital spending are greatest for the most severely ill (i.e., those with a SOI score of 4).
- The odds of hospital readmission for the early home health users are statistically significantly lower than the odds of readmission for the non-home health PAC users across all SOI categories.

The post-hospital period-of-care costs and odds of hospital readmission are statistically significantly lower for diabetes patients, COPD patients, and CHF patients requiring PAC who use early home health, in every SOI category.

- The following slides present the difference in Medicare post-hospital period-of-care spending and odds ratios of hospital readmission between early home health users and non-home health PAC users for each diagnosis and SOI score.
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Study Results - Diabetes

Difference in Medicare Period-of-Care Spending Between Early Home Health and Non-Home Health PAC, by SOI*

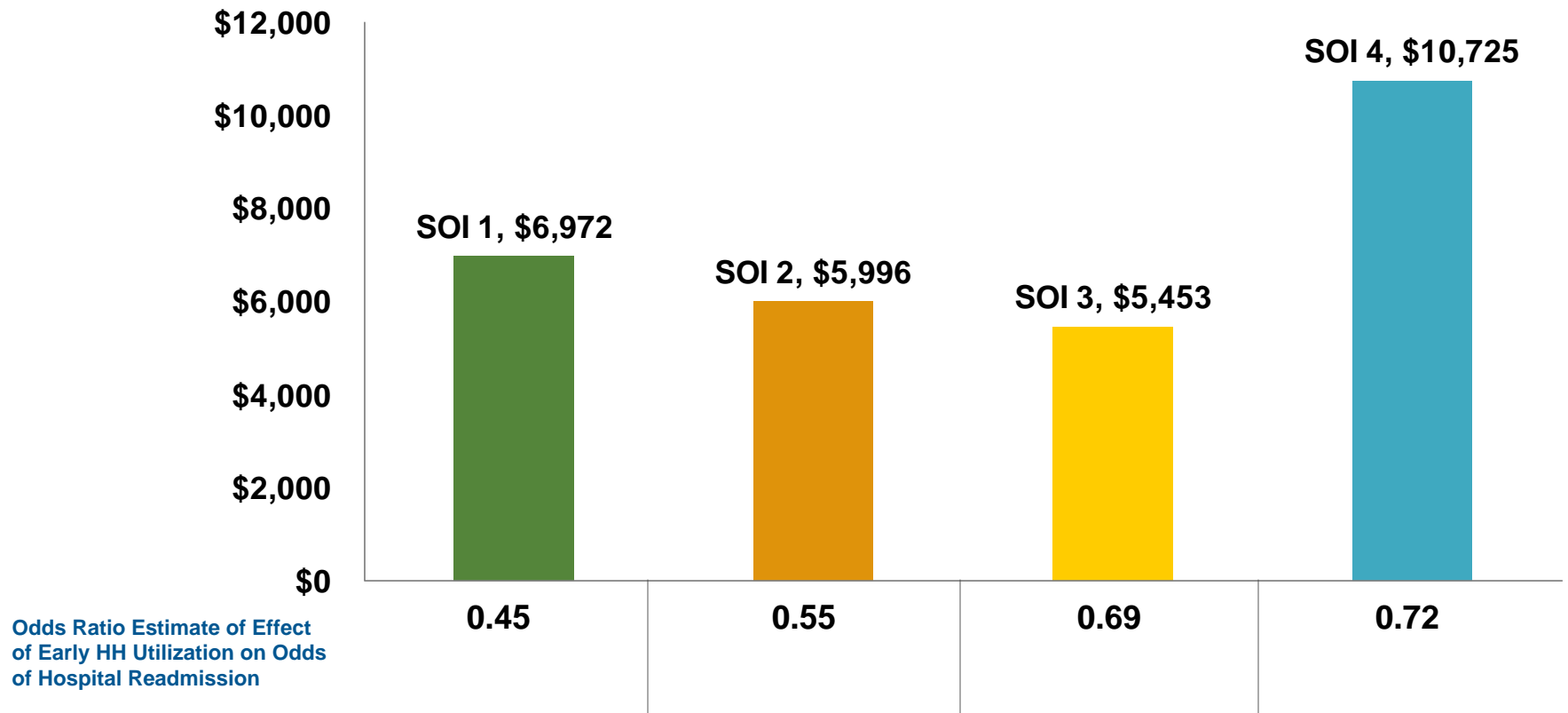


*A SOI score of 1 is least clinically severe and a SOI score of 4 is most clinically severe. Odds ratio is the ratio of odds of readmission for home health users to the odds of readmission for non-home health users. An odds ratio of less than 1 means that home health users are less likely to be readmitted. All differences are statistically significant.



