Use of Home Health Care and Other Care Services Among Medicare Beneficiaries

Clinically Appropriate and Cost-Effective Placement (CACEP) Project Working Paper Series

Working Paper #2: Baseline Statistics of Medicare Payments by Episode Type for Select MS-DRGs and Chronic Conditions

Dobson | DaVanzo

Dobson DaVanzo & Associates, LLC Vienna, VA 703.260.1760 www.dobsondavanzo.com

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Working Paper #2: Baseline Statistics of Medicare Payments by Episode Type for Select MS-DRGs and Chronic Conditions

Submitted to:
Alliance for Home Health Quality and Innovation (AHHQI)

Submitted by:

Dobson | DaVanzo

Allen Dobson, Ph.D.
Audrey El-Gamil
Steven Heath, M.P.A.
Jinglin Wang, M.P.A.
Greg Berger
Joan E. DaVanzo, Ph.D., M.S.W.

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Table of Contents

Preface

Dobson DaVanzo & Associates, LLC was commissioned to conduct a study to determine how the Medicare home health benefit can better meet beneficiary needs and improve the quality and efficiency of care provided within the U.S. health care system.[1] The *Clinically Appropriate and Cost-Effective Placement (CACEP)* project is a data driven study and, as such, is rich in information that will be used to answer a wide variety of research questions. This report is the second working paper in a series of focused reports on several important aspects of the study.

The CACEP analyses are based on all Medicare Part A and Part B claims for a five percent sample of Medicare beneficiaries from 2007 to 2009.[2] We expect that our working paper statistics will also be of use to policymakers as they consider various Medicare reform strategies.

This multifaceted study investigates patterns of care within three distinct "episode types." Within each episode type, simulations will be performed to study the impact of different clinically appropriate and cost-effective uses of home health care on the Medicare program.

This series of working papers will include the following topics:

- Frequencies of episode types for select MS-DRGs and chronic conditions (Working Paper #1)
- Medicare payments by episode type and select MS-DRGs and chronic conditions (Working Paper #2)
- Patient pathways by episode type and select MS-DRGs and chronic conditions (Working Paper #3)
- Acute care hospital readmissions by episode type and select MS-DRGs and chronic conditions (Working Paper #4)

The descriptive statistics presented in the working papers comprise a point of departure for subsequent quantitative analyses that will be presented in the final report.

[1] This study was commissioned by the Alliance for Home Health Quality and Innovation (Alliance).

[2] CACEP analyses exclude Medicare utilization and payments for durable medical equipment, orthotics, prosthetics, and services (DMEPOS). Data were obtained from CMS in accordance to the DUA process (DUA #21007).

Key Concepts and Terms

This section introduces key concepts and terms that are used throughout this report.

Key Concepts

Index Short Term Acute Care Hospitalization: Short term acute care hospital admission that initiates the post-acute care episode. Hospitalization is preceded by 15 days of no facility-based or home health care.

Episode Types:

1) Post-acute care episode – Episode that includes all care provided during a fixed 60-day period after discharge from the index acute care hospitalization. Payments presented for the post-acute care episodes include the index acute care hospitalization.
2) Pre-acute care episode – Episode that includes all care provided during a fixed 60-day period prior to the index acute care hospital admission. Payments presented for the pre-acute care episodes include the index acute care hospitalization.
3) Non-post-acute care community-based episode – Episode that includes all care provided nine months following discharge of an admission to home health from the community (community-referred admission as opposed to following discharge from a facility-based setting). Payments presented for non-post-acute care community-based episodes include the initial home health admission.

First Setting: The first setting a patient enters following discharge from the index acute care hospitalization.

- HHA - Home health agency
- IRF - Inpatient rehabilitation facility
- SNF - Skilled nursing facility
- LTCH - Long-term care hospital
- STACH - Short term acute care hospital; patient was admitted home and readmitted to the hospital before receiving care from any other setting (readmission)
- Community - Physician or outpatient visit; patient was admitted home and received a physician or outpatient visit (including hospital outpatient department visit or ambulatory surgical center visit) prior to any other care setting
- ER - Emergency room
- OP Therapy – Outpatient therapy
- Hospice – Hospice care
- Other IP - Other inpatient hospital, such as psychiatric hospital admission
- No Care - Patient returned home and received no inpatient or ambulatory care during the episode

Readmission: Any hospitalization during the 60-day post-acute care episode following the index acute care hospitalization.

Key Concepts and Terms

Select Key Terms

CC	Complications/Comorbidities; severity level of MS-DRG
CCW Data	Chronic Condition Warehouse Dataset provided by CMS that flags each beneficiary for the presence of 21 chronic conditions
CHF	Congestive Heart Failure
Clean Period	Period prior to the index acute care hospitalization that does not contain any facility-based care or home health care
CMMI	Center for Medicare & Medicaid Innovation
CMS	Centers for Medicare & Medicaid Services
Community	First Setting; includes physician or outpatient visits
Community-Referred Home Health Admission	Admission to home health from the community, not from a facility-based care setting
COPD	Chronic Obstructive Pulmonary Disease
ER	Emergency Room
First Setting	First care setting patient enters following discharge from index acute care hospitalization
FFS	Fee-for-Service
HCC	Hierarchical Condition Category
HHA	Home Health Agency; refers to First Setting
Hospice	First Setting; Hospice care
HRR	Hospital Referral Region
Index Short Term Acute Care Hospitalization	Hospital admission that initiates the post-acute care episode. Hospitalization is preceded by 15 days of no facility-based or home health care. Also referred to as "Index acute care hospitalization" or "Index STACH"
IRF	Inpatient Rehabilitation Facility; refers to First Setting
IRF-PAI	Assessment tool used for patients in IRFs
LTCH	Long-Term Care Hospital; refers to First Setting
MCC	Major Complications/Comorbidities; severity level of MS-DRG
MDS	Assessment tool used for patients in SNFs
MedPAC	Medicare Payment Advisory Commission
MS-DRG	Medicare Severity Diagnosis Related Group
No Care	First Setting; patient did not receive any care following discharge from index acute care hospitalization for length of episode
Non-Post-Acute Care Community-Based Episode	Episode Type 3: Nine months following discharge from first community-referred home health admission
OASIS	Assessment tool used for patients in HHAs
Other IP	First Setting; other inpatient setting such as psychiatric hospitals
PAC	Post-Acute Care
Post-Acute Care Episode	Episode Type 1: 60-days following index acute care hospital discharge
Pre-Acute Care Episode	Episode Type 2: 60-days prior to index acute care hospital admission
Primary Chronic Condition	Chronic condition identified by the highest community-risk score
Readmission	Acute care hospital admission following discharge from the index acute care hospital admission within the 60-day post-acute care episode
SNF	Skilled Nursing Facility; refers to First Setting
STACH	Short Term Acute Care Hospital; refers to First Setting and indicates patient was readmitted to the hospital before receiving care from another setting

Introduction

The overall purpose of the *Clinically Appropriate and Cost-Effective Placement (CACEP)* project is to determine how the Medicare home health benefit can better meet beneficiary needs and improve the quality and efficiency of care provided within the U.S. health care system. Before we can identify the types of patients and pathways of care for which home health can have the greatest impact, we must understand the relationships between the various acute and post-acute care providers and payment systems within patient episodes of care. The purpose of this second working paper is to present baseline Medicare payments (also referred to as expenditures) for each episode type.

Using the data platform we have constructed that links patient-level Medicare claims files across care settings over time, we calculated a payment baseline for each type of episode. We summed together the payments made by Medicare to each type of health care provider included in each patient episode. These payments cover care provided in the inpatient and outpatient hospital, emergency room (ER), skilled nursing facility (SNF), inpatient rehabilitation facility (IRF), long-term care hospital (LTCH), home health agencies (HHA), hospice, and other inpatient settings (such as psychiatric hospitals), as well as outpatient therapy and physician services.

We present both total and average Medicare payments made by episode type at several levels of aggregation, such as by Medicare-Severity Diagnosis-Related Group (MS-DRG), chronic condition, and certain patient pathways (the sequence of settings from which a patient receives care during an episode).

Overview of Payment Systems

The multiple prospective payment systems used by Medicare to reimburse providers are complex and each have a unique method for setting payment amounts, adjusting payments for local market conditions (such as area wages), and risk-adjusting payments to reflect patient severity. These unique payment systems have formed payment silos that, to a certain extent, work against the coordination of care across settings. While it is not necessary to review each payment system in detail, we provide a brief overview of the

major payment systems as background. More specifically, we discuss how payments are determined by Medicare for each type of provider of service.

Acute care hospitals, IRFs, and LTCHs are all paid for the patient stay; the hospital outpatient department and physicians are paid according to a fee schedule; HHAs are paid for 60-day episodes of care; and SNFs, hospice, and inpatient psychiatric facilities (IPF) are paid per diem payments. In examining payments per episode, it is important to consider the varying types of payments different providers received from Medicare.

Inpatient Prospective Payment System (IPPS)

The IPPS covers payments made to short-term acute care hospitals (STACH). The payment unit is the discharge or case, which is assigned to one of 746 Medicare Severity Diagnosis Related Groups (MS-DRGs) that group patients with similar conditions and their expected resource use. Each MS-DRG is paid at a pre-determined amount that is adjusted for patient severity and reflects the expected relative cost of the patient's case.

Outpatient Prospective Payment System (OPPS)

The OPPS covers payments made to the hospital outpatient department and emergency rooms in our study. Hospital outpatient services are categorized using Healthcare Common Procedure Coding System (HCPCS) codes, and are grouped into ambulatory payment classifications (APCs) based on clinical and cost similarities. OPPS is essentially a fee schedule and pays procedures under the same APC at the same rate. In contrast, outpatient therapy is paid for using the Physician Fee Schedule (PFS).

Physician Fee Schedule (PFS)

The PFS covers payments made to physicians and includes outpatient therapy services. Physician services are also categorized by HCPCS (primarily Current Procedural Terminology (CPT)) codes, and include office visits, surgical procedures, and a broad range of diagnostic and therapeutic services. CMS determines the PFS payment rates by using relative value units (RVUs). RVUs are calculated by factoring in, or considering, the amount of physician work required to provide a service, as well as expenses related to maintaining a practice, and practice liability insurance (PLI).

Home Health Prospective Payment System (HH PPS)

The HH PPS covers payments made to home health agencies at a predetermined rate for each 60-day episode of care. These episode payments are based on a patient's clinical and functional status and service use, and are adjusted for the geographic area in which services are delivered. Home health patients are categorized into one of 153 home health resource groups (HHRGs), each with its own relative payment amount. Patients are grouped into HHRGs based on their clinical, functional, and service (therapy) utilization scores. Clinical information and functionality are measured using the Outcome and Assessment Information Set (OASIS) assessment tool.

Introduction

Skilled Nursing Facility Prospective Payment System (SNF PPS)

Under the SNF PPS, Medicare pays a pre-determined daily rate for up to 100 days of care, which can include both nursing care and rehabilitation services. The daily base rate is adjusted for patient severity using the Resource Utilization Group (RUG) system, which assigns patients to one of 66 RUG categories based on the number of minutes of therapy that the patient is expected to use, the need for services, the presence of certain clinical conditions, and the patient's ability to perform activities of daily living. These measures are captured using the Minimum Data Set (MDS) resident assessment tool. The nursing and rehabilitation components are separate payment amounts, each creating a case-mix measurement.

Inpatient Rehabilitation Facility Prospective Payment System (IRF PPS)

Under the IRF PPS, payments are made at a predetermined case rate. Beneficiaries eligible for inpatient rehabilitation services – based on therapy need and clinical condition – are assigned to one of 100 case-mix groups (CMGs) based on the primary reason for intensive rehabilitation care, their age, levels of functional and cognitive impairment, and comorbid conditions. Functional and cognitive status is measured using the functional independence measures (FIM) of the IRF Patient Assessment Instrument (IRF-PAI).

Long-Term Care Hospital Prospective Payment System (LTCH PPS)

The LTCH PPS, similar to the STACH and IRF, pays a predetermined case rate, and categorized patients into case-mix groups called Medicare Severity Long-Term Care Diagnosis Related Groups (MS-LTC-DRGs).

Hospice Prospective Payment System (Hospice PPS)

Similar to the SNF PPS, the Hospice PPS pays a daily rate for each day a beneficiary is enrolled in the hospice benefit. Hospice services fall under four categories which determine payments: routine home care, continuous home care, inpatient respite care, and general inpatient care.

Inpatient Psychiatric Facility Prospective Payment System (IPF PPS)

The majority of beneficiaries that fall into the "Other Inpatient" first setting after discharge from the hospital are admitted to IPFs. Like the SNF and Hospice PPSs, inpatient psychiatric services are paid a predetermined daily rate.

Introduction

Chronic Conditions and Medicare Expenditures

Recognition of the importance of chronic conditions, both in terms of patient health status and health system costs, has grown significantly over the past several decades. Currently, chronic conditions account for an estimated 84 percent of U.S. health expenditures.[3]

In the Medicare program, the top 10 medical conditions for beneficiaries accounted for nearly one-half of the growth in Medicare payments between 1987 and 2006. While heart disease accounted for a significant portion of growth in health care costs in the second half of the twentieth century, growth in health care costs over the past decade were driven more by a variety of other chronic conditions such as diabetes, arthritis, kidney disease, and hypertension.[4] Growth in the prevalence of these chronic conditions is fueling greater growth in spending for prescription drugs and ambulatory services (such as physician visits and hospital outpatient services) than spending for these services in acute care settings (such as an inpatient hospital).

A recent study published in the journal *Health Services Research* found that high cost Medicare beneficiaries (those in the highest quartile of Medicare payments) had an average number of Hierarchical Condition Categories (HCCs)[5] over four times higher than low cost Medicare beneficiaries, and that HCCs explained a large majority of their medical costs.[6] HCCs can include both acute and chronic conditions, and these results further demonstrate the need to understand Medicare costs as they relate to clinical conditions and comorbidities.

In recognition of the role of chronic conditions as a driver of health care expenditures, the Patient Protection and Affordable Care Act (Affordable Care Act) included numerous provisions targeted to improve access to and quality of health care for Medicare and Medicaid beneficiaries with chronic conditions. Indeed, Title IV of the Act is named "Prevention of Chronic Disease and Improving Public Health," and includes Section 4108 (Incentives for Prevention of Chronic Disease in Medicaid) and Section 4201 (Community Transformation Grants), both of which establish programs to reform the treatment of chronic diseases. Other notable parts of the Affordable Care Act include Section 2703 (State Option to Provide Health Homes for Enrollees with Chronic Conditions), Section 3502 (Establishing Community Health Teams to Support the Patient-Centered Medical Home), and Section 3503 (Medication Management Services in Treatment of Chronic Disease).

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[3] Thorpe KE, Ogden LL (2010). The foundation that health reform lays for improved payment, care coordination, and prevention. *Health Affairs* 29(6): 1183-1187.

[4] Thorpe KE, Ogden LL, Galactionova K (2010). Chronic conditions account for rise in Medicare spending from 1987 to 2006. *Health Affairs* 29(4): 718-724.

[5] HCCs are used in the Medicare Advantage program to adjust capitated payments for health expenditure risk of their enrollees. The HCC model controls for patient demographics as well as clinical comorbidities present within the last year of Medicare claims.

[6] Reschovsky JD, Hadley J, Saiontz-Martinez CB, Boukus ER (2011). Following the money: Factors associated with the cost of treating high-cost Medicare beneficiaries. *Health Services Research* 46(4): 997-1021.

Introduction

In this working paper, we focus much of our analysis of Medicare payments on chronic conditions. First, we identify each episode based on its "primary chronic condition," which is a designation we developed using the CMS categorization within its Chronic Condition Warehouse (CCW) data, and the HCC community risk scores used by the Medicare Advantage program.[7] We also examine the relationship between multiple chronic conditions and episode payments by examining the distribution of payments by number of chronic conditions per episode. In addition, for Episode Type 2 (Pre-Acute Care) and Episode Type 3 (Non-Post-Acute Care Community-Based) we use "primary chronic condition" to clinically define the episode (unlike in the Episode Type 1 (Post-Acute Care), where we use the index acute care hospitalization MS-DRG to clinically define the episode).

Upcoming Study Analyses

The analysis of Medicare payments presented in this report will be used to inform our future analyses, in which we will model changes across care settings based on the current Medicare home health benefit. In order to understand how home health care is provided to Medicare beneficiaries at different stages of patient care, this study will include simulations that model the effect of home health care on Medicare payments and, for example, hospital readmissions, under different payment policy changes.

In the remainder of this report, we re-introduce the methodology for developing our three episode types, as well as present Medicare episode payments. These descriptive statistics present the distribution of Medicare payments within episodes and by care setting within a context of patients' chronic conditions.

[7] For a more in-depth discussion of our methodology for determining "primary chronic conditions," please see *Working Paper #1: Creating and Benchmarking Episodes: Baseline Statistics of Episode Frequency and Patient Diagnoses.*

Methods in Brief

For a full description of the analytic methods for the study, see *Working Paper #1: Creating and Benchmarking Episodes: Baseline Statistics of Episode Frequency and Patient Diagnoses.* We present a brief review of the analytic methods in this chapter. This is followed by chapters each devoted to one specific episode type. We provide additional information on each type of episode in the introduction to each of these chapters.

Datasets

These analyses are based on all Part A and Part B claims from a five percent sample of Medicare beneficiaries from 2007 to 2009, including: inpatient and outpatient hospitals, LTCHs, SNFs, IRFs, HHAs, hospice, and physician and outpatient therapy visits. These data were requested from the Centers for Medicare & Medicaid Services (CMS) Chronic Condition Warehouse (CCW),[8] which is a database that flags each patient claim with the clinical conditions for which the patient has been historically treated. The CCW data contain flags for 21 common conditions, including, but not limited to, diabetes, congestive heart failure, osteoporosis, various cancers, depression, and stroke.

Episode Definitions

Patient "episodes" were created to capture all health care utilization following (or preceding) key points in the patient's care. In this study, "episode" consists of all care during a fixed period of time. An episode is, thus, inclusive of all care and not limited to the care provided in a single setting (i.e., a "stay" in a skilled nursing facility, a home health "episode," and an outpatient "visit"). The concept of an episode begins to change the way care is viewed (e.g., breaks down the payment silos profiled above).

[8] Data was provided by CMS under Data Use Agreement number #21007.

Methods in Brief

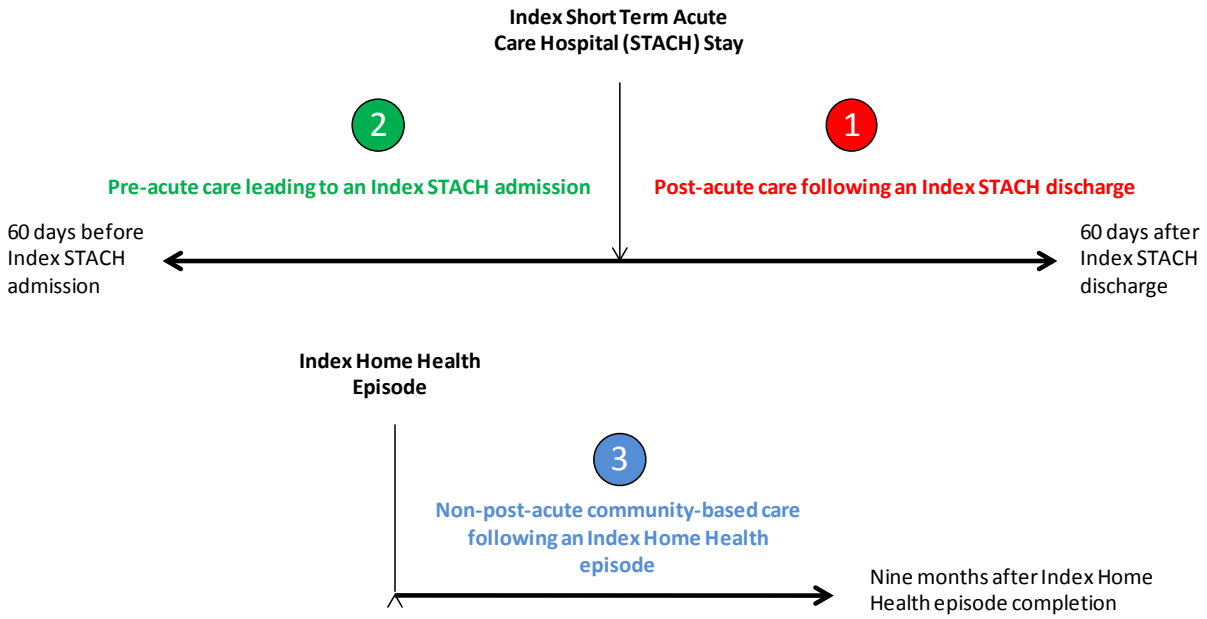
Three episode definitions were developed to capture the following uses of home health care:

- Episode Type 1: Use of home health as a post-acute care provider
- Episode Type 2: Use of home health as a pre-acute care provider
- Episode Type 3: Use of home health as a non-post-acute care community-based provider

All episode types have the same internal structure. Each episode type is initiated by an index event. This index event is either an acute care hospital admission or admission into home health care that is preceded by at least 15 days of no facility-based or home health care (referred to as the "clean period"). Episode Types 1 and 3 capture all health care utilization, across all settings, for a fixed number of days **following discharge** from the index stay, while Episode Type 2 tracks all care **preceding** the index acute care hospital stay. The length of the episode varies by Episode Type, but all episodes are fixed in length. Care initiated within the episode timeframe that extends beyond the end of the episode is partitioned to include only the care and payments that occurred within the episode timeframe. For example, if a patient initiates a home health stay 55 days following discharge from the index acute care hospital discharge (of a 60-day fixed-length episode), we calculated the per-day payments for the home health admission and only included the payments for the first five days in our calculation of the total 60-day episode payments.

Exhibit A.1 illustrates how the three episode types in this study relate to each other. Each index acute care hospital stay that initiates a post-acute care episode (Episode Type 1) has a pre-acute care episode that captures the care that led to the index acute care hospitalization (Episode Type 2). Episode Type 1 extends for 60 days following discharge from the acute care hospital, while Episode Type 2 captures 60 days prior to the index acute care hospital admission. Episode Type 3 is indexed by a home health episode and captures nine months following discharge from the index home health episode.

Exhibit A.1: Relationship between Episode Types



We have made several modifications to the database for this second report that are not reflected in Working Paper #1. In order to remove the effect of geographic location on Medicare payment amounts, we standardized the database by adjusting all Medicare payments by the appropriate wage index for the labor-related portion for each type of provider payment. We also standardized the database to 2009 dollars by inflating all Medicare payments in 2007 and 2008 to 2009 dollars.

In addition to adjustments on the Medicare episode payment amounts, we created a "look back" period for each episode in order to better understand the care patients received prior to the index acute care hospitalization. As a result of this change, the numbers of episodes and Medicare episode payments are slightly different than those presented in Working Paper #1.

In the remainder of this report, all descriptive statistics, including number of episodes, Medicare payments, and clinical distributions are extrapolated from our five percent sample to the universe of Medicare beneficiaries. Cell sizes less than 11 individuals are suppressed, per our data use agreement with CMS.

Summary of Findings

Post-Acute Care Episodes

Post-acute care episodes are clinically defined in this series of working papers by the index acute care hospitalization MS-DRG and include all care received for the 60 days following discharge from the index acute care hospital. These episodes show various possibilities for clinically appropriate use of home health care that moderates the use of more expensive facility-based care.

MS-DRGs

- Medicare payments are used to define and examine resource intensity within post-acute episodes by MS-DRG and by first setting (i.e., the first setting after index acute care hospital discharge, such as home health, SNF, or the community).
- Approximately 80 percent of post-acute care episodes, in terms of both frequencies and payments, are concentrated in the top 20 percent of MS-DRGs by total Medicare episode payments (n=148).
- Average Medicare episode payments vary widely by first setting. Within first setting, the MS-DRG associated with an episode and the number of chronic conditions does not appear to explain these differences in payments.
- MS-DRG-specific analyses identified different payment patterns by first setting. Patient demographic factors also differed by first setting and/or MS-DRGs.

Chronic Conditions

- The ranking of primary chronic conditions (by prevalence) for all post-acute care episodes is consistent across first setting, suggesting that chronic conditions do not explain Medicare payment differences across the various first settings.
- Average Medicare episode payments increase proportionately with the number of chronic conditions. The average number of chronic conditions per episode within and across MS-DRGs ranges between four and seven.

Summary of Findings

Distribution of Care Settings

- First post-acute care settings (e.g., HHA, SNF, IRF, LTCH) tend to specialize in certain MS-DRGs. That is, MS-DRG payment rankings vary by first settings across post-acute episodes, especially for LTCHs. The proportion of first setting payments attributed to post-acute care also varies by MS-DRG.
- HHA and SNF first setting episodes tend to show comparable MS-DRG payment rankings (i.e., the top MS-DRGs by total Medicare episode payments), while IRF and LTCH first setting episodes each show unique MS-DRG payment rankings.
- Average first setting Medicare episode payment levels are highly variable within episodes by MS-DRGs. These differences are not explained by facility "room and board" (not shown in tables). HHA first setting episodes are the least expensive, followed by SNF, IRF, and LTCH. These rankings are consistent across MS-DRGs, but the spread of Medicare episode payment differences varies within MS-DRGs.
- HHA and Community first setting episodes have similar payment patterns.
- The index acute care hospitalization is generally more expensive than the subsequent HHA, SNF, Community, ER, OP therapy, and hospice care. The average Medicare payment for the index acute care hospitalization is about the same or less than the IRF and LTCH portion of their respective first setting episodes.
- The percent of episodes containing a hospital readmission is just under 25 percent for all first settings. This statistic varies by MS-DRG. For instance, only 6.2 percent of HHA first setting episodes in MS-DRG 470 include a readmission, compared to about 12 percent for SNF and IRF first setting episodes, 7.3 percent for Community first setting episodes, and 27.8 percent for LTCH first setting episodes.

Demographics

- Beneficiary demographic characteristics exert differential effects on average Medicare episode payments across MS-DRGs, by first setting. This is particularly true for the characteristics "live alone," "over 85 years," and "died during episode."
- Patients who live alone are twice as likely to go to a SNF or an IRF as an HHA within an MS-DRG 470 episode. This relationship does not hold for MS-DRGs where mobility is less of an issue.

These observations suggest that clinically appropriate use of home health care to moderate use of the more expensive facility-based settings could be a way to reduce Medicare payments, but public policy in these areas will need to be very carefully considered, given the complexity of relationships observed in the data.

Summary of Findings

Pre-Acute Care Episodes

Pre-acute care episodes are clinically defined by the patient's primary chronic condition, which is hierarchically ordered using Medicare Advantage community-risk score for comparable hierarchical condition categories (HCCs). These episodes show the relative mix of services and Medicare episode payments provided to patients prior to the index acute care hospitalization.

Chronic Conditions

- Due to the hierarchical structure of the primary chronic conditions, groups categorized as higher-severity primary chronic conditions (e.g., osteoporosis, COPD, CHF*COPD) contain patients who also have lower-severity conditions. Thus, lower ranked conditions such as diabetes appear to be under-represented because many diabetes cases also have a higher ranked chronic condition that dominates.
- Given our clinical typology, pre-acute episodes are concentrated among beneficiaries with primary chronic conditions of CHF*COPD, DIABETES*CHF, osteoporosis, COPD, and rheumatoid arthritis/osteoarthritis.
- Medicare episode payments rise with increased numbers of chronic conditions. However, episodes with an extreme number of chronic conditions (12+) do not exhibit increased episode payments relative to episodes with fewer comorbidities.

Distribution of Care Settings

- The probability that a type of setting (or service) is used varies widely by primary chronic condition within pre-acute care episodes. This is likely due to the hierarchical structure and resulting severity-level of the primary chronic conditions.
- Physicians are seen in nearly 100 percent of pre-acute episodes across all primary chronic conditions. HHA is used on average in 3.7 percent of episodes. SNFs are used in 1.8 percent of episodes, IRFs in 0.2 percent, and LTCHs in 0.1 percent. These percentages reflect the fact that SNFs, IRFs, and LTCHs are primarily used as post-acute care settings after a hospital stay, whereas patients can come to HHA from the community.

Summary of Findings

Non-Post-Acute Care Community-Based Episodes

Non-post-acute care community-based episodes are defined clinically by the patient's primary chronic condition. These episodes are initiated with a home health admission from the community and follow care for nine months following the first home health episode discharge. These episodes reflect the continuity and coordination of care provided to community-bound patients by home health agencies.

Chronic Conditions

- The most frequent primary chronic conditions among the non-post-acute care community-based episodes are CHF*COPD, DIABETES*CHF, CHF*RENAL, osteoporosis, COPD, and rheumatoid arthritis/osteoarthritis.
- The average non-post-acute care community-based episode contains 5.5 chronic conditions, slightly more than the average of 5.1 chronic conditions for pre-acute care episodes.
- The average payment for home health care within episodes does not vary significantly with the average number of chronic conditions.
- Patients with higher-ranked primary chronic conditions have higher average home health payments compared to those with lower-ranked primary chronic conditions. For example, CHF*COPD episodes have an average payment of $8,142 for home health services while cataract episodes have an average payment of $3,845 for home health services.

Distribution of Care Settings

- Physician care is received in 97.5 percent of all non-post-acute care community-based episodes.
- The amount of SNF care within the episode varies by primary chronic condition. The use of SNF care increases with the severity of the primary chronic conditions (e.g., more SNF care for CHF*COPD and CHF*RENAL episodes).
- The percent of hospitalizations and deaths within the non-post-acute care community-based episodes is positively correlated with the average number of chronic conditions.

Regional Variation

Regional variation was investigated across all three episode types.

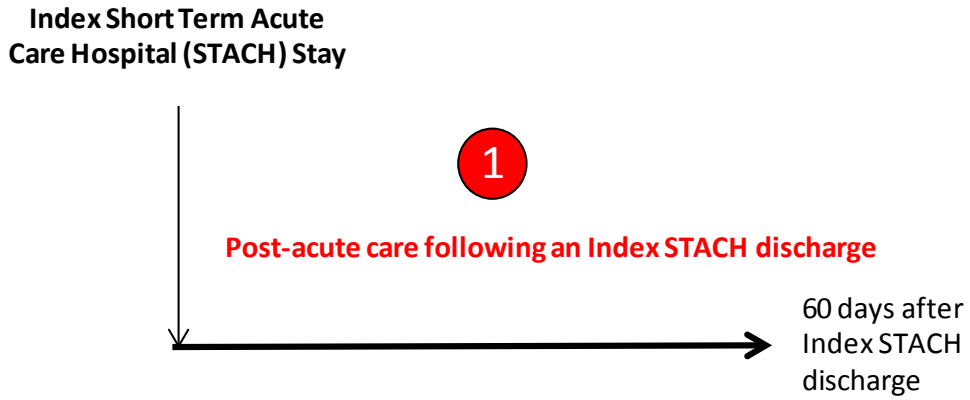
- There is limited variation in the overall average wage-adjusted Medicare episode payments across regions for all post-acute episodes. However, within a single MS-DRG, there is greater variation across regions, suggesting differences in practice patterns in different parts of the U.S.
- There is greater variation in the utilization and average Medicare episode payments across regions for pre-acute care and non-post-acute care community-based episode types than for post-acute care episodes.
- There is a positive correlation (0.636) between home health and SNF payments in all 10 regions. (That is, when payments for one setting increase, they increase in other settings.)
- In three regions (Dallas, Atlanta, and San Francisco), the relative percent distribution of episodes between home health and SNF is comparable, and the SNF percent distribution of episodes is less than the national average of 16.2 percent. This finding suggests that home health is being used relatively more than SNF care in these markets. In the other seven regions, the percent distribution of SNF episodes is both higher than home heath and higher than the national average.
- The variation in IRF and LTCH utilization is greater than for other settings, confirming previous research findings that utilization of these settings may be supply-driven.

Episode Type 1: 60-Day Post-Acute Care Episodes

Brief Review of Episode Definition[9]

Initiated by an index short term acute care hospital (STACH) stay, Episode Type 1 captures all post-acute care (facility-based, home health, and ambulatory) that patients receive following a hospital discharge. This episode type was constructed to include all care within 60 days following the index acute care hospital discharge (Exhibit 1.1).

Exhibit 1.1: Description of Post-Acute Care Episode



[9] For a complete review of the episode definition, see *Working Paper 1*: *Creating and Benchmarking Episodes: Baseline Statistics of Episode Frequency and Patient Diagnoses.*

Episode Type 1: Post-Acute Episodes

Episodes are clinically defined by the index acute care hospitalization MS-DRG, and operationally defined by the first setting following the index acute care hospitalization. This nomenclature does not mean, however, that the episode only includes care from the first setting; episodes often contain care from several different settings.

A review of each "first setting" definition is presented in Exhibit 1.2.

Exhibit 1.2: Review of First Settings Used to Identify Post-Acute Care Episodes

First Setting	Definition
HHA	Home health agency
IRF	Inpatient rehabilitation facility
SNF	Skilled nursing facility
LTCH	Long-term care hospital
STACH	Short term acute care hospital; readmission to the hospital before receiving care from any other setting
Community	Physician or outpatient visit (including hospital outpatient department or ambulatory surgical center)
ER	Emergency room
OP Therapy	Outpatient therapy
Hospice	Hospice care
Other IP	Other inpatient hospital, such as psychiatric hospital admission
No Care	Patient received no inpatient or ambulatory care during the episode

The Medicare payment data presented for post-acute care episodes include both the Medicare payment for the index acute care hospitalization and payments for all subsequent post-acute care during the fixed-length episode. (Beneficiary copayments, deductibles, and payments from other third parties are excluded from all payment amounts.)

Across all three years (2007-2009), there are 24,239,080 total post-acute care episodes and a total of $472.8 billion in Medicare payments.[10] In 2008, the nine million post-acute care episodes represent 58.0 percent of total Medicare fee-for-service spending in that year. There are fewer episodes in 2007 and 2009, due to the episode look-back periods and data run-off. That is, 60-day fixed-length episodes could not be created for index acute care hospital discharges occurring before March 2, 2007 since each episode requires a 60-day "look-back" in order for us to control for patient severity. Additionally, 60-day post-acute care episodes could not be created after October 31, 2009. Therefore, the completed post-acute care episodes in our working dataset for 2007 represent 48.5 percent of total fee-for-service Medicare expenditures, and 45.7 percent in 2009. Exhibit 1.3 shows the total number of Type 1 episodes and Medicare episode payments for Type 1 episodes by year.

[10] Due to database refinements, the number of episodes and total Medicare episode payments contained in this working paper differ from Working Paper 1, as discussed in the "Methods in Brief".

Episode Type 1: Post-Acute Episodes

Exhibit 1.3: Number of Type 1 Episodes and Medicare Episode Paid for 60-Day Fixed-Length Post-Acute Episodes (2007-2009)

Year	Number of Episodes	Medicare Episode Paid[a]	Total Medicare Fee-for-Service Expenditures[b]	Percent of Total Medicare Fee-for-Service Expenditures
2007	7,691,740	$145,510,756,400	$299,900,000,000	48.5%
2008	9,173,580	$178,688,197,120	$308,300,000,000	58.0%
2009	7,373,760	$148,586,611,480	$325,400,000,000	45.7%
Total	**24,239,080**	**$472,785,565,000**	**n/a**	**n/a**

Source: Dobson | DaVanzo analysis of research-identifiable 5% SAF for all sites of service, 2007-2009, wage index adjusted by setting and geographic region, and standardized to 2009 dollars. All episodes have been extrapolated to reflect the universe of Medicare beneficiaries.
[a] Medicare Episode Paid includes care from all facility-based and ambulatory care settings and excludes beneficiary co-payments.
[b] Congressional Budget Office, March Baselines for Medicare, 2008-2010.

Descriptive Statistics by First Setting

Exhibit 1.4 shows the overall distribution of post-acute episodes by first setting. The average Medicare episode payment across all first settings is $19,505. More than one-half (52.7 percent) of all post-acute episodes have a first setting of Community, indicating that a physician or outpatient visit is the first care a patient receives following discharge from the index acute care hospital. Community first setting episodes represent 39.1 percent of total Medicare episode payments. SNF is the second most frequent first setting, representing 16.2 percent of episodes and 24.3 percent of Medicare episode payments. About 12 percent (12.4 percent) of episodes are HHA first setting episodes, which represent 12.9 percent of episode costs.

Exhibit 1.4: Number of Episodes and Medicare Episode Paid by First Setting for 60-Day Fixed-Length Post-Acute Episodes (2007-2009)

First Setting	Number of Episodes	Percent of Episodes	Medicare Episode Paid[a] (in millions)	Percent of Total Episode Paid	Average Medicare Episode Paid
HHA	3,005,900	12.4%	$61,155	12.9%	$20,345
SNF	3,938,080	16.2%	$115,064	24.3%	$29,218
IRF	675,840	2.8%	$29,867	6.3%	$44,193
LTCH	154,480	0.6%	$13,883	2.9%	$89,869
STACH	655,420	2.7%	$19,475	4.1%	$29,713
Community	12,762,420	52.7%	$184,772	39.1%	$14,478
ER	729,840	3.0%	$11,943	2.5%	$16,364
OP Therapy	342,680	1.4%	$5,220	1.1%	$15,233
Hospice	481,000	2.0%	$8,490	1.8%	$17,651
Other IP	99,020	0.4%	$2,334	0.5%	$23,572
No Care[b]	1,394,400	5.8%	$20,583	4.4%	$14,761
Overall Average	**24,239,080**	**100.0%**	**$472,786**	**100.0%**	**$19,505**

Source: Dobson | DaVanzo analysis of research-identifiable 5% SAF for all sites of service, 2007-2009, wage index adjusted by setting and geographic region, and standardized to 2009 dollars. All episodes have been extrapolated to reflect the universe of Medicare beneficiaries.
[a] Medicare Episode Paid includes care from all facility-based and ambulatory care settings and excludes beneficiary co-payments.
[b] Episodes include deaths during index admission.

Episode Type 1: Post-Acute Episodes

Exhibit 1.5 shows, for each first setting, the ranking of the overall top 20 MS-DRGs for the index acute care hospital based on total Medicare episode payments across first settings. The overall top 20 MS-DRGs represent 28.9 percent of total post-acute care episodes and total episode payments.

The top ranked MS-DRG overall – MS-DRG 470: major joint replacement or reattachment of lower extremity without major complications/comorbidities (MCC) – is the highest ranked surgical MS-DRG by total Medicare episode payments for episodes with a first setting of HHA, SNF, or IRF, representing 4.7 percent of all episodes, and 5.5 percent of all episode payments across all MS-DRGs. MS-DRG 291 – heart failure & shock with MCC – is the third highest ranked MS-DRG overall by total Medicare episode paid, but ranges from the second highest MS-DRG for HHA and hospice first setting episodes to the 29th highest MS-DRG for IRF first setting episodes and 42nd for Other IP. Due to the high frequency and high proportion of total Medicare episode payments for these two MS-DRGs, we analyze these MS-DRGs in greater detail later in this chapter. Several of the top 20 overall MS-DRGs have a high reliance on community-based care settings as the episode first setting, and a lower reliance on facility-based care settings as the episode first setting, such as MS-DRG 392 – Esophagitis, gastroenteritis and miscellaneous digestive disorders without MCC, and MS-DRG 247 – Percutaneous cardiovascular procedure with drug-eluting stent without MCC.

Exhibit 1.6 shows the ranking of the top 20 MS-DRGs based on total Medicare episode payment for HHA first setting episodes. The top 20 MS-DRGs for home heath first setting episodes represent 25.5 percent of total HHA episodes, and 34.4 percent of total Medicare payments for HHA first setting episodes. MS-DRG 470 represents 4.7 percent of the episodes with a first setting of HHA, but 10.8 percent of the total Medicare payments for HHA first setting episodes. MS-DRG 291 represents 1.5 percent of HHA first setting episodes and 1.8 percent of total Medicare payments for HHA first setting episodes.

Exhibit 1.5: Top 20 MS-DRGs (Ranked by Medicare Episode Paid[a]) by First Setting for 60-Day Fixed-Length Post-Acute Episodes (2007-2009)

MS-DRG	Medical/ Surgical	Percent Episodes	Percent Episode Paid	Overall	HHA	SNF	IRF	LTCH	STACH	Comm-unity	ER	OP Therapy	Hospice	Other IP	No Care[b]
470: Major joint replacement or reattachment of lower extremity w/o MCC	**Surgical**	**4.7%**	**5.5%**	**1**	**1**	**1**	**1**	**34**	**66**	**10**	**21**	**1**	**64**	**31**	**65**
871: Septicemia or severe sepsis w/o MV 96+ hours w MCC	Medical	1.8%	2.1%	2	6	3	20	3	13	6	15	2	1	24	2
291: Heart failure & shock w MCC	**Medical**	**1.5%**	**1.6%**	**3**	**2**	**7**	**29**	**9**	**3**	**3**	**8**	**7**	**2**	**42**	**12**
003: ECMO or trach w MV 96+ hrs or PDX exc face, mouth & neck w maj O.R.	Surgical	0.2%	1.5%	4	91	31	10	1	187	64	142	16	6	100	1
194: Simple pneumonia & pleurisy w CC	Medical	2.1%	1.5%	5	9	5	65	22	7	5	7	4	13	12	18
481: Hip & femur procedures except major joint w CC	Surgical	0.8%	1.4%	6	73	2	3	53	314	133	207	25	41	58	177
292: Heart failure & shock w CC	Medical	1.6%	1.3%	7	3	14	63	37	2	7	9	9	16	26	36
065: Intracranial hemorrhage or cerebral infarction w CC	Medical	1.0%	1.3%	8	29	6	2	30	56	52	72	5	7	23	32
392: Esophagitis, gastroent & misc digest disorders w/o MCC	Medical	2.5%	1.3%	9	20	35	125	80	1	2	1	11	43	13	28
690: Kidney & urinary tract infections w/o MCC	Medical	1.9%	1.3%	10	11	4	64	43	14	16	13	3	19	7	52
247: Perc cardiovasc proc w drug-eluting stent w/o MCC	Surgical	1.4%	1.3%	11	66	195	239	268	5	1	2	79	299	144	30
641: Nutritional & misc metabolic disorders w/o MCC	Medical	1.7%	1.1%	12	16	9	58	84	9	15	12	12	22	5	60
329: Major small & large bowel procedures w MCC	Surgical	0.4%	1.1%	13	5	11	17	4	55	49	46	64	15	202	6
460: Spinal fusion except cervical w/o MCC	Surgical	0.6%	1.0%	14	7	29	7	194	46	20	10	23	550	75	40
287: Circulatory disorders except AMI, w card cath w/o MCC	Medical	1.3%	1.0%	15	31	98	103	42	4	4	5	71	154	48	33
293: Heart failure & shock w/o CC/MCC	Medical	1.3%	0.9%	16	10	40	123	233	8	11	14	29	40	79	70
683: Renal failure w CC	Medical	1.0%	0.9%	17	23	16	74	44	21	21	19	26	18	10	42
193: Simple pneumonia & pleurisy w MCC	Medical	0.9%	0.9%	18	22	18	60	17	17	24	45	17	17	44	17
312: Syncope & collapse	Medical	1.6%	0.9%	19	24	24	55	138	20	12	18	20	80	14	47
280: Acute myocardial infarction, discharged alive w MCC	Medical	0.6%	0.9%	20	13	15	26	18	22	34	39	48	4	45	37

Source: Dobson | DaVanzo analysis of research-identifiable 5% SAF for all sites of service, 2007-2009, wage index adjusted by setting and geographic region, and standardized to 2009 dollars. All episodes have been extrapolated to reflect the universe of Medicare beneficiaries.

[a] Medicare Episode Paid includes care from all facility-based and ambulatory care settings and excludes beneficiary co-payments.

[b] Episodes include deaths during index admission.