Study Results - COPD

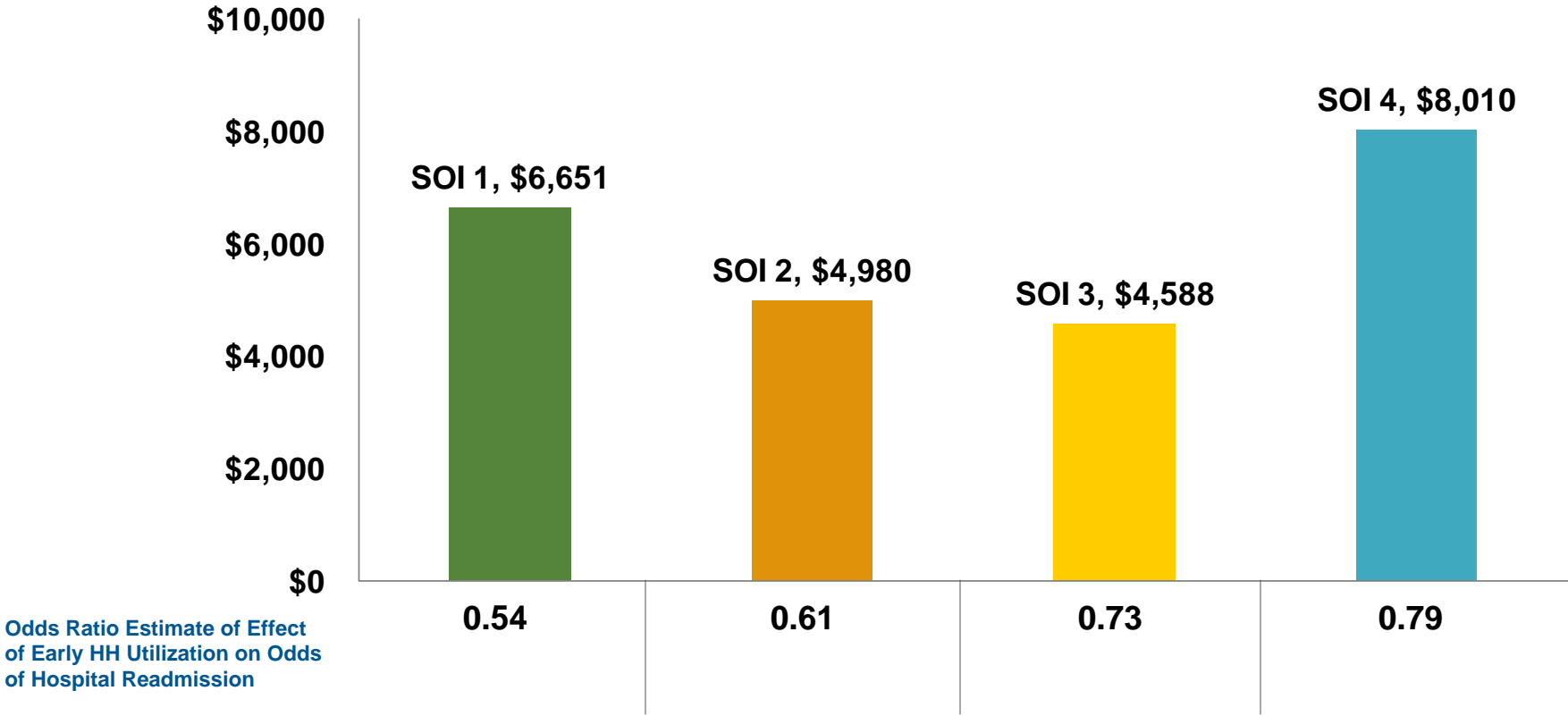
Difference in Medicare Period-of-Care Spending Between Early Home Health and Non-Home Health PAC, by SOI*



*An SOI score of 1 is least clinically severe and a SOI score of 4 is most clinically severe. Odds ratio is the ratio of odds of readmission for home health users to the odds of readmission for non-home health users. An odds ratio of less than 1 means that home health users are less likely to be readmitted. All differences are statistically significant.

Study Results - CHF

Difference in Medicare Period-of-Care Spending Between Early Home Health and Non-Home Health PAC, by SOI*



*An SOI score of 1 is least clinically severe and a SOI score of 4 is most clinically severe. Odds ratio is the ratio of odds of readmission for home health users to the odds of readmission for non-home health users. An odds ratio of less than 1 means that home health users are less likely to be readmitted. All differences are statistically significant.

Study Results – Impact Analyses

Medicare Spending Impact Analyses

The following impact analyses assess the effect of the lower post-hospitalization period-of-care costs and odds of readmission for the early home health users on Medicare spending.

- Early use of home health was associated with a \$1.71 billion reduction in Medicare post-hospital spending over the 2005-2006 period (in aggregate).
- If the lower period-of-care costs associated with early use of home health were applied to the periods of care for non-home health users, Medicare post-hospital spending over the 2005-2006 period (in aggregate) could have been further reduced by \$1.77 billion.
- The use of early home health is associated with an estimated 24,000 fewer hospital readmissions. The fewer readmissions are associated with a \$216 million reduction in Medicare spending over the 2005-2006 period (in aggregate). The \$216 million reduction is a component of the \$1.71 billion reduction.