Exhibit 1.6: Top 20 MS-DRGs for HHA First Setting (Ranked by Medicare Episode Paid[a]) by First Setting for 60-Day Fixed-Length Post-Acute Episodes (2007-2009)

MS-DRG	Medical/ Surgical	Percent Episodes	Percent Episode Paid	HHA	Overall	SNF	IRF	LTCH	STACH	Comm-unity	ER	OP Therapy	Hospice	Other IP	No Care[b]
470: Major joint replacement or reattachment of lower extremity w/o MCC	**Surgical**	**4.7%**	**10.8%**	**1**	**1**	**1**	**1**	**34**	**66**	**10**	**21**	**1**	**64**	**31**	**65**
291: Heart failure & shock w MCC	**Medical**	**1.5%**	**1.8%**	**2**	**3**	**7**	**29**	**9**	**3**	**3**	**8**	**7**	**2**	**42**	**12**
292: Heart failure & shock w CC	Medical	1.6%	1.7%	3	7	14	63	37	2	7	9	9	16	26	36
234: Coronary bypass w cardiac cath w/o MCC	Surgical	0.3%	1.6%	4	47	59	31	85	82	58	50	468	612	635	108
329: Major small & large bowel procedures w MCC	Surgical	0.4%	1.6%	5	13	11	17	4	55	49	46	64	15	202	6
871: Septicemia or severe sepsis w/o MV 96+ hours w MCC	Medical	1.8%	1.5%	6	2	3	20	3	13	6	15	2	1	24	2
460: Spinal fusion except cervical w/o MCC	Surgical	0.6%	1.5%	7	14	29	7	194	46	20	10	23	550	75	40
330: Major small & large bowel procedures wCC	Surgical	0.6%	1.5%	8	25	32	67	40	29	29	27	114	57	127	22
194: Simple pneumonia & pleurisy w CC	Medical	2.1%	1.5%	9	5	5	65	22	7	5	7	4	13	12	18
293: Heart failure & shock w/o CC/MCC	Medical	1.3%	1.2%	10	16	40	123	233	8	11	14	29	40	79	70
690: Kidney & urinary tract infections w/o MCC	Medical	1.9%	1.0%	11	10	4	64	43	14	16	13	3	19	7	52
190: Chronic obstructive pulmonary disease w MCC	Medical	1.1%	1.0%	12	21	36	84	19	11	18	17	36	31	46	39
280: Acute myocardial infarction, discharged alive w MCC	Medical	0.6%	1.0%	13	20	15	26	18	22	34	39	48	4	45	37
220: Cardiac valve & oth maj cardiothoracic proc w/o card cath w CC	Surgical	0.1%	1.0%	14	75	70	48	148	160	98	94	287	573	606	148
191: Chronic obstructive pulmonary disease w CC	Medical	1.2%	1.0%	15	23	37	91	35	10	19	11	37	33	20	64
641: Nutritional & misc metabolic disorders w/o MCC	Medical	1.7%	1.0%	16	12	9	58	84	9	15	12	12	22	5	60
236: Coronary bypass w/o cardiac cath w/o MCC	Surgical	0.2%	1.0%	17	77	110	75	235	120	74	85	262	568	224	155
603: Cellulitis w/o MCC	Medical	1.2%	0.9%	18	30	26	119	29	27	33	24	14	86	33	80
233: Coronary bypass w cardiac cath w MCC	Surgical	0.1%	0.9%	19	60	57	12	14	102	95	101	229	201	386	24
392: Esophagitis, gastroent & misc digest disorders w/o MCC	Medical	2.5%	0.8%	20	9	35	125	80	1	2	1	11	43	13	28

Source: Dobson | DaVanzo analysis of research-identifiable 5% SAF for all sites of service, 2007-2009, wage index adjusted by setting and geographic region, and standardized to 2009 dollars. All episodes have been extrapolated to reflect the universe of Medicare beneficiaries.

[a] Medicare Episode Paid includes care from all facility-based and ambulatory care settings and excludes beneficiary co-payments.

[b] Episodes include deaths during index admission.

Episode Type 1: Post-Acute Episodes

Exhibit 1.7 shows the ranking of primary chronic conditions by total Medicare episode payments for each first setting. The top five primary chronic conditions represent almost 77.9 percent of total post-acute care episodes and are consistently ranked across all care settings. This indicates that patients with these primary chronic conditions are the most extensively represented and most expensive across facility-based, home health, and ambulatory care settings.

Exhibit 1.7: Primary Chronic Condition[a] (Ranked by Medicare Episode Paid[b]) by First Setting for 60-Day Fixed-Length Post-Acute Episodes (2007-2009)

Primary Chronic Condition	Percent of Episodes	HHA	Overall	SNF	IRF	LTCH	STACH	Comm-unity	ER	OP Therapy	Hospice	Other IP	No Care[c]
CHF*COPD	26.9%	1	1	1	1	1	1	1	1	1	1	1	1
DIABETES*CHF	13.3%	2	2	3	3	2	2	2	2	4	2	6	2
Osteoporosis	16.1%	3	3	2	2	5	3	3	3	3	4	4	5
Rheumatoid Arthritis/Osteoarthritis	14.8%	4	4	4	4	6	6	4	5	2	7	5	6
Chronic Obstructive Pulmonary Disease	6.8%	5	5	6	5	3	4	5	4	5	6	3	4
CHF*RENAL	5.6%	6	6	5	6	4	5	6	7	6	3	7	3
Lung Cancer	2.1%	7	10	11	11	10	10	9	11	14	5	13	12
Ischemic Heart Disease	2.3%	8	7	14	13	13	9	7	8	12	13	16	7
Heart Failure	2.2%	9	8	7	10	9	8	10	9	13	8	11	8
Depression	1.8%	10	9	12	12	8	7	8	6	9	15	2	11
None	1.2%	11	12	15	14	11	11	11	10	8	14	10	9
Stroke/Transient Ischemic Attack	1.2%	12	11	13	7	7	12	12	12	7	11	12	10
Alzheimer's Disease and Related Disorders	1.2%	13	13	9	9	12	14	14	13	11	10	9	14
Alzheimer's Disease	1.2%	14	14	8	15	15	16	16	15	10	9	8	15
Chronic Kidney Disease	0.7%	15	15	16	16	14	13	13	14	17	12	17	13
Colorectal Cancer	0.6%	16	17	17	18	16	15	15	16	19	16	18	18
Diabetes	0.5%	17	18	18	17	17	18	18	18	16	18	15	16
Hip/Pelvic Fracture	0.4%	18	16	10	8	18	19	21	21	15	17	14	19
Acute Myocardial Infarction	0.2%	19	19	20	21	21	17	17	17	23	21	22	17
Cataract	0.3%	20	20	19	19	20	21	19	19	18	22	21	20
Atrial Fibrillation	0.2%	21	21	21	20	19	20	20	20	21	19	20	21
Glaucoma	0.1%	22	22	22	22	24	22	23	22	20	24	19	22
Female Breast Cancer	0.1%	23	24	23	24	23	24	24	24	24	20	*	24
Prostate Cancer	0.1%	24	23	24	23	22	23	22	23	22	23	*	23
Endometrial Cancer	0.0%	25	25	25	25	*	25	25	25	25	25	*	25

Source: Dobson | DaVanzo analysis of research-identifiable 5% SAF for all sites of service, 2007-2009, wage index adjusted by setting and geographic region, and standardized to 2009 dollars.

[a] For methodology used to determine primary chronic condition, see Working Paper #1.

[b] Medicare Episode Paid includes care from all facility-based and ambulatory care settings and excludes beneficiary co-payments.

[c] Episodes include deaths during index admission.

* Primary Chronic Condition not present in this first setting.

Episode Type 1: Post-Acute Episodes

Exhibit 1.8 and Exhibit 1.9 show the number of episodes, total Medicare episode payments, and average Medicare episode payments by the number of chronic conditions per episode. The number of chronic conditions per episode is normally distributed, with an average of 5.1 chronic conditions represented per episode. As the number of chronic conditions per episode increases, the average Medicare episode payment increases.

Exhibit 1.8: Number of Episodes and Medicare Episode Paid by Number of Chronic Conditions for 60-Day Fixed-Length Post-Acute Episodes (2007-2009)

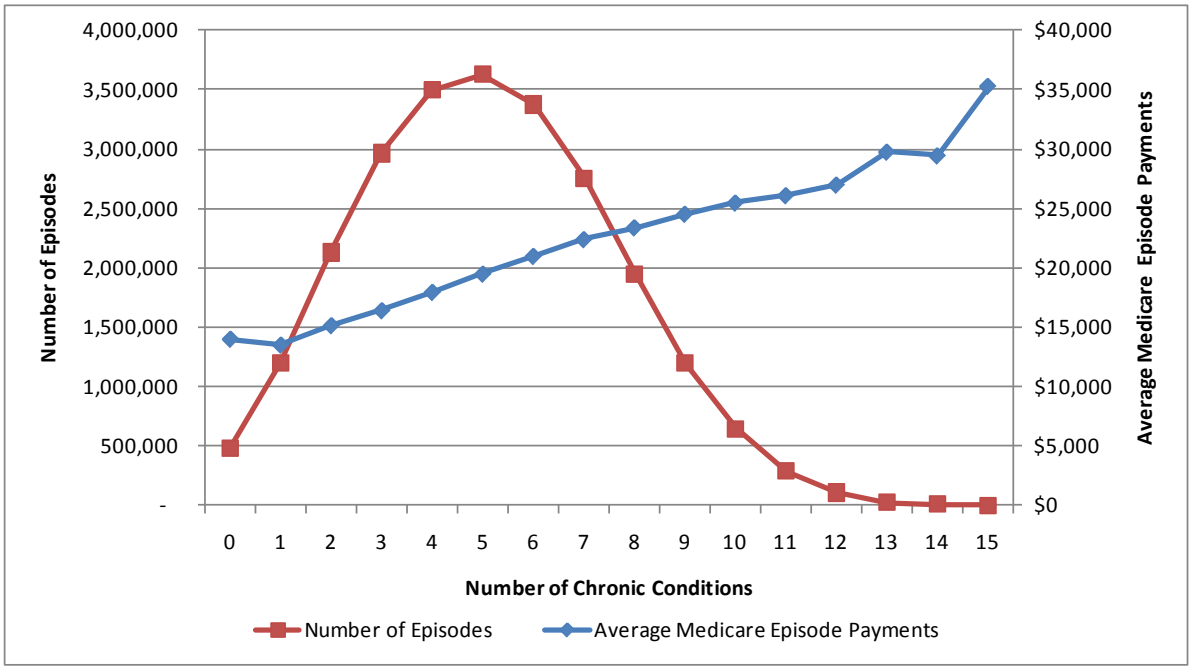
Number of Chronic Conditions	Number of Episodes	Medicare Episode Paid[a] (in millions)	Average Medicare Episode Paid
0	480,480	$6,744	$14,037
1	1,194,680	$16,181	$13,545
2	2,128,860	$32,303	$15,174
3	2,965,360	$48,717	$16,429
4	3,495,700	$62,822	$17,971
5	3,626,100	$70,715	$19,502
6	3,375,880	$70,864	$20,991
7	2,753,080	$61,668	$22,400
8	1,946,800	$45,536	$23,390
9	1,197,160	$29,367	$24,530
10	644,760	$16,421	$25,469
11	289,180	$7,545	$26,090
12	106,900	$2,884	$26,982
13	26,200	$779	$29,746
14	7,140	$210	$29,432
15	800	$28	$35,267
Total	**24,239,080**	**$472,786**	**$19,505**

Source: Dobson | DaVanzo analysis of research-identifiable 5% SAF for all sites of service, 2007-2009, wage index adjusted by setting and geographic region, and standardized to 2009 dollars. All episodes have been extrapolated to reflect the universe of Medicare beneficiaries.

[a] Medicare Episode Paid includes care from all facility-based and ambulatory care settings and excludes beneficiary co-payments.

Episode Type 1: Post-Acute Episodes

Exhibit 1.9: Number of Episodes and Average Medicare Episode Paid[a] by Number of Chronic Conditions for 60-Day Fixed-Length Post-Acute Episodes (2007-2009)



Source: Dobson | DaVanzo analysis of research-identifiable 5% SAF for all sites of service, 2007-2009, wage index adjusted by setting and geographic region, and standardized to 2009 dollars. All episodes have been extrapolated to reflect the universe of Medicare beneficiaries.
[a] Average Medicare Episode Paid includes care from all facility-based and ambulatory care settings and excludes beneficiary co-payments.

Distribution of Episodes and Medicare Episode Payments for Select MS-DRGs

In the remainder of the chapter we analyze the post-acute care episode payments for select MS-DRGs in more detail. These sections contain descriptive statistics on the distribution of episodes by first setting and the distribution of Medicare episode payments.

MS-DRG 470 – Major Joint Replacement or Reattachment of Lower Extremity w/o MCC

As presented above, MS-DRG 470 represents 4.7 percent of all post-acute episodes and 5.5 percent of total episode payments (Exhibit 1.5). In this section, we further analyze the post-acute episodes with an index acute care hospitalization of MS-DRG 470 to better understand the distribution of episode payments across facility- and non-facility based care settings. The ultimate goal of these analyses is to better understand how the Medicare episode payment and patient demographics differ by first setting.

Exhibit 1.10 shows the number of episodes and total episode payments by first setting for episodes with an index acute care hospitalization of MS-DRG 470. The Medicare episode paid amount reflects the payments for the total episode, including the index acute care hospitalization, facility, home health, and ambulatory care settings. Almost one-third (32.4 percent) of these episodes enter home health as the first setting, but represent

approximately one-quarter (25.4 percent) of the total episode payments for this MS-DRG. Another 38.0 percent of Medicare episodes have a first setting SNF, which represents 44.5 percent of the total episode payments. IRF first setting episodes represent 11.4 percent of the total episodes but represent 16.6 percent of the Medicare episode payments. Almost 18 percent of all episodes go to an ambulatory care setting following discharge from the acute care hospital, and represent almost 13 percent of total episode payments. Overall, episodes with facility-based care settings (and home health) as a first setting represent 82 percent of all episodes, and 87 percent of total episode payments for MS-DRG 470.

The average Medicare episode payment for HHA first setting episodes ($18,068) is very similar to the average payment for both Community ($17,340) and ER ($17,766) first setting episodes. This suggests that for MS-DRG 470, HHA first setting episodes payments approximate those that do not start within a formal care structure. The average episode payment for HHA first setting episodes is significantly lower than both SNF ($26,861) and IRF ($33,538) average episode payments. Average episode payment for LTCH first setting episodes is much higher, at $57,896. The overall average episode payment across all first settings is $22,986.

Exhibit 1.10: Distribution of Episodes and Medicare Episode Paid by First Setting for MS-DRG 470 for 60-Day Fixed-Length Post-Acute Episodes (2007-2009)

First Setting	Number of Episodes	Percent of Episodes	Medicare Episode Paid[a] (in millions)	Percent of Medicare Episode Paid	Average Medicare Episode Paid
HHA	366,140	32.4%	$6,616	25.4%	$18,068
SNF	430,240	38.0%	$11,557	44.5%	$26,861
IRF	128,680	11.4%	$4,316	16.6%	$33,538
LTCH	1,080	0.1%	$63	0.2%	$57,896
STACH	2,580	0.2%	$78	0.3%	$30,302
Community	134,240	11.9%	$2,328	9.0%	$17,340
ER	6,460	0.6%	$115	0.4%	$17,766
OP Therapy	53,980	4.8%	$815	3.1%	$15,103
Hospice	1,200	0.1%	$31	0.1%	$25,569
Other IP	460	0.0%	$14	0.1%	$30,574
No Care[b]	5,980	0.5%	$68	0.3%	$11,290
Total	**1,131,040**	**100.0%**	**$25,999**	**100%**	**$22,986**

Source: Dobson | DaVanzo analysis of research-identifiable 5% SAF for all sites of service, 2007-2009, wage index adjusted by setting and geographic region, and standardized to 2009 dollars. All episodes have been extrapolated to reflect the universe of Medicare beneficiaries.

[a] Medicare Episode Paid includes care from all facility-based and ambulatory care settings and excludes beneficiary co-payments.

[b] Episodes include deaths during index admission.

Episode Type 1: Post-Acute Episodes

Of the average total episode payment of $22,986, the care provided during the index acute care hospitalization accounts for an average of 58.2 percent, or $13,373 (Exhibit 1.11). This care includes the hospital stay, as well as any physician, hospital outpatient, or ER visits that occurred during the index acute care hospital stay.

Both the average index acute care hospitalization payments and the post-acute care payments vary significantly across first settings for MS-DRG 470.The 60 days of post-acute care have an average Medicare payment of $9,613. The average index acute care hospitalization payments range across first settings from $11,290 for No Care to $16,392 for LTCH episodes. This difference is likely due to outlier payments and other IPPS adjustment factors. That is, the lower than average index acute care hospital payments and lack of any post-acute care for No Care episodes suggests that these patients may have a lower clinical severity than patients in the other first settings. The average post-acute care payment for HHA first setting episodes is only slightly higher than the average payment for Community and ER first setting episodes ($4,967 compared to $4,163 for Community and $4,595 for ER). SNF and IRF first setting episodes have an average post-acute care payment of $13,243 and $19,675, respectively.

Exhibit 1.11: Average Medicare Episode Payment for Index Hospitalization and Post-Acute Care Services by First Setting for MS-DRG 470 for 60-Day Fixed-Length Post-Acute Episodes (2007-2009)

First Setting	Average Medicare Episode Paid[a]	Average Paid for Index Services[b]	Average Paid for Post Acute Care
HHA	$18,068	$13,101	$4,967
SNF	$26,861	$13,618	$13,243
IRF	$33,538	$13,863	$19,675
LTCH	$57,896	$16,392	$41,504
STACH	$30,302	$13,228	$17,074
Community	$17,340	$13,177	$4,163
ER	$17,766	$13,171	$4,595
OP Therapy	$15,103	$12,825	$2,277
Hospice	$25,569	$13,727	$11,842
Other IP	$30,574	$11,975	$18,599
No Care[c]	$11,290	$11,290	$0
Overall Average	**$22,986**	**$13,373**	**$9,613**

Source: Dobson | DaVanzo analysis of research-identifiable 5% SAF for all sites of service, 2007-2009, wage index adjusted by setting and geographic region, and standardized to 2009 dollars.

[a] Average Medicare Episode Paid includes care from all facility-based and ambulatory care settings and excludes beneficiary co-payments.

[b] Average Paid for Index services include the index acute care hospitalization payment, index outpatient payment, index physician payment, and the index ER payment.

[c] Episodes include deaths during index admission.

Episode Type 1: Post-Acute Episodes

Exhibit 1.12 shows the distribution of average Medicare episode payments and percent of total episode payments across care settings for each first setting. On average, the hospital inpatient payment for the acute care index acute care hospitalization represents one-half (50.3 percent) of the total episode payments, or $11,561 of the total average payment of $22,986. (The index acute care hospitalization only reflects the acute care hospital stay, and excludes other services provided to the patient during the stay, such as physician or ER visits or readmissions).

Due to the range in payment for post-acute care by first setting, the percent of total episode payments represented by the index acute care hospitalization varies significantly by first setting, and ranges from 23.4 percent for LTCH first setting episodes to 88.0 percent of No Care episodes. The individual hospital payment ranges from $9,930 for No Care to $13,567 for LTCH first setting episodes. (While No Care episodes have no care following the discharge from the hospitalization, these episodes contain payments for services from physicians, outpatient departments, and ER visits that occurred during the index acute care hospitalization. A transfer from one acute care hospital to another during the index acute care hospitalization is captured in the STACH payments for these patients.)

The index acute care hospitalization, facility-based, and home health care settings at any time during the episode represent about $19,980 of the total average episode payments for MS-DRG 470 (almost 87 percent of total episode payments). On average, $2,575 (or 11.0 percent of total episode payments) is associated with physician visits. This ranges from $1,021 for No Care (9.0 percent) to $5,655 for LTCH episodes (9.8 percent). Community first setting episodes have 15.1 percent of total episode payments associated with physician visits, but this only represents on average $2,617 per episode.

About 82.1 percent of all episodes have a first setting of HHA, SNF, IRF, LTCH, or STACH readmission. The first setting is typically associated with the largest proportion of episode payments (excluding the index acute care hospitalization). Almost one-fifth (18 percent) of episode payments are attributed to home health services for HHA first setting episodes, while SNF care represents one-third of episode payments for SNF first setting episodes.

Exhibit 1.12: Distribution of Average Medicare Episode Paid and Percent of Medicare Episode Paid by First Setting for MS-DRG 470 for 60-Day Fixed-Length Post-Acute Episodes (2007-2009)

First Setting	Percent of Episodes	Average Medicare Episode Paid[a]	Index Hospital-ization	HHA	SNF	IRF	LTCH	STACH	Out-patient	Physician	ER	OP Therapy	Hospice	Other IP
HHA	32.4%	$18,068	$11,432	$3,267	$63	$27	$15	$674	$105	$2,250	$39	$187	$4	$4
			63.3%	18.1%	0.4%	0.1%	0.1%	3.7%	0.6%	12.5%	0.2%	1.0%	0.0%	0.0%
SNF	38.0%	$26,861	$11,711	$1,627	$8,981	$91	$34	$1,311	$125	$2,685	$72	$169	$34	$23
			43.6%	6.1%	33.4%	0.3%	0.1%	4.9%	0.5%	10.0%	0.3%	0.6%	0.1%	0.1%
IRF	11.4%	$33,538	$11,745	$2,098	$1,330	$13,073	$74	$1,414	$113	$3,379	$52	$222	$12	$26
			35.0%	6.3%	4.0%	39.0%	0.2%	4.2%	0.3%	10.1%	0.2%	0.7%	0.0%	0.1%
LTCH	0.1%	$57,896	$13,567	$1,153	$3,986	$1,565	$27,399	$4,180	$125	$5,655	$47	$113	$106	$0
			23.4%	2.0%	6.9%	2.7%	47.3%	7.2%	0.2%	9.8%	0.1%	0.2%	0.2%	0.0%
STACH	0.2%	$30,302	$11,553	$965	$1,446	$707	$709	$10,386	$466	$3,573	$189	$258	$50	$0
			38.1%	3.2%	4.8%	2.3%	2.3%	34.3%	1.5%	11.8%	0.6%	0.9%	0.2%	0.0%
Community	11.9%	$17,340	$11,471	$440	$559	$960	$29	$949	$133	$2,617	$44	$121	$9	$7
			66.2%	2.5%	3.2%	5.5%	0.2%	5.5%	0.8%	15.1%	0.3%	0.7%	0.1%	0.0%
ER	0.6%	$17,766	$11,415	$960	$510	$167	$0	$1,145	$210	$2,548	$512	$268	$4	$29
			64.3%	5.4%	2.9%	0.9%	0.0%	6.4%	1.2%	14.3%	2.9%	1.5%	0.0%	0.2%
OP Therapy	4.8%	$15,103	$11,197	$47	$80	$25	$0	$641	$128	$1,951	$32	$996	$8	$0
			74.1%	0.3%	0.5%	0.2%	0.0%	4.2%	0.8%	12.9%	0.2%	6.6%	0.1%	0.0%
Hospice	0.1%	$25,569	$11,659	$200	$2,099	$737	$0	$2,878	$63	$2,665	$77	$22	$5,168	$0
			45.6%	0.8%	8.2%	2.9%	0.0%	11.3%	0.2%	10.4%	0.3%	0.1%	20.2%	0.0%
Other IP	0.0%	$30,574	$10,154	$1,046	$2,871	$571	$0	$1,123	$115	$2,869	$194	$260	$0	$11,370
			33.2%	3.4%	9.4%	1.9%	0.0%	3.7%	0.4%	9.4%	0.6%	0.8%	0.0%	37.2%
No Care[b]	0.5%	$11,290	$9,930	$0	$0	$0	$0	$302	$24	$1,021	$13	$0	$0	$0
			88.0%	0.0%	0.0%	0.0%	0.0%	2.7%	0.2%	9.0%	0.1%	0.0%	0.0%	0.0%
Overall Average	**100.0%**	**$22,986**	**$11,561**	**$1,979**	**$3,672**	**$1,651**	**$58**	**$1,060**	**$119**	**$2,575**	**$56**	**$214**	**$23**	**$19**
			50.3%	**8.6%**	**16.0%**	**7.2%**	**0.3%**	**4.6%**	**1.0%**	**11.0%**	**0.0%**	**1.0%**	**0.0%**	**0.0%**

Source: Dobson | DaVanzo analysis of research-identifiable 5% SAF for all sites of service, 2007-2009, wage index adjusted by setting and geographic region, and standardized to 2009 dollars. All episodes have been extrapolated to reflect the universe of Medicare beneficiaries.

[a] Average Medicare Episode Paid includes care from all facility-based and ambulatory care settings and excludes beneficiary co-payments.

[b] Episodes include deaths during index admission.

Due to the different Medicare payment systems, average payment per episode does not allow for adequate comparison of differences in care received across first settings. A large predictor of total episode payments is the length of stay in facility-based care settings. Exhibit 1.13 shows the distribution of average lengths of stays and number of visits for MS-DRG 470 episodes by first setting. On average, the length of stay for an index acute care hospitalization of MS-DRG 470 is 3.7 days. Outpatient therapy (OP Therapy) and ER first setting episodes have the shortest index acute care hospitalization length of stay with 3.2 days, compared to 6.0 and 7.5 days for Hospice and LTCH first setting episodes, respectively. Due to the design of the Medicare home health benefit (60 day episodes), patients spend, on average, 15.7 days in home health during the overall episode, compared to 8.3 days in a SNF, 1.3 days in an IRF, and 0.1 day in an LTCH. On average, patients receive 16.9 physician visits and 1.3 outpatient visits during the 60-day fixed length episode (see "Overall Average" row).

The number of days spent in home health and SNF for these first setting episodes are similar (24.6 and 20.2 days, respectively), but the average payments for these settings within their respective first setting episodes are very different - $3,267 for HHA, and $8,981 for SNF (See Exhibit 1.12). It is interesting to note that SNF, IRF, and LTCH first setting episodes all utilize home health services during the episode. On average, 13.6 days of SNF first setting episodes are spent in home health, 18.0 days of IRF first setting episodes, and 10.7 days of LTCH first setting episodes are spent in home health. HHA first setting episodes average fewer physician visits than facility-based care first setting episodes

Exhibit 1.13: Distribution of Average Length of Stay (Number of Visits) per Episode by First Setting for MS-DRG 470 for 60-Day Fixed-Length Post-Acute Episode (2007-2009)

First Setting	Percent of Episodes	Index Hospital-ization	HHA	SNF	IRF	LTCH	STACH	Out-patient	Physician	ER	OP Therapy	Hospice	Other IP
HHA	32.4%	3.4	24.6	0.1	0.0	0.0	0.4	1.3	13.6	0.1	0.6	0.0	0.0
SNF	38.0%	4.1	13.6	20.2	0.1	0.0	0.8	1.2	18.2	0.2	0.5	0.2	0.0
IRF	11.4%	4.0	18.0	3.4	10.6	0.1	0.9	1.1	24.0	0.1	0.6	0.1	0.0
LTCH	0.1%	7.5	10.7	10.0	1.3	24.6	2.5	0.6	38.6	0.1	0.2	0.1	0.0
STACH	0.2%	3.4	8.8	3.2	0.4	0.6	5.2	2.1	24.3	0.4	0.7	0.4	0.0
Community	11.9%	3.3	3.7	1.3	0.8	0.0	0.6	1.3	17.7	0.1	0.4	0.1	0.0
ER	0.6%	3.2	7.7	1.2	0.1	0.0	0.6	1.6	16.9	1.3	0.9	0.0	0.0
OP Therapy	4.8%	3.2	0.4	0.2	0.0	0.0	0.3	1.5	10.4	0.1	2.7	0.1	0.0
Hospice	0.1%	6.0	1.5	4.5	0.5	0.0	1.5	0.2	17.3	0.2	0.1	28.7	0.0
Other IP	0.0%	4.0	8.8	7.3	0.3	0.0	0.5	2.3	18.9	0.2	0.8	0.0	8.6
No Care[a]	0.5%	3.5	0.0	0.0	0.0	0.0	0.1	0.0	4.9	0.0	0.0	0.0	0.0
Overall Average	**100.0%**	**3.7**	**15.7**	**8.3**	**1.3**	**0.1**	**0.6**	**1.3**	**16.9**	**0.1**	**0.6**	**0.1**	**0.02**

Source: Dobson | DaVanzo analysis of research-identifiable 5% SAF for all sites of service, 2007-2009, wage index adjusted by setting and geographic region, and standardized to 2009 dollars

[a] Episodes include deaths during index admission.

Episode Type 1: Post-Acute Episodes

To better understand the role clinical characteristics play in the distribution of episode payments by first setting, we investigated the distribution of episode payments and frequency of chronic conditions by first setting.

Exhibit 1.14 and Exhibit 1.15 show the number of episodes, total Medicare episode payments, and average episode payments by the number of chronic conditions per episode for MS-DRG 470. On average, there are 4.2 chronic conditions represented per episode. The average episode payment increases as the number of chronic conditions per episode increases.

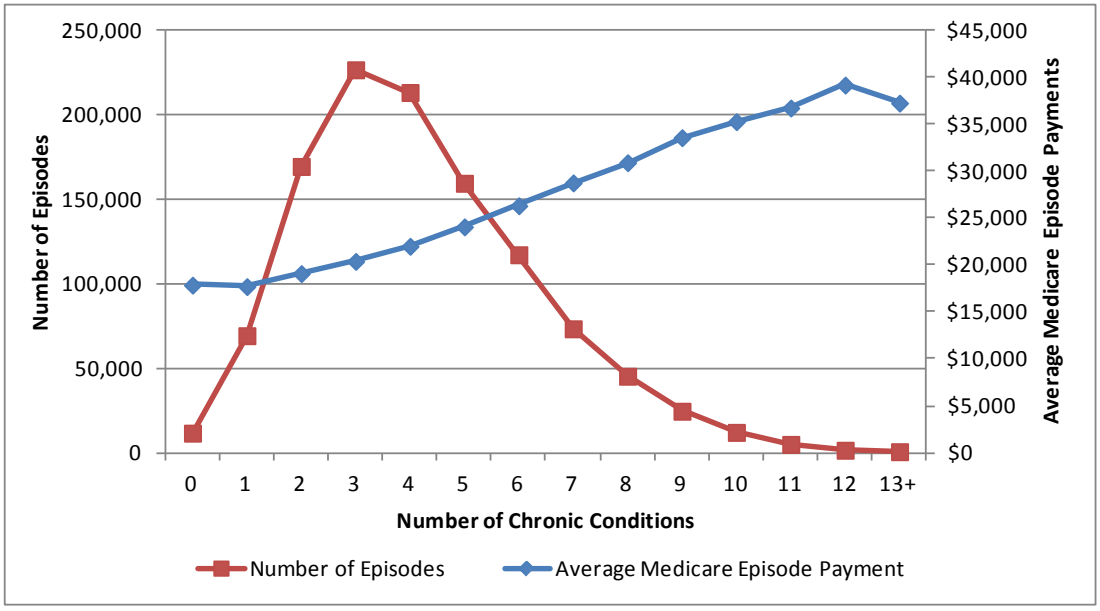
Exhibit 1.14: Number of Episodes and Medicare Episode Paid by Number of Chronic Conditions for MS-DRG 470 for 60-Day Fixed-Length Post-Acute Episodes (2007-2009)

Number of Chronic Conditions	Number of Episodes	Medicare Episode Paid[a] (in millions)	Average Medicare Episode Paid
0	11,680	$209	$17,880
1	69,400	$1,230	$17,724
2	169,640	$3,242	$19,109
3	226,900	$4,631	$20,411
4	213,440	$4,700	$22,022
5	159,680	$3,847	$24,092
6	117,340	$3,091	$26,344
7	73,480	$2,115	$28,780
8	45,400	$1,404	$30,934
9	24,660	$829	$33,598
10	12,140	$429	$35,307
11	5,020	$185	$36,765
12	1,560	$61	$39,207
13+	700	$26	$37,286
Total	**1,131,040**	**$25,999**	**$22,986**

Source: Dobson | DaVanzo analysis of research-identifiable 5% SAF for all sites of service, 2007-2009, wage index adjusted by setting and geographic region, and standardized to 2009 dollars. All episodes have been extrapolated to reflect the universe of Medicare beneficiaries.

[a] Medicare Episode Paid includes care from all facility-based and ambulatory care settings and excludes beneficiary co-payments.

Exhibit 1.15: Number of Episodes and Average Medicare Episode Paid by Number of Chronic Conditions for MS-DRG 470 for 60-Day Fixed-Length Post-Acute Episodes (2007-2009)



Source: Dobson | DaVanzo analysis of research-identifiable 5% SAF for all sites of service, 2007-2009, wage index adjusted by setting and geographic region, and standardized to 2009 dollars. All episodes have been extrapolated to reflect the universe of Medicare beneficiaries.
[a] Medicare Episode Paid includes care from all facility-based and ambulatory care settings and excludes beneficiary co-payments.

We focus the remainder of our analysis of MS-DRG 470 on episodes that have a first setting of facility-based post-acute care, HHA, or Community, which represent 94 percent of MS-DRG 470 episodes.

Exhibit 1.16 shows the average episode payment across select first settings for MS-DRG 470. Facility-based care, HHA, and Community first setting episodes represent $25.0 billion in Medicare payments. The average episode payment for episodes that are initiated in these first settings is $23,479, which is higher than the average episode payment across all first settings of $22,986. HHA first setting episodes are $5,411 less than the overall average episode payment for these first settings, while LTCH first setting episodes are $34,417 more than the overall average.

It is unclear based on this data whether these differences are due to differences in patient severity, due to differences in efficiency across first settings, or due to a combination of both.

Exhibit 1.16: Average Medicare Episode Paid by Select First Setting for MS-DRG 470 for 60-Day Fixed-Length Post-Acute Episodes (2007-2009)

First Setting	Number of Episodes	Medicare Episode Paid[a] (in millions)	Average Medicare Episode Paid	Average Overall Paid	Difference
HHA	366,140	$6,616	$18,068	$23,479	$5,411
SNF	430,240	$11,557	$26,861	$23,479	($3,382)
IRF	128,680	$4,316	$33,538	$23,479	($10,059)
LTCH	1,080	$63	$57,896	$23,479	($34,417)
STACH	2,580	$78	$30,302	$23,479	($6,823)
Community	134,240	$2,328	$17,340	$23,479	$6,140
Total	**1,062,960**	**$24,958**	**$23,479**	**$23,479**	**$0**

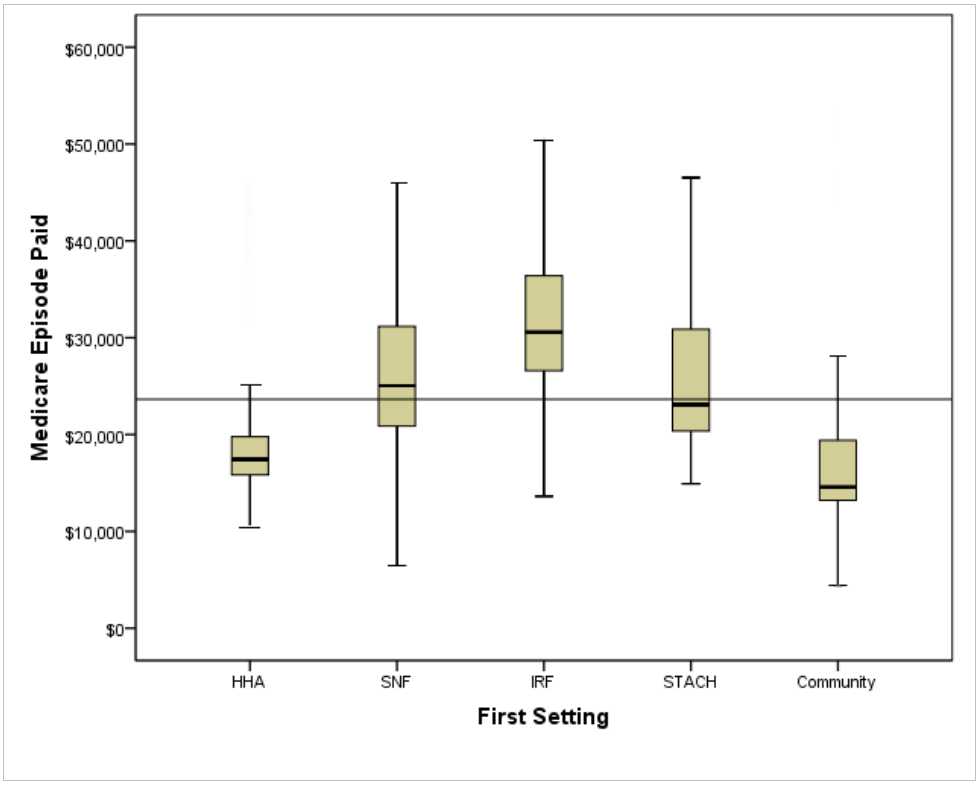
Source: Dobson | DaVanzo analysis of research-identifiable 5% SAF for all sites of service, 2007-2009, wage index adjusted by setting and geographic region, and standardized to 2009 dollars. All episodes have been extrapolated to reflect the universe of Medicare beneficiaries.

[a] Medicare Episode Paid includes care from all facility-based and ambulatory care settings and excludes beneficiary co-payments.

Exhibit 1.16A shows the distribution of total Medicare episode payments by first setting for MS-DRG 470 using a box plot.[11] SNF first setting episodes have the largest range of total episode payments, while HHA first setting episodes have the smallest range. Additionally, the inter-quartile range (25th to 75th percentile as indicated by the box) of HHA first setting episodes clusters more tightly around the median total episode payment than the other first settings.

[11] A box plot is a measure of dispersion reflecting the assumptions of a normal distribution. The "box" in the middle represents 50 percent of the observations (also known as the interquartile range), and the dark line in the box represents the median value. The "whiskers" represent two standard deviations of the observations. The solid line across all first settings represents the average Medicare episode payment across all select first settings.

Exhibit 1.16A: Distribution of Medicare Episode Paid[a] by Select First Settings for MS-DRG 470 for 60-Day Fixed-Length Post-Acute Episodes (2007-2009)



Source: Dobson | DaVanzo analysis of research-identifiable 5% SAF for all sites of service, 2007-2009, wage index adjusted by setting and geographic region, and standardized to 2009 dollars.

[a] Medicare Episode Paid includes care from all facility-based and ambulatory care settings and excludes beneficiary co-payments.

Episode Type 1: Post-Acute Episodes

Exhibit 1.17 shows the rank for primary chronic conditions by total episode payments for select first setting for episodes with an index acute care hospitalization of MS-DRG 470. The top two primary chronic conditions for HHA first setting episodes – rheumatoid arthritis/osteoarthritis and osteoporosis – are the first two primary chronic conditions for all episodes overall, as well as for SNF and IRF first setting episodes. The third ranked primary chronic condition for HHA – chronic obstructive pulmonary disease (COPD) – is ranked fifth overall and in SNF and IRF first setting episodes.

Exhibit 1.17: Primary Chronic Condition[a] (Ranked by Medicare Episode Paid[b]) by Select First Setting for MS-DRG 470 for 60-Day Fixed-Length Post-Acute Episodes (2007-2009)

Primary Chronic Condition	Percent of Home Health Episodes	HHA	Overall	SNF	IRF	LTCH	STACH	Community
Rheumatoid Arthritis/Osteoarthritis	54.0%	1	1	1	2	3	1	1
Osteoporosis	23.7%	2	2	2	1	1	3	2
Chronic Obstructive Pulmonary Disease	7.1%	3	5	5	5	7	4	4
CHF*COPD	4.9%	4	3	3	3	2	2	3
DIABETES*CHF	5.0%	5	4	4	4	4	5	5
CHF*RENAL	1.4%	6	6	7	6	5	6	6
None	1.4%	7	8	9	9	*	10	7
Lung Cancer	0.6%	8	9	8	8	*	8	9
Hip/Pelvic Fracture	0.5%	9	7	6	7	6	7	8
Ischemic Heart Disease	0.4%	10	10	10	10	*	9	10
Depression	0.3%	11	11	11	12	*	*	12
Cataract	0.2%	12	12	17	*	*	11	11
Diabetes	0.1%	13	13	13	13	*	*	15
Chronic Kidney Disease	0.1%	14	15	16	14	*	*	14
Heart Failure	0.1%	15	14	12	11	*	*	13

Source: Dobson | DaVanzo analysis of research-identifiable 5% SAF for all sites of service, 2007-2009, wage index adjusted by setting and geographic region, and standardized to 2009 dollars.

[a] For methodology used to determine primary chronic condition, see Working Paper #1.

[b] Medicare Episode Paid includes care from all facility-based and ambulatory care settings and excludes beneficiary co-payments.

* Primary chronic condition not present in this setting.

Patient demographics can be a determinant of which patients are more likely to receive care in different first settings. Exhibit 1.18 shows the distribution of episodes with an index acute care hospitalization of MS-DRG 470 by select patient demographic categories, by first setting. Patients who live alone are about twice as likely to go to SNF or IRF as to HHA. This may be largely due to the important role and responsibility of caregivers in home health care. Patients may enter SNFs and IRFs due to their lack of caregiver support. If a patient does not have a caregiver at home, home health support is not an appropriate option for the patient.

Episode Type 1: Post-Acute Episodes

On average, HHA first setting episodes following MS-DRG 470 serve a younger population (with only 3.1 percent over 85 years old), compared to almost 20 percent of SNF and IRF first setting episodes. Home health's younger population may also be related to the overall lower rate of death during the episode for MS-DRG 470. However, HHA first setting episodes have a similar proportion of patients who reside in rural areas, those who are non-white, and dual eligibles compared to those patients with a first setting of SNF and IRF. Due to the intensity of care provided in LTCHs, patients with LTCHs as a first setting are older and more likely to die during the episode.

Based on the first setting of the episode, 6.2 percent of HHA first setting episodes for MS-DRG 470 contain an acute care hospital readmission. This does not mean, however, that the readmission immediately followed the home health stay. A larger proportion of episodes that have a first setting of SNF and IRFs contain a hospital readmission – 12.2 percent for SNF, and 12.4 percent for IRFs. More than one-quarter of LTCH first setting episodes contain a hospital readmission.

Exhibit 1.18: Distribution of Episodes by Beneficiary Demographic Characteristics by Select First Setting for MS-DRG 470 for 60-Day Fixed-Length Post-Acute Episodes (2007-2009)

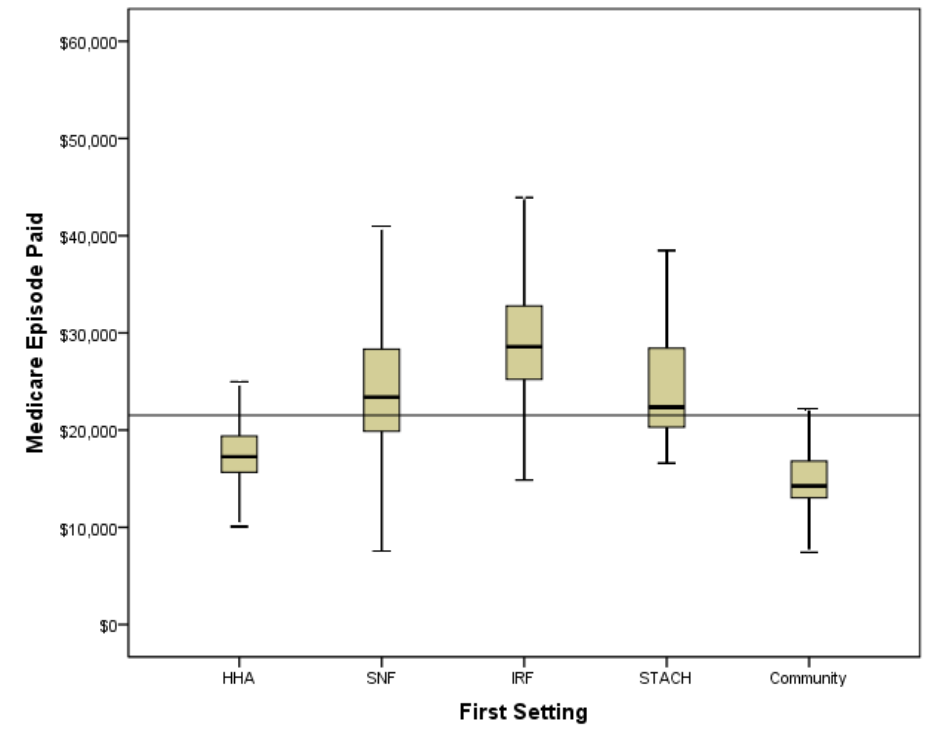
Beneficiary Demographic	HHA	SNF	IRF	LTCH	STACH	Community
Live Alone	20.6%	44.0%	40.2%	27.8%	20.2%	9.4%
Over 85 Years Old	3.1%	18.0%	19.5%	24.1%	3.1%	5.3%
Female	63.8%	78.2%	77.2%	66.7%	56.6%	60.6%
Resides in Rural Area	27.0%	26.5%	23.5%	16.7%	41.9%	34.8%
Race Non-White	8.9%	8.3%	9.7%	14.8%	7.0%	7.2%
Died During Episode	1.9%	8.0%	7.4%	25.9%	5.4%	3.3%
Dual Eligible	10.0%	14.2%	12.8%	20.4%	14.0%	8.8%
Episode Contains Readmission	6.2%	12.2%	12.4%	27.8%	100.0%	7.3%
Overall Average	**32.4%**	**38.0%**	**11.4%**	**0.1%**	**0.2%**	**11.9%**

Source: Dobson | DaVanzo analysis of research-identifiable 5% SAF for all sites of service, 2007-2009, wage index adjusted by setting and geographic region, and standardized to 2009 dollars.