Impact Analysis	Result
Reduction in Medicare post-hospital spending over 2005-2006 associated with use of early home health	\$1.71 billion
Reduction in Medicare post-hospital spending over 2005-2006 if lower period-of-care costs associated with early home health were applied to periods of care for non-home health users	\$1.77 billion
Fewer hospital readmissions over 2005-2006 period associated with use of early home health	24,000
Reduction in Medicare spending over 2005-2006 associated with the 24,000 fewer readmissions	\$216 million

Areas for Further Research

- This study methodology may be applied to a broader population, such as the entire Medicare population including those without chronic conditions.
- Additional analyses may focus on identifying other factors that contribute to effect of home health on Medicare spending, such as the selection of home health as a setting of care and patient functional status.



Appendix: Detailed Methodology & Limitations

Study Methodology

Methodology

- Study Sample
 - » The study sample consisted of Medicare beneficiaries with a primary or secondary diagnosis of diabetes, COPD, or CHF who utilized PAC.
 - Definition of Early Home Health Users
 - » Beneficiaries with a home health claim in the same quarter as the initial hospitalization. Note these beneficiaries may have used another PAC setting in addition to home health.
 - » The Medicare claims data sets we used include quarters of service rather than dates of service; therefore, we assumed that in the initial quarter of the period of care, the hospital stay preceded the home health stay or any other PAC utilization.
 - » Number of periods of care in the early home health group was 279,733.
 - Definition of Non-Home Health Users
 - » Beneficiaries with PAC (SNF, IRF, LTCH, hospice) but no home health utilization during their period of care.
 - » Number of periods of care in the non-home health group was 292,360.
 - Populations Not Included in the Analysis
 - » Beneficiaries with late home health utilization, defined as having a home health claim at any point in their period of care other than in the same quarter as the initial hospitalization.
 - » Beneficiaries who did not have a hospitalization before receiving home health services (i.e., their home health services were paid through Medicare Part B).
 - » Beneficiaries who did not utilize PAC services.
-

Study Methodology (continued)

Methodology

- Definition of Period of Care
 - » Periods of care begin with an initial inpatient hospitalization and end after a one-quarter break in hospital or PAC utilization. Analysis was restricted to beneficiaries with no hospital or PAC utilization in the quarter prior to the beginning of the period of care so that we could determine the beginning of the period of care. We also excluded periods of care that did not end in the last quarter of 2006.

- Definition of Period-of-Care Costs
 - » All Medicare costs incurred after the initial hospitalization. Initial hospital stay costs were excluded in the calculation of period-of-care costs.

- Statistical Analyses
 - » Post-hospitalization period-of-care costs and odds of hospital readmissions were estimated through multivariate regression.
 - » The regression model included the following risk-adjustment variables: SOI, age, sex, race, dual-eligibility status, geography based on beneficiaries' urban or rural designation, and hospice utilization.
 - We chose SOI to risk-adjust for clinical characteristics because it is a more robust measure than case-mix alone. To assign a SOI score, a patient's hospital procedure and diagnosis codes were run through the APR-DRG grouper.

Study Methodology (continued)

Methodology

- Calculation of Medicare Spending Reduction
 - » The total Medicare program spending reduction was calculated by multiplying the estimated post-hospitalization period-of-care savings for each chronic condition and SOI score by the number of periods of care with early home health in each chronic condition and SOI score.
 - » The estimated potential spending reduction for the non-home health PAC group were calculated by multiplying the estimated post-hospitalization period-of-care savings for each chronic condition and SOI score by the number of non-home health PAC episodes of care in each chronic condition and SOI score.

- Calculation of Total Number of Reduced Readmissions and Spending
 - » For both the early home health users and comparison group, we calculated the average number of hospital readmissions per period of care. We then multiplied the difference between the two averages by the number of periods of care in the early home health group to derive the total difference in the number of readmissions.
 - » We also estimated the Medicare spending reduction on readmissions associated with the total number of reduced readmissions by multiplying the total reduction in the number of readmissions by the average cost of a readmission for early home health users.

Study Limitations

Study Limitations

- We controlled for a number of factors in the regression model; however, there may be other factors, such as functional status, family care giving, or site of care selection, that contribute to the effect of early home health use on period-of-care costs and odds of readmission that are not adequately controlled for in this analysis.
- Another key limitation is that our data sets do not include exact dates of service; therefore, we assumed that in the first quarter of the period of care, the inpatient hospital claim preceded the home health use or any other PAC use. It is possible that some of the beneficiaries in our sample had PAC use, including home health use, before the first hospitalization.
- Due to the delay of the release of the 2007 Standard Analytical Files (SAF), our analysis was limited to the use of 2005 and 2006 SAF Medicare claims data. Therefore, we excluded periods of care from the analysis that had not ended by the last quarter of 2006. In addition, we excluded periods of care that began in the first quarter of 2005 because without the 2004 SAF files, we could not determine whether these beneficiaries were in the middle of a period of care. Nevertheless, our sample size was robust enough to obtain statistically significant results.
- To properly define and isolate the study population, the study findings are applicable to a specific group – beneficiaries with a primary or secondary diagnosis of diabetes, COPD, or CHF that used PAC over the 2005 and 2006 period. These findings cannot be extrapolated to the entire home health population, PAC population, chronically ill population, or Medicare population.