Episode Type 1: Post-Acute Episodes

Exhibit 1.19 shows the distribution of total Medicare episode payments by first setting for episodes with an index acute care hospitalization of MS-DRG 470 and a primary chronic condition of rheumatoid arthritis/osteoarthritis using a box plot. SNF first setting episodes have the largest range of total episode payments, while HHA and Community first setting episodes have the smallest range. The inter-quartile range (25th to 75th percentile as indicated by the box) of HHA and Community first setting episodes clusters more tightly around the median than the other facility-based care settings, indicating the variety of care patients received within the episode after a facility-based first setting.

Exhibit 1.19: Medicare Episode Paid[a] with Primary Chronic Condition of Rheumatoid Arthritis/Osteoarthritis[b] by Select First Setting for MS-DRG 470 for 60-Day Fixed-Length Post-Acute Episodes (2007-2009)



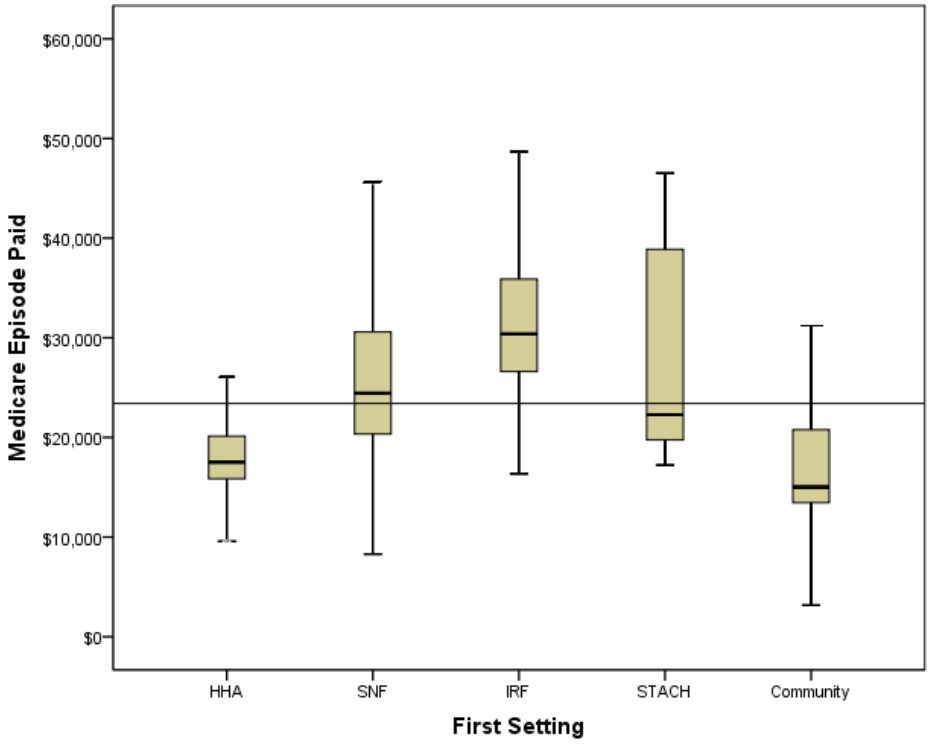
Source: Dobson | DaVanzo analysis of research-identifiable 5% SAF for all sites of service, 2007-2009, wage index adjusted by setting and geographic region, and standardized to 2009 dollars. Data are trimmed at 2.5 standard deviations.

[a] Medicare Episode Paid includes care from all facility-based and ambulatory care settings and excludes beneficiary co-payments.

[b] For methodology used to determine primary chronic condition, see Working Paper #1.

Exhibit 1.20 shows the distribution of total Medicare episode payments by first setting for episodes with an index acute care hospitalization of MS-DRG 470 and a primary chronic condition of COPD. Episodes with a primary chronic condition of COPD and first setting of HHA have total episode payments that are less concentrated than the distribution of episode payments for episodes with a primary chronic condition of rheumatoid arthritis/osteoarthritis.

Exhibit 1.20: Medicare Episode Paid[a] with Primary Chronic Condition of COPD[b] by Select First Setting for MS-DRG 470 for 60-Day Fixed-Length Post-Acute Episodes (2007-2009)



Source: Dobson | DaVanzo analysis of research-identifiable 5% SAF for all sites of service, 2007-2009, wage index adjusted by setting and geographic region, and standardized to 2009 dollars. Data are trimmed at 2.5 standard deviations.

[a] Medicare Episode Paid includes care from all facility-based and ambulatory care settings and excludes beneficiary co-payments.

[b] For methodology used to determine primary chronic condition, see Working Paper #1.

MS-DRG 291 – Heart Failure and Shock with MCC

MS-DRG 291 is the second-ranked medical MS-DRG by Medicare episode payments overall and represents 1.5 percent of all episodes and 1.6 percent of total episode payments (Exhibit 1.5). In this section, we further analyze the episodes with an index acute care hospitalization MS-DRG 291 to better understand the distribution of episode payments across facility- and ambulatory-based care settings. The ultimate goal of these

analyses is to better understand what drives Medicare episode payments in each first setting and the differences in the patient populations treated in each setting.

Exhibit 1.21 shows the frequency of episodes and total Medicare episode payments by first setting for episodes with an index acute care hospitalization of MS-DRG 291. The Medicare episode paid amount reflects the payments for the total episode, including the index acute care hospitalization, facility, and ambulatory care settings. Almost one-half (48.0 percent) of all episodes have a first setting of Community, which includes physician and hospital outpatient visits and represents 42.5 percent of total episode payments. SNF first setting episodes – the highest proportion of any facility-based care setting – represent 17.8 percent of total episodes and 23.6 percent of the total episode payments. Another 15.2 percent of total episodes enter HHA as the first setting, and represent 14.2 percent of the total episode payments for this MS-DRG. Overall, facility-based and HHA first settings represent 38.3 percent of all episodes and 47.6 percent of total episode payments.

HHA first setting episodes have an average episode payment ($20,211), which is lower than facility-based care settings and similar to Community and OP Therapy first setting episodes. The average episode payment for all ambulatory care settings and HHA is lower than the overall average episode payment across all first settings of $21,572.

Exhibit 1.21: Distribution of Episodes and Medicare Episode Paid by First Setting for MS-DRG 291 for 60-Day Fixed-Length Post-Acute Episodes (2007-2009)

First Setting	Number of Episodes	Percent of Episodes	Medicare Episode Paid[a] (in millions)	Percent of Medicare Episode Paid	Average Medicare Episode Paid
HHA	54,640	15.2%	$1,104	14.2%	$20,211
SNF	64,200	17.8%	$1,833	23.6%	$28,551
IRF	3,460	1.0%	$157	2.0%	$45,426
LTCH	2,480	0.7%	$154	2.0%	$62,123
STACH	12,840	3.6%	$450	5.8%	$35,030
Community	172,700	48.0%	$3,303	42.5%	$19,127
ER	8,200	2.3%	$181	2.3%	$22,124
OP Therapy	3,780	1.1%	$76	1.0%	$20,004
Hospice	13,780	3.8%	$212	2.7%	$15,412
Other IP	240	0.1%	$10	0.1%	$41,459
No Care[b]	23,660	6.6%	$284	3.7%	$12,024
Total	**359,980**	**100.0%**	**$7,765**	**100.0%**	**$21,572**

Source: Dobson | DaVanzo analysis of research-identifiable 5% SAF for all sites of service, 2007-2009, wage index adjusted by setting and geographic region, and standardized to 2009 dollars. All episodes have been extrapolated to reflect the universe of Medicare beneficiaries.

[a] Medicare Episode Paid includes care from all facility-based and ambulatory care settings and excludes beneficiary co-payments.

[b] Episodes include deaths during index admission.

Episode Type 1: Post-Acute Episodes

Unlike episode payments for MS-DRG 470, more than one-half of the average Medicare episode payments are for the care following the index acute care hospitalization (Exhibit 1.22). Of the average total episode payment of $21,572, the care provided during the index acute care hospitalization accounts for 43.0 percent of the total episode payment ($9,291). This care includes the hospital stay, as well as any physician, hospital outpatient, or ER visits that occurred during the hospital stay. The 60 days of post-acute care comprises an average of $12,280 total Medicare episode payments. The average index acute care hospitalization payments are slightly more stable across first settings than presented in MS-DRG 470, and range from $8,718 for Other IP first setting episodes to $12,144 for LTCH first setting episodes.

Post-acute care episode payments, however, range significantly from $5,766 for patients with Hospice first setting episodes to $49,979 for LTCH first setting episodes. The average post-acute care payment for HHA first setting episodes is only slightly higher than the average payment for Community and OP Therapy first setting episodes ($11,104 compared to $10,205 for Community and $11,147 for OP Therapy. SNF and IRF episodes contain $18,784 and $34,420 of post-acute care services, respectively.

Exhibit 1.22: Average Medicare Episode Payment for Index Hospitalization and Post-Acute Care Services by First Setting for MS-DRG 291 for 60-Day Fixed-Length Post-Acute Episodes (2007-2009)

First Setting	Average Medicare Episode Paid[a]	Average Paid for Index Services[b]	Average Paid for Post-Acute Care
HHA	$20,211	$9,108	$11,104
SNF	$28,551	$9,767	$18,784
IRF	$45,426	$11,006	$34,420
LTCH	$62,123	$12,144	$49,979
STACH	$35,030	$9,185	$25,844
Community	$19,127	$8,922	$10,205
ER	$22,124	$9,387	$12,736
OP Therapy	$20,004	$8,858	$11,147
Hospice	$15,412	$9,646	$5,766
Other IP	$41,459	$8,718	$32,741
No Care[c]	$12,024	$12,024	$0
Overall Average	**$21,572**	**$9,291**	**$12,280**

Source: Dobson | DaVanzo analysis of research-identifiable 5% SAF for all sites of service, 2007-2009, wage index adjusted by setting and geographic region, and standardized to 2009 dollars.

[a] Medicare Episode Paid includes care from all facility-based and ambulatory care settings and excludes beneficiary co-payments.

[b] Average Paid for Index Services includes the index acute care hospitalization payment, index outpatient payment, index physician payment, and the index ER payment.

[c] Episodes include deaths during index admission.

Episode Type 1: Post-Acute Episodes

Exhibit 1.23 shows the distribution of the average Medicare episode payments and percent of total episode payments across each care setting by first setting. On average, the Medicare payments for the index acute care hospitalization alone represents just over one-third (36.6 percent) of total episode payments, or $7,903 of the total average payment of $21,572. (The index acute care hospitalization only reflects the acute care hospital stay, and excludes other services provided to the patient during the stay, such as physician or ER visits). Due to the range in payments for post-acute care by first setting, the percent of total episode payments for the index acute care hospitalization varies significantly by first setting, and ranges from 15.1 percent for LTCH first setting episodes to 73.7 percent of No Care episodes. (While No Care episodes have no care following the discharge from the hospitalization, these episodes contain payments for services from physicians, outpatient departments, and ER visits that occurred during the index acute care hospitalization. A transfer from one acute care hospital to another during the index acute care hospitalization is captured as STACH payments for these patients.) The payment for the index acute care hospitalization ranges from $7,346 for OP Therapy to $9,363 for LTCH.

More than one-quarter of the average Medicare episode payment is attributed to acute care rehospitalizations during the episode. The average cost of a rehospitalization varies by first setting, with Hospice first setting episodes having the lowest readmission costs per episode ($928) and STACH first setting episodes having the most expensive readmissions costs per episode ($19,039).

The index acute care hospitalization, facility-based, and home health settings at any time during the episode represent about $17,013 of the total average episode payments for MS-DRG 291 (78.9 percent of total episode payments). On average, $2,943 (or 13.6 percent of total episode payments) is associated with physician visits. This ranges from $1,674 for No Care (13.9 percent) to $7,686 for LTCH episodes (12.4 percent). Community first setting episodes have 15.0 percent of total episode payments associated with physician visits, but this only represents on average $2,872 per episode.

Exhibit 1.23: Distribution of Average Medicare Episode Paid and Percent of Medicare Episode Paid by First Setting for MS-DRG 291 for 60-Day Fixed-Length Post-Acute Episodes (2007-2009)

First Setting	Percent of Episodes	Average Medicare Episode Paid[a]	Index Hospital-ization	HHA	SNF	IRF	LTCH	STACH	Out-patient	Physician	ER	OP Therapy	Hospice	Other IP
HHA	15.2%	$20,211	$7,687	$2,524	$573	$149	$181	$5,343	$580	$2,867	$103	$7	$191	$6
			38.0%	12.5%	2.8%	0.7%	0.9%	26.4%	0.0%	14.2%	0.5%	0.0%	0.9%	2.9%
SNF	17.8%	$28,551	$8,016	$545	$10,296	$127	$102	$5,139	$510	$3,279	$145	$27	$316	$47
			28.1%	1.9%	36.1%	0.4%	0.4%	18.0%	0.2%	11.5%	0.5%	0.1%	1.1%	1.8%
IRF	1.0%	$45,426	$8,685	$1,700	$2,687	$17,001	$678	$8,852	$352	$4,991	$68	$52	$360	$0
			19.1%	3.7%	5.9%	37.4%	1.5%	19.5%	0.0%	11.0%	0.1%	0.1%	0.8%	0.8%
LTCH	0.7%	$62,123	$9,363	$590	$2,158	$804	$29,869	$10,772	$396	$7,686	$126	$34	$288	$38
			15.1%	1.0%	3.5%	1.3%	48.1%	17.3%	0.1%	12.4%	0.2%	0.1%	0.5%	0.6%
STACH	3.6%	$35,030	$7,989	$506	$1,095	$345	$440	$19,039	$913	$4,235	$222	$9	$184	$53
			22.8%	1.4%	3.1%	1.0%	1.3%	54.4%	0.2%	12.1%	0.6%	0.0%	0.5%	2.6%
Community	48.0%	$19,127	$7,750	$250	$389	$174	$101	$5,601	$1,710	$2,872	$140	$28	$92	$20
			40.5%	1.3%	2.0%	0.9%	0.5%	29.3%	0.1%	15.0%	0.7%	0.1%	0.5%	8.9%
ER	2.3%	$22,124	$8,117	$401	$651	$158	$16	$7,071	$1,372	$3,324	$703	$21	$198	$92
			36.7%	1.8%	2.9%	0.7%	0.1%	32.0%	0.4%	15.0%	3.2%	0.1%	0.9%	6.2%
OP Therapy	1.1%	$20,004	$7,346	$65	$490	$0	$179	$5,475	$887	$3,449	$117	$1,787	$209	$0
			36.7%	0.3%	2.4%	0.0%	0.9%	27.4%	0.0%	17.2%	0.6%	8.9%	1.0%	4.4%
Hospice	3.8%	$15,412	$7,992	$3	$177	$0	$0	$928	$137	$1,790	$60	$5	$4,320	$0
			51.9%	0.0%	1.1%	0.0%	0.0%	6.0%	0.0%	11.6%	0.4%	0.0%	28.0%	0.9%
Other IP	0.1%	$41,459	$7,422	$549	$2,982	$0	$3,737	$3,822	$321	$4,398	$284	$0	$455	$17,490
			17.9%	1.3%	7.2%	0.0%	9.0%	9.2%	42.2%	10.6%	0.7%	0.0%	1.1%	0.8%
No Care[b]	6.6%	$12,024	$8,861	$0	$0	$0	$0	$1,418	$33	$1,674	$38	$0	$0	$0
			73.7%	0.0%	0.0%	0.0%	0.0%	11.8%	0.0%	13.9%	0.3%	0.0%	0.0%	0.3%
Overall Average	**100.0%**	**$21,572**	**$7,903**	**$649**	**$2,218**	**$313**	**$327**	**$5,603**	**$1,086**	**$2,943**	**$140**	**$40**	**$314**	**$35**
			36.6%	**3.0%**	**10.3%**	**1.5%**	**1.5%**	**26.0%**	**5.0%**	**13.6%**	**0.7%**	**0.2%**	**1.5%**	**0.2%**

Source: Dobson | DaVanzo analysis of research-identifiable 5% SAF for all sites of service, 2007-2009, wage index adjusted by setting and geographic region, and standardized to 2009 dollars.

[a] Average Medicare Episode Paid includes care from all facility-based and ambulatory care settings and excludes beneficiary co-payments.

[b] Episodes include deaths during index admission.

Due to the differences in Medicare payment systems, the average payment per episode does not allow for a comparison of differences in care received across settings. A large predictor of total episode payments is the length of stay in facility-based care settings. Exhibit 1.24 shows the distribution of average lengths of stays and number of visits for MS-DRG 291 episodes by first setting. On average, the length of stay for an index acute care hospitalization of MS-DRG 291 is 5.9 days. Community first setting episodes have the shortest index acute care hospitalization length of stay with 4.7 days, compared to 9.9 and 9.4 days for LTCH and IRF first setting episodes, respectively. Patients spend, on average, 9.6 days in home health during the episode, compared to 6.3 days in a SNF, 0.2 days in an IRF, and 0.3 days in a LTCH. On average, patients receive 27.2 physician visits during the 60-day episode, which indicates that patients are likely seeing several specialists.

For MS-DRG 291, the average lengths of stay in the facility-based and HHA settings vary significantly by first setting. For an HHA first setting episode, the average length of stay in home health is 39.1 days, compared to an average of 29.5 days for a SNF stay in a SNF first setting episode. Even though the stay in the first setting is 10 days shorter for a SNF versus HHA episode, the average payment for care in the first setting varies significantly - $2,524 for home health stay in a HHA first setting episode, and $10,296 for a SNF stay in a SNF episode (see Exhibit 1.23). Similar to MS-DRG 470, all other facility-based first setting episodes for MS-DRG 291 used home health care as well.

Exhibit 1.24: Distribution of Average Length of Stay (Number of Visits) per Episode by First Setting for MS-DRG 291 for 60-Day Fixed-Length Post-Acute Episodes (2007-2009)

First Setting	Percent of Episodes	Index Hospital-ization	HHA	SNF	IRF	LTCH	STACH	Out-patient	Physician	ER	OP Therapy	Hospice	Other IP
HHA	15.2%	6.8	39.1	1.5	0.1	0.1	3.1	2.0	28.1	0.2	0.0	1.0	0.0
SNF	17.8%	8.0	6.7	29.5	0.1	0.1	3.4	1.3	31.1	0.3	0.1	1.6	0.1
IRF	1.0%	9.4	18.1	6.8	13.1	0.6	5.3	1.3	44.8	0.1	0.1	1.6	0.0
LTCH	0.7%	9.9	7.4	6.5	0.6	23.1	4.8	0.9	60.2	0.2	0.2	0.5	0.0
STACH	3.6%	5.4	8.1	2.4	0.3	0.3	10.1	1.6	36.9	0.4	0.0	0.8	0.1
Community	48.0%	4.7	3.7	1.0	0.1	0.1	2.7	2.4	26.1	0.3	0.1	0.4	0.0
ER	2.3%	4.8	6.0	1.7	0.1	0.0	3.8	1.9	28.8	1.6	0.1	1.1	0.1
OP Therapy	1.1%	6.4	0.8	1.4	0.0	0.1	4.0	2.6	33.7	0.2	2.3	1.3	0.0
Hospice	3.8%	7.4	0.1	0.5	0.0	0.0	0.4	0.3	16.6	0.1	0.0	20.9	0.0
Other IP	0.1%	5.8	8.5	7.2	0.0	1.6	3.0	0.2	43.3	0.4	0.0	3.2	21.2
No Care[a]	6.6%	6.8	0.0	0.0	0.0	0.0	0.5	0.1	15.2	0.1	0.0	0.0	0.0
Overall Average	**100.0%**	**5.9**	**9.6**	**6.3**	**0.2**	**0.3**	**3.0**	**1.9**	**27.2**	**0.3**	**0.1**	**1.5**	**0.04**

Source: Dobson | DaVanzo analysis of research-identifiable 5% SAF for all sites of service, 2007-2009, wage index adjusted by setting and geographic region, and standardized to 2009 dollars. All episodes have been extrapolated to reflect the universe of Medicare beneficiaries.

[a] Episodes include deaths during index admission.

Episode Type 1: Post-Acute Episodes

To better understand the role that clinical characteristics play in the distribution of episode payments by first setting, we investigated the distribution of episode payments and frequency of chronic conditions by first setting.

Exhibit 1.25 and Exhibit 1.26 show the number of episodes, total Medicare episode payments, and average episode payments by the number of chronic conditions per episode for MS-DRG 291. On average there are of 6.6 chronic conditions represented per episode. Generally, the average Medicare episode payment increases monotonically as the number of chronic conditions per episode increases. However, the Medicare episode payments for episodes that contain no chronic conditions are $30,454 per episode on average. This is due to several outlier episodes that have significant episode costs even though they have no chronic condition flags.

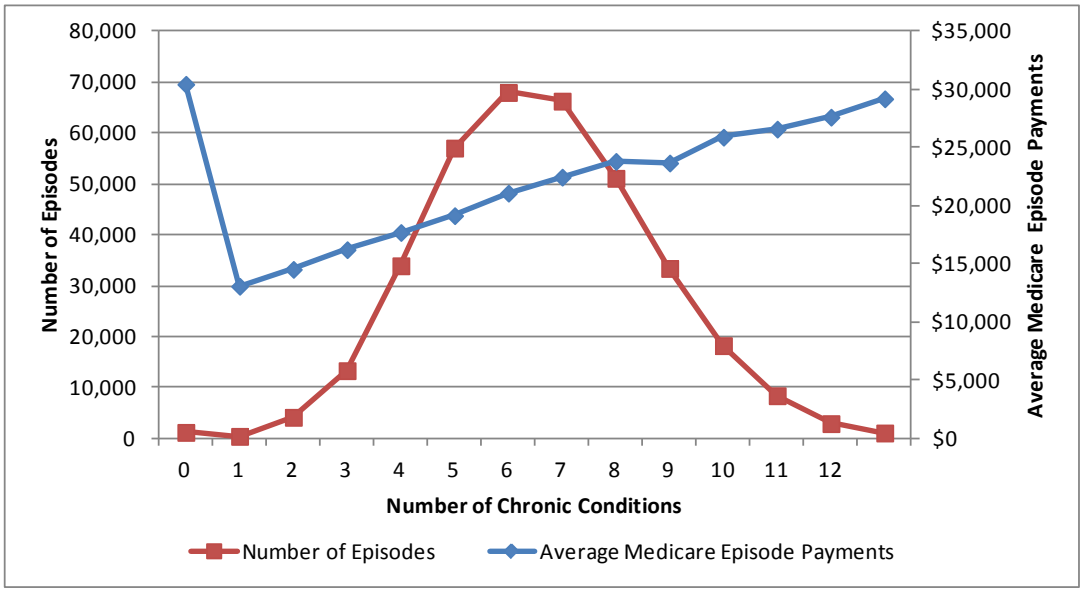
Exhibit 1.25: Number of Episodes and Medicare Episode Paid by Number of Chronic Conditions for MS-DRG 291 for 60-Day Fixed-Length Post-Acute Episodes (2007-2009)

Number of Chronic Conditions	Number of Episodes	Medicare Episode Paid [a] (in millions)	Average Medicare Episode Paid
0	1,240	$38	$30,454
1	460	$6	$13,097
2	4,200	$61	$14,549
3	13,360	$217	$16,241
4	33,960	$602	$17,719
5	57,080	$1,094	$19,164
6	68,000	$1,435	$21,097
7	66,300	$1,490	$22,473
8	51,140	$1,219	$23,829
9	33,440	$792	$23,688
10	18,280	$474	$25,908
11	8,440	$225	$26,601
12	2,960	$82	$27,628
13+	1,120	$33	$29,204
Total	**359,980**	**$7,765**	**$21,572**

Source: Dobson | DaVanzo analysis of research-identifiable 5% SAF for all sites of service, 2007-2009, wage index adjusted by setting and geographic region, and standardized to 2009 dollars. All episodes have been extrapolated to reflect the universe of Medicare beneficiaries.

[a] Medicare Episode Paid includes care from all facility-based and ambulatory care settings and excludes beneficiary co-payments.

Exhibit 1.26: Number of Episodes and Average Medicare Episode Paid by Number of Chronic Conditions for MS-DRG 291 for 60-Day Fixed-Length Post-Acute Episodes (2007-2009)



Source: Dobson | DaVanzo analysis of research-identifiable 5% SAF for all sites of service, 2007-2009, wage index adjusted by setting and geographic region, and standardized to 2009 dollars. All episodes have been extrapolated to reflect the universe of Medicare beneficiaries.
[a] Average Medicare Episode Paid includes care from all facility-based and ambulatory care settings and excludes beneficiary co-payments.

Since the facility-based care settings, HHA, and Community first setting episodes with an index acute care hospitalization of MS-DRG 291 represent 86.3 percent of all episodes for this MS-DRG, we focus the remainder of our analysis on these care settings. The following analyses further investigate the differences in the patient characteristics by first setting.

Exhibit 1.27 shows the average Medicare episode payments across select first settings for MS-DRG 291. These first setting episodes (including HHA, SNF, IRF, LTCH, STACH, and Community first setting episodes) represent $7.0 billion in Medicare payments. The average Medicare episode payment for episodes that are initiated in these selected first settings is $22,562, which is slightly higher than the average episode payment across all first settings of $21,572 (Exhibit 1.23). HHA first setting episodes are $2,351 less than the overall average episode payment for these select first settings, while LTCH first setting episodes are $39,561 more than the overall average. As shown in Exhibit 1.23 above, a large driver of the average episode payment for Community first setting episodes is acute care hospital readmissions.

Exhibit 1.27 shows that for some patients, clinically appropriate use of HHA as a first setting to moderate use of the other care settings (other than the Community) could potentially reduce Medicare episode payments per episode by an average of $2,351.

Exhibit 1.27: Medicare Episode Paid by Select First Setting for MS-DRG 291 for 60-Day Fixed-Length Post-Acute Episode (2007-2009)

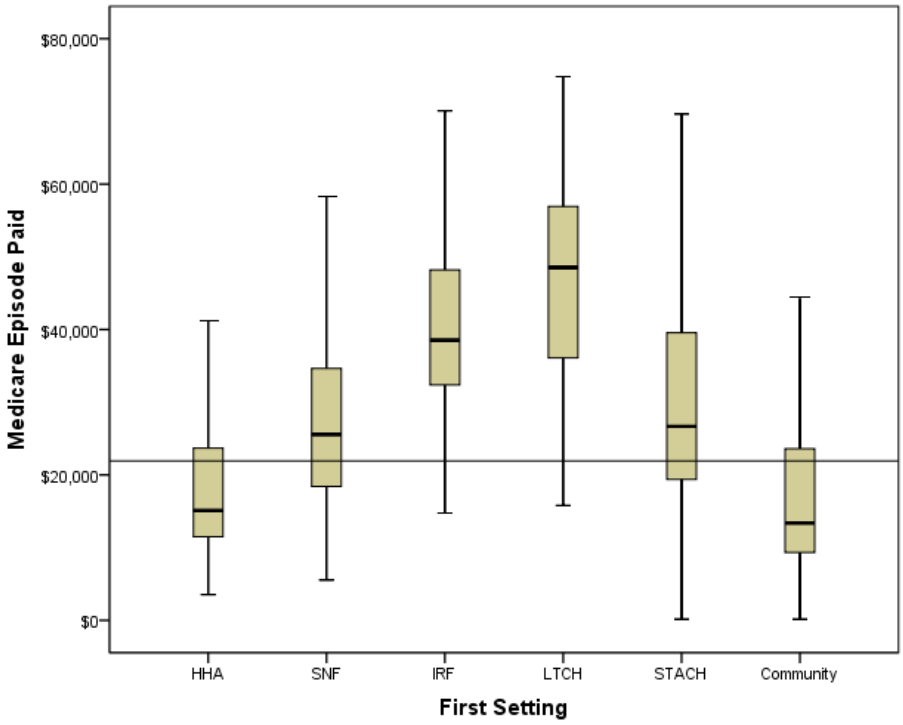
First Setting	Number of Episodes	Medicare Episode Paid[a] (in millions)	Average Medicare Episode Paid	Average Overall Paid	Difference
HHA	54,640	$1,104	$20,211	$22,562	$2,351
SNF	64,200	$1,833	$28,551	$22,562	($5,989)
IRF	3,460	$157	$45,426	$22,562	($22,864)
LTCH	2,480	$154	$62,123	$22,562	($39,561)
STACH	12,840	$450	$35,030	$22,562	($12,468)
Community	172,700	$3,303	$19,127	$22,562	$3,435
Total	**310,320**	**$7,001**	**$22,562**	**$22,562**	**$0**

Source: Dobson | DaVanzo analysis of research-identifiable 5% SAF for all sites of service, 2007-2009, wage index adjusted by setting and geographic region, and standardized to 2009 dollars. All episodes have been extrapolated to reflect the universe of Medicare beneficiaries.

[a] Medicare Episode Paid includes care from all facility-based and ambulatory care settings and excludes beneficiary co-payments.

Exhibit 1.27A shows the distribution of total Medicare episode payments by first setting for MS-DRG 291 using a box plot. STACH first setting episodes have the largest range of total episode payments, likely due to the variety of reasons patients are readmitted to the acute care hospital within the episode. The inter-quartile range (25^{th} to 75^{th} percentile as indicated by the box) of total episode payments for HHA and Community first setting episodes clusters more tightly around the median, and is lower than the other facility-based first settings.

Exhibit 1.27A: Distribution of Medicare Episode Paid[a] by Select First Setting for MS-DRG 291 for 60-Day Fixed-Length Post-Acute Episodes (2007-2009)



Source: Dobson | DaVanzo analysis of research-identifiable 5% SAF for all sites of service, 2007-2009, wage index adjusted by setting and geographic region, and standardized to 2009 dollars. Data are trimmed at 2.5 standard deviations.
[a] Medicare Episode Paid includes care from all facility-based and ambulatory care settings.
[a] For methodology used to determine primary chronic condition, see Working Paper #1.

Patient demographics can be a determinant of the first setting to which a patient is discharged after the index acute care hospitalization. Exhibit 1.28 shows the distribution of episodes with an index acute care hospitalization of MS-DRG 291 by select patient demographic characteristics, such as "lives alone." HHA first setting episodes contain patients that are equally as likely to live alone compared to patients with the first setting of SNF, but are more likely to live alone than IRF first setting patients.

On average, HHA first setting episodes following MS-DRG 291 serve a younger population (with only 36.6 percent over 85 years old) compared to more than 50 percent in SNF. HHA first setting episodes have a similar proportion of female, dual eligibles, and non-white patients compared to those patients with a first setting of IRF.

Patients with a STACH or Community first setting represent a different patient demographic than the facility-based care settings. Both STACH and Community episodes contain a smaller proportion of patients who live alone, are over 85 years old, and are female.

Exhibit 1.28: Distribution of Episodes by Beneficiary Demographic Characteristics by Select First Setting for MS-DRG 291 for 60-Day Fixed-Length Post-Acute Episodes (2007-2009)

Beneficiary Demographic	HHA	SNF	IRF	LTCH	STACH	Community
Live Alone	40.0%	40.8%	30.1%	21.0%	23.1%	20.5%
Over 85 Years Old	36.6%	51.5%	30.1%	25.8%	20.1%	19.7%
Female	62.3%	68.0%	65.9%	60.5%	47.5%	51.7%
Resides in Rural Area	18.0%	24.9%	23.1%	16.9%	25.5%	24.0%
Race Non-White	17.6%	12.8%	17.3%	29.8%	31.6%	28.6%
Died During Episode	42.8%	58.3%	45.7%	56.5%	48.3%	34.4%
Dual Eligible	22.6%	32.9%	19.7%	37.1%	31.8%	30.3%
Episode Contains Readmission	37.2%	37.7%	45.7%	29.8%	100.0%	34.8%
Overall Average	**15.2%**	**17.8%**	**1.0%**	**0.7%**	**3.6%**	**48.0%**

Source: Dobson | DaVanzo analysis of research-identifiable 5% SAF for all sites of service, 2007-2009, wage index adjusted by setting and geographic region, and standardized to 2009 dollars.

Exhibit 1.29 shows the rank for total episode payments of primary chronic conditions for select first settings for episodes with an index acute care hospitalization of MS-DRG 291. The top three chronic conditions overall – CHF*COPD, DIABETES*CHF, and CHF*RENAL – represent 94.8 percent of episodes and are the first three primary chronic conditions for HHA as well as across all other first settings. The largest difference in the ranking of chronic conditions across first settings is among the episodes with no chronic conditions (None). Patients with no chronic conditions are ranked fourth among IRF, LTCH, and STACH episodes, and seventh for HHA and overall.

Exhibit 1.29: Primary Chronic Condition[a] (Ranked by Medicare Episode Paid[b]) by Select First Setting for MS-DRG 291 for 60-Day Fixed-Length Post-Acute Episodes (2007-2009)

Primary Chronic Condition	Percent of Home Health Episodes	HHA	Overall	SNF	IRF	LTCH	STACH	Community
CHF*COPD	62.5%	1	1	1	1	1	1	1
DIABETES*CHF	20.6%	2	2	2	2	2	2	2
CHF*RENAL	11.7%	3	3	3	3	3	3	3
Heart Failure	2.1%	4	4	4	5	5	5	4
Osteoporosis	1.4%	5	5	6	7	*	6	6
Rheumatoid Arthritis/Osteoarthritis	1.2%	6	6	5	6	*	7	7
None	0.2%	7	7	9	4	4	4	5
Lung Cancer	0.1%	8	8	7	8	*	8	9
Hip/Pelvic Fracture	0.1%	9	9	8	*	*	*	8
Alzheimer's Disease and Related Disorders or Senile	0.0%	*	10	*	*	*	*	11
Chronic Obstructive Pulmonary Disease	0.0%	*	11	*	*	*	*	10

Source: Dobson | DaVanzo analysis of research-identifiable 5% SAF for all sites of service, 2007-2009, wage index adjusted by setting and geographic region, and standardized to 2009 dollars.

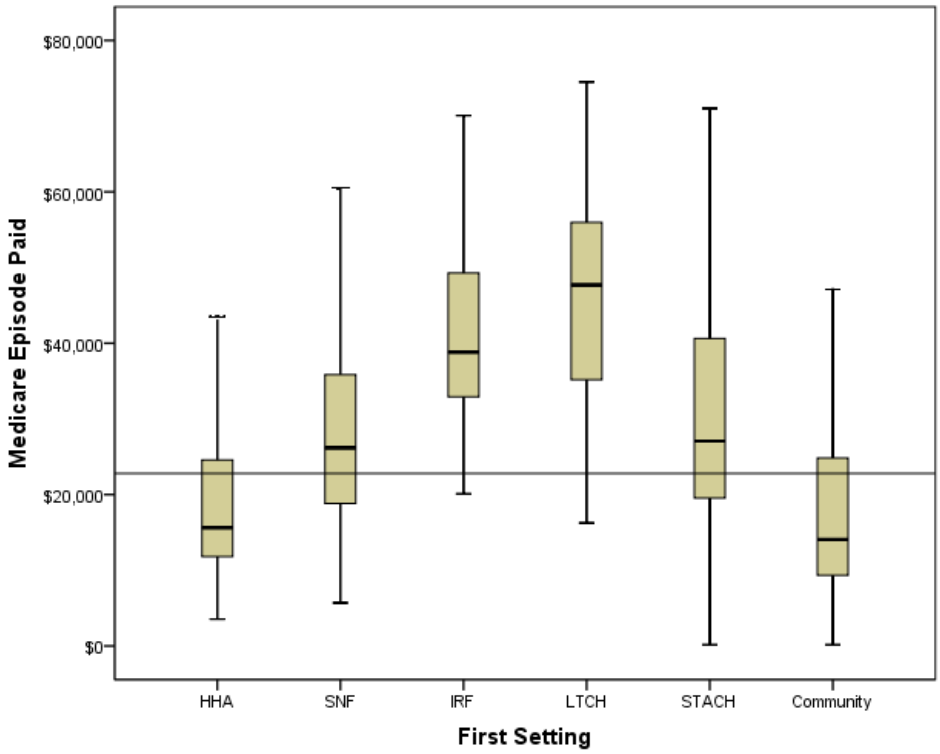
[a] For methodology used to determine primary chronic condition, see Working Paper #1.

[b] Medicare Episode Paid includes care from all facility-based and ambulatory care settings.

* Primary Chronic Condition not present in this setting.

Exhibit 1.30 shows the distribution of total episode payments by first setting for episodes with an index acute care hospitalization of MS-DRG 291 and a primary chronic condition of CHF*COPD. HHA and Community first setting episodes have the lowest average Medicare episode payment with their 75th percentile payment value resembling the overall average payment across all settings. HHA and Community first setting episodes have a similar distribution of payments per episode, and SNF and STACH payments are similar to each other.

Exhibit 1.30: Medicare Episode Paid[a] with Primary Chronic Condition of CHF*COPD[b] by Select First Setting for MS-DRG 291 for 60-Day Fixed-Length Post-Acute Episodes (2007-2009)



Source: Dobson | DaVanzo analysis of research-identifiable 5% SAF for all sites of service, 2007-2009, wage index adjusted by setting and geographic region, and standardized to 2009 dollars. Data are trimmed at 2.5 standard deviations.

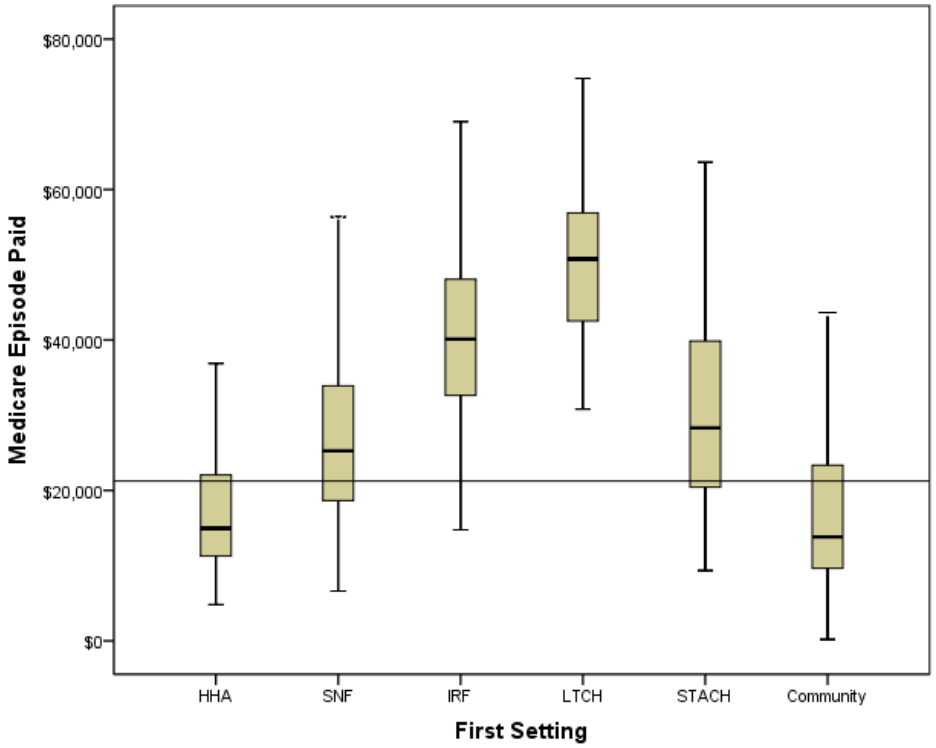
[a] Medicare Episode Paid includes care from all facility-based and ambulatory care settings.

[a] For methodology used to determine primary chronic condition, see Working Paper #1.

Episode Type 1: Post-Acute Episodes

Exhibit 1.31 shows the distribution of total episode payments by first setting for episodes with an index acute care hospitalization of MS-DRG 291 and a primary chronic condition of DIABETES*CHF. HHA and Community first setting episodes continue to have the lowest average Medicare episode payment, with the 75th percentile approximating the overall average episode payment. The distribution of payments for episodes with a primary chronic condition of DIABETES*CHF by first setting resembles the distribution of payments for episodes with CHF*COPD, presented above.

Exhibit 1.31: Medicare Episode Paid[a] with Primary Chronic Condition of DIABETES*CHF[b] by Select First Setting for MS-DRG 291 for 60-Day Fixed-Length Post-Acute Episode (2007-2009)



Source: Dobson | DaVanzo analysis of research-identifiable 5% SAF for all sites of service, 2007-2009, wage index adjusted by setting and geographic region, and standardized to 2009 dollars. Data are trimmed at 2.5 standard deviations.

[a] Medicare Episode Paid includes care from all facility-based and ambulatory care settings.

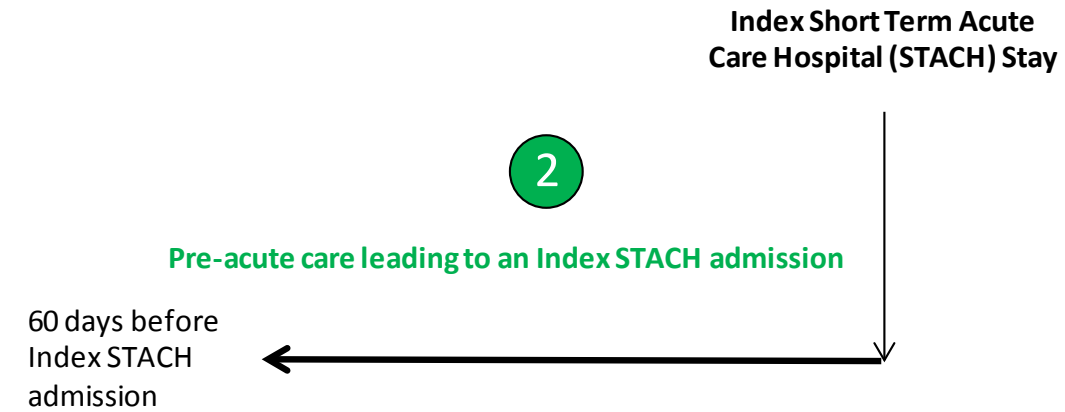
[a] For methodology used to determine primary chronic condition, see Working Paper #1.

Episode Type 2: 60-Day Pre-Acute Care Episodes

Brief Review of Episode Definition[12]

Initiated by an index acute care hospital stay, the Type 2 episode captures all pre-acute care (facility-based, home health, and ambulatory) that patients receive preceding the index acute care hospital admission. This episode type was constructed to include all care within 60 days prior to the index acute care hospital admission as well as the index admission itself (Exhibit 2.1). This episode type will be used to understand the type of care that precedes the index acute care hospitalization that was analyzed in Episode Type 1.

Exhibit 2.1: Description of Pre-Acute Care Episode



[12] For a complete review of the episode definition, see *Working Paper #1: Creating and Benchmarking Episodes: Baseline Statistics of Episode Frequency and Patient Diagnoses.*

Episode Type 2: Pre-Acute Episodes

Type 2 episodes are clinically defined by the patient's primary chronic condition. A primary chronic condition was determined by mapping each chronic condition identified in the patients' CCW claims data onto one of the HCCs used to determine expected payments in the Medicare Advantage program and then ranking in order of severity. Patients with two select disease interactions were ranked as the highest risk. For example, patients with both CHF and COPD were ranked with a higher severity index score than single conditions (CHF*COPD). The other two interacted conditions include diabetes and CHF (DIABETES*CHF), and CHF and renal failure (CHF*RENAL).

For those patients who do not have these three disease interaction categories, the primary chronic condition is determined by their highest ranked chronic condition. That is, if a patient has more than one chronic condition, their primary chronic condition is the one with the highest community risk score according to the most closely related HCC. Therefore, in order to have a single mutually exclusive primary chronic condition for each patient, patients are only represented in one primary chronic condition category. We present a crosswalk of CCW chronic conditions to HCCs in Appendix A.

The Medicare episode payment data presented for the pre-acute care episodes include both payments for the care provided during the fixed-length episode prior to the index acute care hospitalization as well as the index acute care hospitalization itself. The Medicare payments related to the index acute care hospitalization are included in both the Episode Type 1 and Episode Type 2 analyses; therefore the Medicare payments for these episode types cannot be added together to calculate the total care before and after the index acute care hospitalization, as it will double count the payments for the index acute care hospitalization. For select sections within this chapter, however, we present payments for pre-acute care episodes excluding the index acute care hospitalization.

Across all three years, there are a total of 25,664,640 Type 2 episodes that represent $344.2 billion in Medicare payments. The number of episodes represented in this analysis by year differs slightly from the post-acute care episodes due to the run-off of claims. That is, a post-acute care episode cannot start after October 31, 2009, but the index acute care hospitalization for a pre-acute care episode can be December 31, 2009. Pre-acute care episodes started between October 31, 2009 and December 31, 2009 will not have an accompanying post-acute care episode. Since pre-acute care episodes cannot be constructed for index acute care hospitalizations that occur prior to March 2, 2007, the proportion of total Medicare fee-for-service expenditures for 2007 (33.6 percent) is somewhat underestimated. In 2008 and 2009, the pre-acute care episodes represent about 38 percent of total Medicare fee-for-service spending.

Exhibit 2.2 shows the total number of episodes and Medicare payments by year.

Episode Type 2: Pre-Acute Episodes

Exhibit 2.2: Number of Episodes and Medicare Episode Paid for 60-Day Fixed-Length Pre-Acute Episodes (2007-2009)

Year	Number of Episodes	Medicare Episode Paid[a]	Total Medicare Fee-for-Service Expenditures[b]	Percent of Total Medicare Fee-for-Service Expenditures
2007	7,691,740	$100,812,764,640	$299,900,000,000	33.6%
2008	9,173,580	$121,895,475,080	$308,300,000,000	39.5%
2009	8,799,320	$121,475,160,760	$325,400,000,000	37.3%
Total	**25,664,640**	**$344,183,400,480**	**n/a**	**n/a**

Source: Dobson | DaVanzo analysis of research-identifiable 5% SAF for all sites of service, 2007-2009, wage index adjusted by setting and geographic region, and standardized to 2009 dollars. All episodes have been extrapolated to reflect the universe of Medicare beneficiaries.

[a] Medicare Episode Paid includes care from all facility-based and ambulatory care settings and excludes beneficiary co-payments.

[b] Congressional Budget Office, March Baselines for Medicare, 2008-2010.

Distribution of Episodes and Medicare Payments by Primary Chronic Condition

Exhibit 2.3 shows the distribution of episodes and Medicare episode payments by episode primary chronic condition, sorted from highest to lowest community risk score. The episode is assigned the most severe chronic condition, (e.g., an "osteoporosis episode" will often contain numerous less-severe conditions). This mutually exclusive assignment of conditions allows us to conduct analyses by chronic condition without duplicating the number of episodes or any Medicare payments.

The most prevalent primary chronic condition is the combination CHF*COPD, representing 24.9 percent of episodes, and 27.3 percent of Medicare episode payments. Osteoporosis is the second most prevalent primary chronic condition, with 15.0 percent of episodes and 12.8 percent of Medicare episode payments.

Episode Type 2: Pre-Acute Episodes

Exhibit 2.3: Distribution of Episodes and Medicare Episode Paid Defined by Primary Chronic Condition[a] for 60-Day Fixed-Length Pre-Acute Episodes (2007-2009)

Primary Chronic Condition	Number of Episodes	Percent of Episodes	Medicare Episode Paid[b] (in millions)	Percent of Medicare Episode Paid
CHF*COPD	6,383,860	24.9%	$93,949	27.3%
DIABETES*CHF	3,423,060	13.3%	$52,601	15.3%
CHF*RENAL	1,436,720	5.6%	$21,638	6.3%
Lung Cancer	516,480	2.0%	$8,599	2.5%
Osteoporosis	3,858,860	15.0%	$44,045	12.8%
COPD	1,974,880	7.7%	$24,335	7.1%
Rheumatoid Arthritis/Osteoarthritis	2,820,200	11.0%	$34,294	10.0%
Hip/Pelvic Fracture	149,120	0.6%	$2,011	0.6%
Heart Failure	669,660	2.6%	$8,893	2.6%
Alzheimer's Disease	340,860	1.3%	$3,297	1.0%
Alzheimer's Disease and Related Disorders or Senile	361,020	1.4%	$4,070	1.2%
Stroke/Transient Ischemic Attack	443,100	1.7%	$5,503	1.6%
Colorectal Cancer	132,200	0.5%	$2,413	0.7%
Depression	802,560	3.1%	$9,287	2.7%
Acute Myocardial Infarction	104,440	0.4%	$1,699	0.5%
Ischemic Heart Disease	862,120	3.4%	$11,189	3.3%
Atrial Fibrillation	81,500	0.3%	$909	0.3%
Chronic Kidney Disease	277,320	1.1%	$4,179	1.2%
Female Breast Cancer	34,940	0.1%	$419	0.1%
Prostate Cancer	52,040	0.2%	$547	0.2%
Endometrial Cancer	10080	0.0%	$128	0.0%
Diabetes	182,840	0.7%	$1,801	0.5%
Glaucoma	55,520	0.2%	$539	0.2%
Cataract	136,860	0.5%	$1,354	0.4%
None	554,400	2.2%	$6,486	1.9%
Total	**25,664,640**	**100.0%**	**$344,183**	**100.0%**

Source: Dobson | DaVanzo analysis of research-identifiable 5% SAF for all sites of service, 2007-2009, wage index adjusted by setting and geographic region, and standardized to 2009 dollars. All episodes have been extrapolated to reflect the universe of Medicare beneficiaries.

[a] For methodology used to determine primary chronic condition, see Working Paper #1.

[b] Medicare Episode Paid includes care from all facility-based and ambulatory care settings and excludes beneficiary co-payments.

Exhibit 2.4 and 2.5 show the average number of chronic conditions and Medicare episode payments by primary chronic condition (ranked by chronic condition acuity). The average pre-acute episode has 5.1 chronic conditions, and Medicare episode payment of $13,411, prior to the index acute care hospitalization. While CHF*COPD and DIABETES*CHF

episodes have the highest number of chronic conditions (7.1 and 6.4, respectively), the average Medicare episode payments for those episode types is only slightly higher than the overall average ($14,717 and $15,367, respectively). However, colorectal cancer and acute myocardial infarction, have fewer chronic conditions (2.9 and 3.3, respectively), but have higher average Medicare episode payments ($18,249 and $16,264, respectively).

Exhibit 2.4: Average Number of Chronic Conditions and Medicare Episode Paid by Primary Chronic Condition[a] for 60-Day Fixed-Length Pre-Acute Episodes (2007-2009)

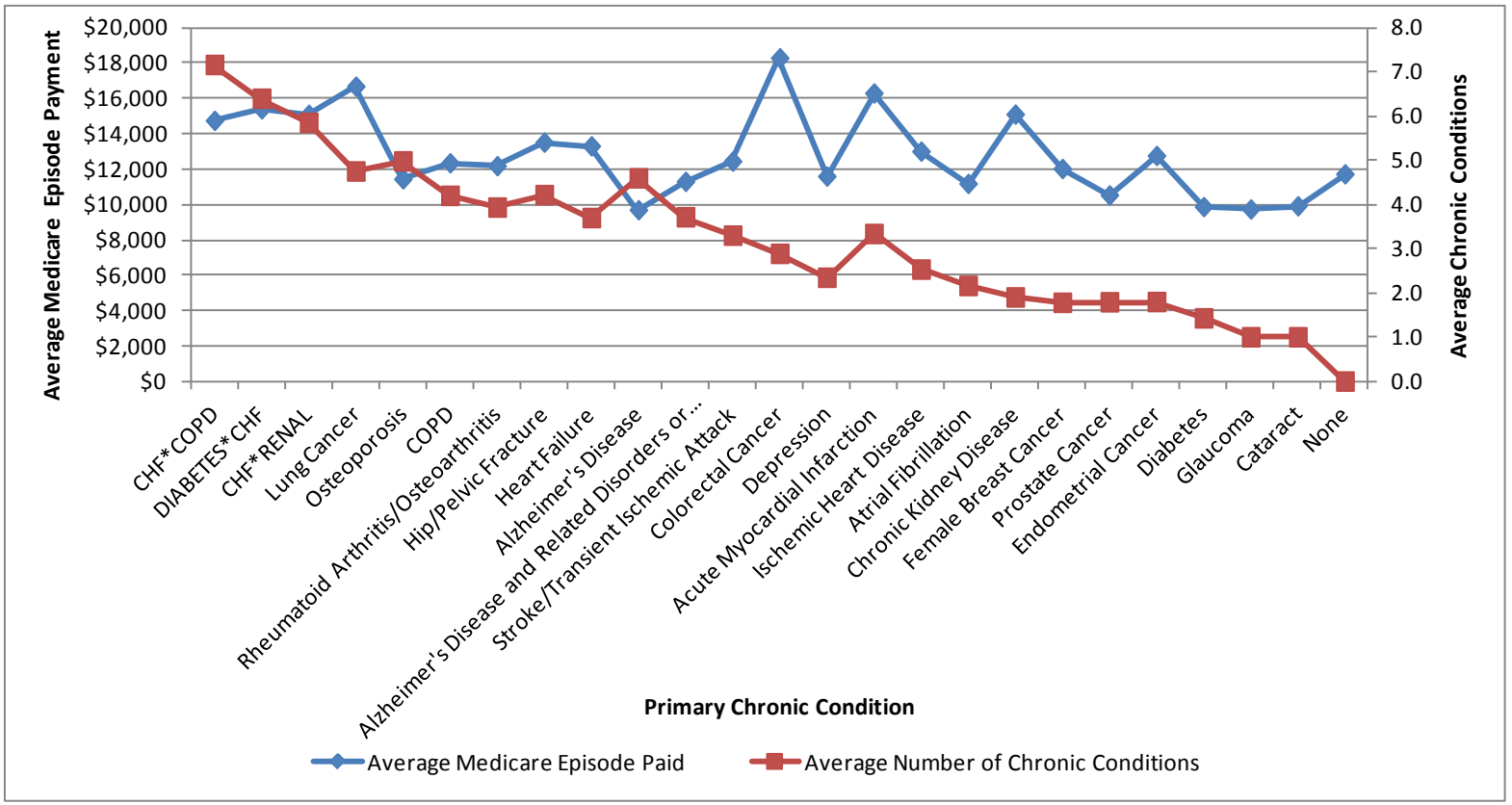
Primary Chronic Condition	Average Number Chronic Conditions	Average Medicare Episode Paid[b]
CHF*COPD	7.1	$14,717
DIABETES*CHF	6.4	$15,367
CHF*RENAL	5.8	$15,060
Lung Cancer	4.7	$16,649
Osteoporosis	5.0	$11,414
COPD	4.2	$12,322
Rheumatoid Arthritis/Osteoarthritis	3.9	$12,160
Hip/Pelvic Fracture	4.2	$13,488
Heart Failure	3.7	$13,279
Alzheimer's Disease	4.6	$9,672
Alzheimer's Disease and Related Disorders or Senile	3.7	$11,274
Stroke/Transient Ischemic Attack	3.3	$12,419
Colorectal Cancer	2.9	$18,249
Depression	2.3	$11,571
Acute Myocardial Infarction	3.3	$16,264
Ischemic Heart Disease	2.5	$12,978
Atrial Fibrillation	2.2	$11,156
Chronic Kidney Disease	1.9	$15,070
Female Breast Cancer	1.8	$11,999
Prostate Cancer	1.8	$10,509
Endometrial Cancer	1.8	$12,734
Diabetes	1.4	$9,849
Glaucoma	1.0	$9,713
Cataract	1.0	$9,894
None	0.0	$11,698
Overall Average	**5.1**	**$13,411**

Source: Dobson | DaVanzo analysis of research-identifiable 5% SAF for all sites of service, 2007-2009, wage index adjusted by setting and geographic region, and standardized to 2009 dollars.

[a] For methodology used to determine primary chronic condition, see Working Paper #1.

[b] Average Medicare Episode Paid includes care from all facility-based and ambulatory care settings and excludes beneficiary co-payments.

Exhibit 2.5: Average Number of Chronic Conditions and Medicare Episode Paid[a] by Primary Chronic Condition[b] for 60-Day Fixed-Length Pre-Acute Episodes (2007-2009)



Source: Dobson | DaVanzo analysis of research-identifiable 5% SAF for all sites of service, 2007-2009, wage index adjusted by setting and geographic region, and standardized to 2009 dollars. All episodes have been extrapolated to reflect the universe of Medicare beneficiaries.

[a] Average Medicare Episode Paid includes care from all facility-based and ambulatory care settings and excludes beneficiary co-payments.

[b] For methodology used to determine primary chronic condition, see Working Paper #1.

Episode Type 2: Pre-Acute Episodes

Exhibit 2.6 shows the distribution of episodes by chronic conditions by the care settings included in the episodes. Across all chronic conditions, virtually all episodes contained at least one physician visit (99.2 percent). More than one-half (54.6 percent) of all episodes contained an outpatient visit, while one in five episodes (20.2 percent) contained an ER visit. Only a small proportion of episodes made use of facility-based or home health services during the pre-acute care episode. Twice as many episodes contained home health services compared to SNF services during the pre-acute episode (3.7 percent versus 1.8 percent). IRF and LTCH stays were only contained in 0.2 percent and 0.1 percent of all episodes, respectively. CHF*COPD, DIABETES*CHF, and CHF*RENAL episodes have a higher than average percent of episodes that contain home health and SNF services.

Episode Type 2: Pre-Acute Episodes

Exhibit 2.6: Distribution of Episodes by Care Setting by Primary Chronic Condition[a] for 60-Day Fixed-Length Pre-Acute Episodes (2007-2009)

Primary Chronic Condition	Percent of Episodes	HHA	SNF	IRF	LTCH	STACH	Out-patient	Physician	ER	OP Therapy	Hospice	Other IP
CHF*COPD	24.9%	6.1%	3.1%	0.3%	0.1%	100.0%	56.6%	99.5%	22.9%	6.4%	1.2%	0.3%
DIABETES*CHF	13.3%	4.8%	2.3%	0.2%	0.1%	100.0%	58.6%	99.4%	20.9%	6.4%	0.9%	0.2%
CHF*RENAL	5.6%	4.7%	2.5%	0.2%	0.0%	100.0%	56.4%	99.3%	20.9%	6.1%	1.2%	0.2%
Lung Cancer	2.0%	3.2%	1.0%	0.2%	N/A	100.0%	68.8%	99.2%	18.9%	3.4%	2.1%	N/A
Osteoporosis	15.0%	3.1%	1.3%	0.2%	0.0%	100.0%	53.3%	99.5%	18.0%	6.1%	0.5%	0.2%
COPD	7.7%	2.5%	1.2%	0.1%	0.1%	100.0%	51.4%	99.1%	21.5%	4.2%	0.7%	0.7%
Rheumatoid Arthritis/Osteoarthritis	11.0%	2.5%	1.0%	0.2%	0.0%	100.0%	55.9%	99.5%	16.3%	6.2%	0.4%	0.2%
Hip/Pelvic Fracture	0.6%	3.3%	2.6%	0.3%	N/A	100.0%	39.7%	98.5%	20.2%	5.0%	2.5%	N/A
Heart Failure	2.6%	2.2%	1.1%	N/A	N/A	100.0%	48.2%	99.0%	20.3%	3.5%	1.0%	0.2%
Alzheimer's Disease	1.3%	3.1%	2.3%	N/A	N/A	100.0%	40.1%	99.2%	19.8%	7.3%	2.5%	0.4%
Alzheimer's Disease and Related Disorders	1.4%	2.7%	1.9%	0.2%	0.1%	100.0%	44.6%	98.9%	21.5%	6.5%	1.3%	0.6%
Stroke/Transient Ischemic Attack	1.7%	1.8%	0.5%	0.3%	N/A	100.0%	45.6%	99.0%	21.2%	3.8%	0.5%	N/A
Colorectal Cancer	0.5%	2.8%	N/A	N/A	N/A	100.0%	68.5%	98.8%	14.0%	1.2%	1.0%	N/A
Depression	3.1%	1.4%	0.4%	0.1%	0.0%	100.0%	53.2%	98.3%	28.2%	2.9%	0.3%	1.8%
Acute Myocardial Infarction	0.4%	0.6%	N/A	N/A	N/A	100.0%	39.2%	98.3%	25.5%	1.2%	N/A	N/A
Ischemic Heart Disease	3.4%	0.9%	0.2%	0.0%	N/A	100.0%	52.5%	98.6%	15.1%	1.7%	0.3%	N/A
Atrial Fibrillation	0.3%	0.7%	N/A	N/A	N/A	100.0%	46.7%	97.6%	14.5%	1.8%	0.4%	N/A
Chronic Kidney Disease	1.1%	1.4%	0.4%	N/A	N/A	100.0%	57.6%	97.2%	17.9%	1.7%	0.8%	N/A
Female Breast Cancer	0.1%	1.5%	N/A	N/A	N/A	100.0%	71.2%	98.4%	10.1%	2.6%	N/A	N/A
Prostate Cancer	0.2%	N/A	N/A	N/A	N/A	100.0%	61.3%	98.4%	11.8%	1.2%	N/A	N/A
Endometrial Cancer	0.0%	N/A	N/A	N/A	N/A	100.0%	76.2%	99.2%	N/A	N/A	N/A	N/A
Diabetes	0.7%	0.6%	N/A	N/A	N/A	100.0%	46.1%	96.7%	16.1%	1.6%	0.4%	N/A
Glaucoma	0.2%	N/A	N/A	N/A	N/A	100.0%	47.4%	99.4%	15.3%	2.4%	N/A	N/A
Cataract	0.5%	0.4%	N/A	N/A	N/A	100.0%	48.6%	99.1%	15.0%	2.2%	N/A	N/A
None	2.2%	0.9%	0.3%	0.1%	0.1%	100.0%	45.9%	95.6%	19.3%	2.5%	0.4%	0.2%
Overall Average	**100.0%**	**3.7%**	**1.8%**	**0.2%**	**0.1%**	**100.0%**	**54.6%**	**99.2%**	**20.2%**	**5.4%**	**0.8%**	**0.3%**

Source: Dobson | DaVanzo analysis of research-identifiable 5% SAF for all sites of service, 2007-2009, wage index adjusted by setting and geographic region, and standardized to 2009 dollars.

[a] For methodology used to determine primary chronic condition, see Working Paper #1.

Episode Type 2: Pre-Acute Episodes

Exhibit 2.7 shows the distribution of average Medicare episode payments and the percent of total episode payments across care settings for each primary chronic condition. On average, the inpatient hospital payment for the acute care index acute care hospitalization represents more than three-quarters (67.9 percent) of the total Medicare episode payments, or $9,103 of the total average payment of $13,411. (The index acute care hospitalization only reflects the acute care hospital stay and excludes other services provided to the patient during the stay, such as physician or ER visits). The percent of total episode payments represented by the index acute care hospitalization varies significantly by primary chronic condition, and ranges from 58.5 percent for female breast cancer to 75.9 percent for acute myocardial infarction. CHF*RENAL episodes have the lowest index acute care hospital payment ($6,921) and acute myocardial infarction episodes have the highest average index acute care hospital payment ($12,345).

Physician services represent 17.2 percent of the total episode payment, while admissions to the acute care hospital (other than the index acute care hospital) represent 7.3 percent of the episode payments. Other facility-based (SNF, IRF, and LTCH) and home health care collectively represent only 1.4 percent of total episode payments.

Since a large proportion of episode payments are attributed to the index acute care hospital payments, we isolated the pre-acute care services by chronic condition to better understand the distribution of Medicare episode payments across episodes by primary chronic condition. Exhibit 2.8 shows the distribution of pre-acute episode payments by care setting for primary chronic conditions. Physician services comprise more than one-half (53.6 percent) of this subset of Medicare episode payments. Hospital admissions other than the index acute care hospitalization represent 22.7 percent overall. Facility-based and home health care settings still represent a small proportion of pre-acute episode payments, with only 4.3 percent of episode payments associated with these care settings.

Episode Type 2: Pre-Acute Episodes

Exhibit 2.7: Distribution of Average Medicare Episode Paid and Percent of Medicare Episode Paid By Care Setting By Primary Chronic Condition[a] for 60-Day Fixed-Length Pre-Acute Episodes (2007-2009)

Primary Chronic Condition	Percent of Episodes	Average Episode Paid[b]	Index Hospital-ization	HHA	SNF	IRF	LTCH	STACH	Out-patient	Physician	ER	OP Therapy	Hospice	Other IP
CHF*COPD	24.9%	$14,717	$9,383	$93	$160	$32	$27	$1,531	$652	$2,517	$168	$60	$73	$20
			63.8%	0.6%	1.1%	0.2%	0.2%	10.4%	4.4%	17.1%	1.1%	0.4%	0.5%	0.1%
DIABETES*CHF	13.3%	$15,367	$10,080	$75	$122	$29	$16	$1,287	$927	$2,563	$142	$58	$55	$12
			65.6%	0.5%	0.8%	0.2%	0.1%	8.4%	6.0%	16.7%	0.9%	0.4%	0.4%	0.1%
CHF*RENAL	5.6%	$15,060	$10,212	$73	$135	$26	$9	$1,118	$757	$2,448	$142	$53	$72	$16
			67.8%	0.5%	0.9%	0.2%	0.1%	7.4%	5.0%	16.3%	0.9%	0.4%	0.5%	0.1%
Lung Cancer	2.0%	$16,649	$10,009	$46	$48	$21	$3	$1,322	$1,212	$3,729	$126	$21	$106	$6
			60.1%	0.3%	0.3%	0.1%	0.0%	7.9%	7.3%	22.4%	0.8%	0.1%	0.6%	0.0%
Osteoporosis	15.0%	$11,414	$8,119	$52	$73	$21	$5	$510	$340	$2,094	$112	$44	$31	$14
			71.1%	0.5%	0.6%	0.2%	0.0%	4.5%	3.0%	18.3%	1.0%	0.4%	0.3%	0.1%
COPD	7.7%	$12,322	$8,587	$38	$64	$15	$11	$838	$422	$2,084	$151	$29	$42	$42
			69.7%	0.3%	0.5%	0.1%	0.1%	6.8%	3.4%	16.9%	1.2%	0.2%	0.3%	0.3%
Rheumatoid Arthritis/ Osteoarthritis	11.0%	$12,160	$8,891	$39	$55	$21	$4	$470	$364	$2,133	$106	$38	$25	$15
			73.1%	0.3%	0.4%	0.2%	0.0%	3.9%	3.0%	17.5%	0.9%	0.3%	0.2%	0.1%
Hip/Pelvic Fracture	0.6%	$13,488	$9,970	$62	$168	$34	$5	$369	$285	$2,210	$126	$52	$185	$22
			73.9%	0.5%	1.2%	0.3%	0.0%	2.7%	2.1%	16.4%	0.9%	0.4%	1.4%	0.2%
Heart Failure	2.6%	$13,279	$9,743	$31	$53	$13	$4	$748	$387	$2,048	$151	$25	$57	$19
			73.4%	0.2%	0.4%	0.1%	0.0%	5.6%	2.9%	15.4%	1.1%	0.2%	0.4%	0.1%
Alzheimer's Disease	1.3%	$9,672	$6,921	$51	$115	$11	$8	$354	$207	$1,618	$125	$67	$163	$33
			71.6%	0.5%	1.2%	0.1%	0.1%	3.7%	2.1%	16.7%	1.3%	0.7%	1.7%	0.3%
Alzheimer's Disease & Senile	1.4%	$11,274	$7,899	$44	$100	$26	$18	$617	$363	$1,900	$142	$52	$72	$40
			70.1%	0.4%	0.9%	0.2%	0.2%	5.5%	3.2%	16.9%	1.3%	0.5%	0.6%	0.4%
Stroke/Transient Ischemic Attack	1.7%	$12,419	$8,771	$28	$28	$43	$2	$711	$486	$2,122	$165	$29	$16	$15
			70.6%	0.2%	0.2%	0.3%	0.0%	5.7%	3.9%	17.1%	1.3%	0.2%	0.1%	0.1%
Colorectal Cancer	0.5%	$18,249	$11,836	$35	$13	$6	$0	$1,228	$1,165	$3,801	$100	$4	$59	$2
			64.9%	0.2%	0.1%	0.0%	0.0%	6.7%	6.4%	20.8%	0.5%	0.0%	0.3%	0.0%

Episode Type 2: Pre-Acute Episodes

Exhibit 2.7 continued: Distribution of Average Medicare Episode Paid and Percent of Medicare Episode Paid By Care Setting By Primary Chronic Condition[a] for 60-Day Fixed-Length Pre-Acute Episodes (2007-2009)

Primary Chronic Condition	Percent of Episodes	Average Episode Paid[b]	Index Hospital-ization	HHA	SNF	IRF	LTCH	STACH	Out-patient	Physician	ER	OP Therapy	Hospice	Other IP
Depression	3.1%	$11,571	$7,820	$17	$17	$10	$7	$904	$529	$1,938	$199	$14	$15	$101
			67.6%	0.2%	0.1%	0.1%	0.1%	7.8%	4.6%	16.8%	1.7%	0.1%	0.1%	0.9%
Acute Myocardial Infarction	0.4%	$16,264	$12,345	$8	$6	$3	$0	$892	$427	$2,334	$236	$5	$8	$0
			75.9%	0.0%	0.0%	0.0%	0.0%	5.5%	2.6%	14.3%	1.5%	0.0%	0.0%	0.0%
Ischemic Heart Disease	3.4%	$12,978	$9,369	$12	$8	$5	$3	$645	$635	$2,182	$100	$8	$12	$1
			72.2%	0.1%	0.1%	0.0%	0.0%	5.0%	4.9%	16.8%	0.8%	0.1%	0.1%	0.0%
Atrial Fibrillation	0.3%	$11,156	$8,084	$7	$8	$2	$3	$500	$450	$1,982	$101	$9	$10	$1
			72.5%	0.1%	0.1%	0.0%	0.0%	4.5%	4.0%	17.8%	0.9%	0.1%	0.1%	0.0%
Chronic Kidney Disease	1.1%	$15,070	$10,377	$17	$18	$6	$4	$1,100	$1,120	$2,262	$112	$8	$41	$4
			68.9%	0.1%	0.1%	0.0%	0.0%	7.3%	7.4%	15.0%	0.7%	0.1%	0.3%	0.0%
Female Breast Cancer	0.1%	$11,999	$7,022	$18	$8	$0	$0	$433	$1,112	$3,309	$60	$17	$21	$0
			58.5%	0.1%	0.1%	0.0%	0.0%	3.6%	9.3%	27.6%	0.5%	0.1%	0.2%	0.0%
Prostate Cancer	0.2%	$10,509	$7,153	$7	$0	$0	$0	$261	$502	$2,501	$63	$3	$17	$0
			68.1%	0.1%	0.0%	0.0%	0.0%	2.5%	4.8%	23.8%	0.6%	0.0%	0.2%	0.0%
Endometrial Cancer	0.0%	$12,734	$7,963	$7	$0	$0	$0	$914	$901	$2,885	$45	$3	$17	$0
			62.5%	0.1%	0.0%	0.0%	0.0%	7.2%	7.1%	22.7%	0.4%	0.0%	0.1%	0.0%
Diabetes	0.7%	$9,849	$7,331	$8	$5	$3	$0	$360	$354	$1,658	$98	$7	$20	$4
			74.4%	0.1%	0.1%	0.0%	0.0%	3.7%	3.6%	16.8%	1.0%	0.1%	0.2%	0.0%
Glaucoma	0.2%	$9,713	$7,256	$8	$5	$11	$0	$230	$327	$1,765	$98	$11	$3	$0
			74.7%	0.1%	0.0%	0.1%	0.0%	2.4%	3.4%	18.2%	1.0%	0.1%	0.0%	0.0%
Cataract	0.5%	$9,894	$7,306	$4	$7	$2	$3	$324	$321	$1,814	$96	$11	$6	$0
			73.8%	0.0%	0.1%	0.0%	0.0%	3.3%	3.2%	18.3%	1.0%	0.1%	0.1%	0.0%
None	2.2%	$11,698	$8,503	$13	$12	$10	$10	$697	$461	$1,828	$122	$13	$19	$11
			72.7%	0.1%	0.1%	0.1%	0.1%	6.0%	3.9%	15.6%	1.0%	0.1%	0.2%	0.1%
Overall Average	**100.0%**	**$13,411**	**$9,103**	**$58**	**$94**	**$23**	**$12**	**$977**	**$581**	**$2,310**	**$139**	**$43**	**$51**	**$20**
			67.9%	0.4%	0.7%	0.2%	0.1%	7.3%	4.3%	17.2%	1.0%	0.3%	0.4%	0.1%

Episode Type 2: Pre-Acute Episodes

Exhibit 2.8: Distribution of Average Medicare Episode Paid and Percent of Medicare Episode Paid By Care Setting (Excluding Index Hospitalization) by Primary Chronic Condition[a] for 60-Day Fixed-Length Pre-Acute Episodes (2007-2009)

Primary Chronic Condition	Percent of Episodes	Average Episode Paid[b] (Pre-Acute)	HHA	SNF	IRF	LTCH	STACH	Out-patient	Physician	ER	OP Therapy	Hospice	Other IP
CHF*COPD	24.9%	$5,334	1.7%	3.0%	0.6%	0.5%	28.7%	12.2%	47.2%	3.1%	1.1%	1.4%	0.4%
DIABETES*CHF	13.3%	$5,287	1.4%	2.3%	0.6%	0.3%	24.4%	17.5%	48.5%	2.7%	1.1%	1.0%	0.2%
CHF*RENAL	5.6%	$4,849	1.5%	2.8%	0.5%	0.2%	23.1%	15.6%	50.5%	2.9%	1.1%	1.5%	0.3%
Lung Cancer	2.0%	$6,639	0.7%	0.7%	0.3%	0.0%	19.9%	18.2%	56.2%	1.9%	0.3%	1.6%	0.1%
Osteoporosis	15.0%	$3,295	1.6%	2.2%	0.6%	0.2%	15.5%	10.3%	63.6%	3.4%	1.3%	0.9%	0.4%
COPD	7.7%	$3,735	1.0%	1.7%	0.4%	0.3%	22.4%	11.3%	55.8%	4.0%	0.8%	1.1%	1.1%
Rheumatoid Arthritis/Osteoarthritis	11.0%	$3,269	1.2%	1.7%	0.6%	0.1%	14.4%	11.1%	65.2%	3.2%	1.2%	0.8%	0.5%
Hip/Pelvic Fracture	0.6%	$3,518	1.8%	4.8%	1.0%	0.1%	10.5%	8.1%	62.8%	3.6%	1.5%	5.3%	0.6%
Heart Failure	2.6%	$3,536	0.9%	1.5%	0.4%	0.1%	21.2%	10.9%	57.9%	4.3%	0.7%	1.6%	0.5%
Alzheimer's Disease	1.3%	$2,752	1.8%	4.2%	0.4%	0.3%	12.9%	7.5%	58.8%	4.5%	2.4%	5.9%	1.2%
Alzheimer's & Senile	1.4%	$3,375	1.3%	2.9%	0.8%	0.5%	18.3%	10.8%	56.3%	4.2%	1.5%	2.1%	1.2%
Stroke/ Ischemic Attack	1.7%	$3,647	0.8%	0.8%	1.2%	0.1%	19.5%	13.3%	58.2%	4.5%	0.8%	0.4%	0.4%
Colorectal Cancer	0.5%	$6,413	0.5%	0.2%	0.1%	0.0%	19.2%	18.2%	59.3%	1.6%	0.1%	0.9%	0.0%
Depression	3.1%	$3,752	0.5%	0.5%	0.3%	0.2%	24.1%	14.1%	51.7%	5.3%	0.4%	0.4%	2.7%
Acute Myocardial Infarction	0.4%	$3,919	0.2%	0.2%	0.1%	0.0%	22.8%	10.9%	59.5%	6.0%	0.1%	0.2%	0.0%
Ischemic Heart Disease	3.4%	$3,609	0.3%	0.2%	0.1%	0.1%	17.9%	17.6%	60.4%	2.8%	0.2%	0.3%	0.0%
Atrial Fibrillation	0.3%	$3,073	0.2%	0.2%	0.1%	0.1%	16.3%	14.6%	64.5%	3.3%	0.3%	0.3%	0.0%
Chronic Kidney Disease	1.1%	$4,693	0.4%	0.4%	0.1%	0.1%	23.4%	23.9%	48.2%	2.4%	0.2%	0.9%	0.1%
Female Breast Cancer	0.1%	$4,976	0.4%	0.2%	0.0%	0.0%	8.7%	22.3%	66.5%	1.2%	0.3%	0.4%	0.0%
Prostate Cancer	0.2%	$3,355	0.2%	0.0%	0.0%	0.0%	7.8%	15.0%	74.5%	1.9%	0.1%	0.5%	0.0%
Endometrial Cancer	0.0%	$4,771	0.1%	0.0%	0.0%	0.0%	19.2%	18.9%	60.5%	0.9%	0.1%	0.4%	0.0%
Diabetes	0.7%	$2,518	0.3%	0.2%	0.1%	0.0%	14.3%	14.0%	65.9%	3.9%	0.3%	0.8%	0.1%
Glaucoma	0.2%	$2,457	0.3%	0.2%	0.5%	0.0%	9.4%	13.3%	71.8%	4.0%	0.5%	0.1%	0.0%
Cataract	0.5%	$2,588	0.2%	0.3%	0.1%	0.1%	12.5%	12.4%	70.1%	3.7%	0.4%	0.2%	0.0%
None	2.2%	$3,195	0.4%	0.4%	0.3%	0.3%	21.8%	14.4%	57.2%	3.8%	0.4%	0.6%	0.3%
Overall Average	**100.0%**	**$4,308**	**1.3%**	**2.2%**	**0.5%**	**0.3%**	**22.7%**	**13.5%**	**53.6%**	**3.2%**	**1.0%**	**1.2%**	**0.5%**

Notes for Exhibit 2.7 and Exhibit 2.8:

Source: Dobson | DaVanzo analysis of research-identifiable 5% SAF for all sites of service, 2007-2009, wage index adjusted by setting and geographic region, and standardized to 2009 dollars. All episodes have been extrapolated to reflect the universe of Medicare beneficiaries.

[a] For methodology used to determine primary chronic condition, see Working Paper #1.

[b] Average Medicare Episode Paid includes care from all facility-based and ambulatory care settings and excludes beneficiary co-payments.

Distribution of Episodes and Medicare Payments for Select Primary Chronic Condition

In the remainder of this chapter, we present the pre-acute care episode payments for select primary chronic conditions in more detail. These sections contain descriptive statistics on the number of chronic conditions within these episodes and the allocation of Medicare episode payments by care setting. Since the index acute care hospitalization (and all related services during the hospitalization) represents more than two-thirds of the total episode payment, we separate these payments from the following analyses. That is, these episode payments isolate the pre-acute services from the index acute care hospitalization.

*CHF*COPD*

CHF*COPD is the most common and most severe primary chronic condition. This chronic condition represents almost one-quarter (24.9 percent) of all pre-acute care episodes. Medicare payments for CHF*COPD episodes totaled $93.9 billion from 2007 to 2009 (Exhibit 2.3). More than one-third of total episode payments ($34.1 billion) are for the pre-acute care services, while Medicare payments for the index acute care hospitalization following these services total $59.9 billion (Exhibit 2.7). The distribution of episodes by number of chronic conditions is normally distributed, with an average of 7.1 chronic conditions per episode (Exhibit 2.4).

As shown in Exhibit 2.9 and 2.10, on average, CHF*COPD episodes with two chronic conditions (i.e., the patient has no other chronic conditions except CHF and COPD) have the lowest average payment for pre-acute care services. The average payment for pre-acute care services increases steadily as the number of chronic conditions increases. Episodes for patients with 15 chronic conditions have the highest average payment for pre-acute services.

The average index acute care hospitalization payment for CHF*COPD episodes is relatively consistent, regardless of the number of chronic conditions contained in the episode. Episodes with only two chronic conditions have the lowest average index acute care hospitalization payments ($8,567) compared to episodes with episodes with 15 chronic conditions ($9,884).

Episode Type 2: Pre-Acute Episodes

Exhibit 2.9: Average Medicare Episode Paid for Index Hospitalization and Pre-Acute Services for Episodes Defined by CHF*COPD[a] for 60-Day Fixed-Length Pre-Acute Episodes (2007-2009)

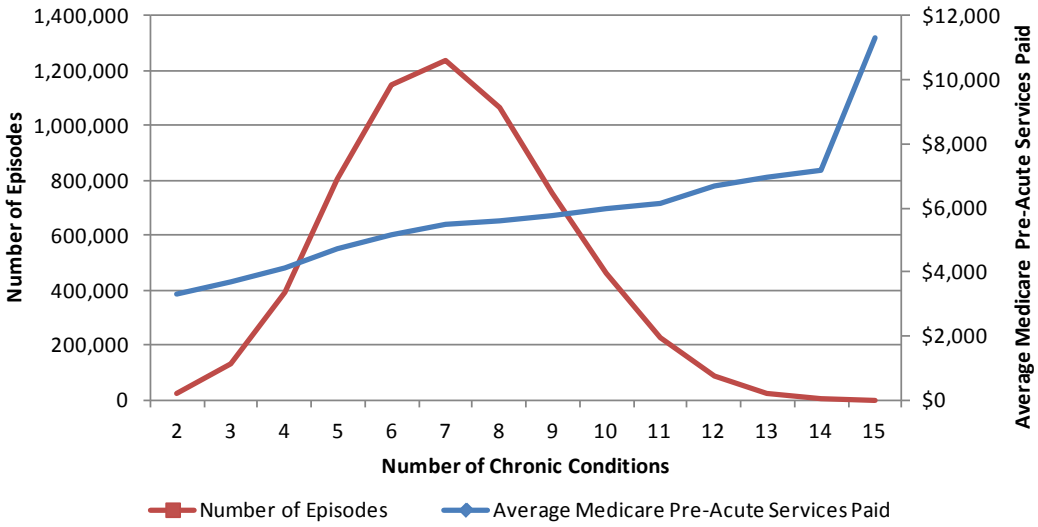
Number of Chronic Conditions	Percent of Episodes	Average Medicare Episode Paid[b]	Average Index Hospitalization Paid	Average Pre-Acute Services Paid
2	0.4%	$11,870	$8,567	$3,303
3	2.1%	$12,996	$9,320	$3,677
4	6.2%	$13,663	$9,554	$4,109
5	12.6%	$14,273	$9,529	$4,744
6	18.0%	$14,782	$9,636	$5,146
7	19.4%	$15,016	$9,550	$5,467
8	16.7%	$14,877	$9,270	$5,607
9	11.9%	$14,993	$9,216	$5,777
10	7.3%	$14,874	$8,914	$5,961
11	3.6%	$14,859	$8,729	$6,131
12	1.4%	$15,512	$8,852	$6,660
13	0.4%	$16,562	$9,591	$6,971
14	0.1%	$16,541	$9,386	$7,155
15	0.0%	$21,215	$9,884	$11,332
Overall Average	**100.0%**	**$14,717**	**$9,383**	**$5,334**

Source: Dobson | DaVanzo analysis of research-identifiable 5% SAF for all sites of service, 2007-2009, wage index adjusted by setting and geographic region, and standardized to 2009 dollars.

[a] For methodology used to determine primary chronic condition, see Working Paper #1.

[b] Average Medicare Episode Paid includes care from all facility-based and ambulatory care settings and excludes beneficiary co-payments.

Exhibit 2.10: Number of Episodes and Average Medicare Pre-Acute Services Paid[a] for Episodes Defined by CHF*COPD[b] for 60-Day Fixed-Length Pre-Acute Episodes (2007-2009)



Source: Dobson | DaVanzo analysis of research-identifiable 5% SAF for all sites of service, 2007-2009, wage index adjusted by setting and geographic region, and standardized to 2009 dollars. All episodes have been extrapolated to reflect the universe of Medicare beneficiaries.

[a] Average Medicare Pre-Acute Services Paid includes care from all facility-based and ambulatory care settings and excludes beneficiary co-payments.

[b] For methodology used to determine primary chronic condition, see Working Paper #1

Episode Type 2: Pre-Acute Episodes

The care provided within an episode is largely contingent on the number of patient chronic conditions, but also is influenced by several other clinical and demographic factors. Exhibit 2.11 shows the overall distribution of Medicare episode payments across care settings for select beneficiary demographic characteristics. Across all CHF*COPD episodes, slightly less than one-half (47.2 percent) of the payments are attributed to physician visits, while 3.0 percent of payments are attributed to SNF services. Home health services represent 1.7 percent of the total episode payments.

Episodes for patients who live alone have a higher proportion of episode payments in HHA, SNF, and IRF settings and a lower proportion of episode payments in outpatient visits. The episode composition for patients who are over 85 years old differs significantly from the overall average distribution of payments by setting. These older patients are twice as likely to receive SNF and hospice services.

Due to the high Medicare payments for hospital admissions, episodes that contain a hospital admission during the pre-acute episode prior to the index acute care hospitalization have a different distribution of episode payments by setting than those without a hospitalization.[13] On average, almost two-thirds (59.9 percent) of the episode payments are for acute care hospitalizations compared to 28.7 percent of payments for episodes overall. Again, these proportions exclude the index acute care hospitalization payments.

Episodes with a hospital admission during the episode have a lower proportion of episode payments related to physician services – only one-quarter of the total episode payments attributed to these services compared to almost one-half for CHF*COPD episodes overall.

[13] Index acute care hospitalizations were determined based on the presence of a 15-day "clean period" of facility-based and home health care. Therefore, any hospitalizations included in the pre-acute care episodes occurred prior to the requisite clean period and within 15 days of facility-based or home health care.

Exhibit 2.11: Distribution of Medicare Pre-Acute Services Paid (Excluding Index Hospitalization) by Beneficiary Demographic Characteristics for Episodes Defined by CHF*COPD[a] for 60-Day Fixed-Length Pre-Acute Episodes (2007-2009)

Beneficiary Demographic	Average Medicare Pre-Acute Services Paid[a]	Percent of Episodes	HHA	SNF	IRF	LTCH	STACH	Out-patient	Physician	ER	OP Therapy	Hospice	Other IP
Lives Alone	$5,169	29.5%	2.8%	4.6%	0.8%	0.5%	26.8%	10.5%	47.5%	3.3%	1.4%	1.3%	0.5%
Over 85 Years Old	$4,002	22.6%	3.0%	6.2%	0.6%	0.5%	21.9%	7.4%	51.8%	3.3%	2.2%	2.9%	0.3%
Female	$4,966	57.6%	2.1%	3.7%	0.6%	0.5%	27.1%	11.2%	48.3%	3.2%	1.4%	1.6%	0.4%
Resides in Rural Area	$5,060	28.3%	1.3%	3.1%	0.6%	0.3%	29.4%	14.1%	42.2%	5.7%	1.1%	1.8%	0.4%
Race Non-White	$6,907	14.7%	1.6%	2.3%	0.5%	0.9%	34.2%	15.8%	39.5%	2.5%	1.0%	1.2%	0.4%
Died During Index Hospitalization	$6,219	34.2%	1.8%	3.9%	0.5%	0.7%	28.4%	12.3%	45.8%	2.7%	1.3%	2.3%	0.3%
Dual Eligible	$6,008	31.2%	1.5%	3.8%	0.4%	0.8%	31.7%	12.7%	41.6%	3.6%	1.8%	1.5%	0.7%
Episode Contains Admission	$15,491	16.5%	1.1%	3.2%	0.9%	0.6%	59.9%	6.4%	24.6%	1.9%	0.6%	0.6%	0.3%
Overall Average	**$5,334**	**100.0%**	**1.7%**	**3.0%**	**0.6%**	**0.5%**	**28.7%**	**12.2%**	**47.2%**	**3.1%**	**1.1%**	**1.4%**	**0.4%**

Source: Dobson | DaVanzo analysis of research-identifiable 5% SAF for all sites of service, 2007-2009, wage index adjusted by setting and geographic region, and standardized to 2009 dollars.

[a] For methodology used to determine primary chronic condition, see Working Paper #1.

[b] Average Medicare Pre-Acute Services Paid includes care from all facility-based and ambulatory care settings and excludes beneficiary co-payments.

Episode Type 2: Pre-Acute Episodes

Osteoporosis

Osteoporosis is the second most common primary chronic condition, and defines 15.0 percent of all pre-acute care episodes. Osteoporosis has the fifth highest acuity rating, which means that these episodes can also include any of the other chronic conditions with lower community risk scores. Medicare payments for osteoporosis episodes totaled $44.0 billion (Exhibit 2.3). About 29 percent of total episode payments for osteoporosis episodes ($12.7 billion) are for the pre-acute care services, while the index acute care hospitalizations following these services total $31.3 billion in Medicare payments (Exhibit 2.7). The distribution of osteoporosis episodes by number of chronic conditions is normally distributed, with an average of 5.0 chronic conditions per episode (Exhibit 2.4).

As shown in Exhibit 2.12 and 2.13, osteoporosis episodes with a single chronic condition (i.e., the patient has no other chronic conditions except for osteoporosis) have the lowest average Medicare payment for pre-acute care services. The average Medicare payment for pre-acute care services increases steadily as the number of chronic conditions increases. However, episodes for patients with 12 or more chronic conditions have an average Medicare episode payment for pre-acute care services that roughly approximates the episode payments for patients with five chronic conditions. The steep decrease in the average pre-acute care service episode payments may be attributed to patient death or the use of hospice or other palliative care for these patients.

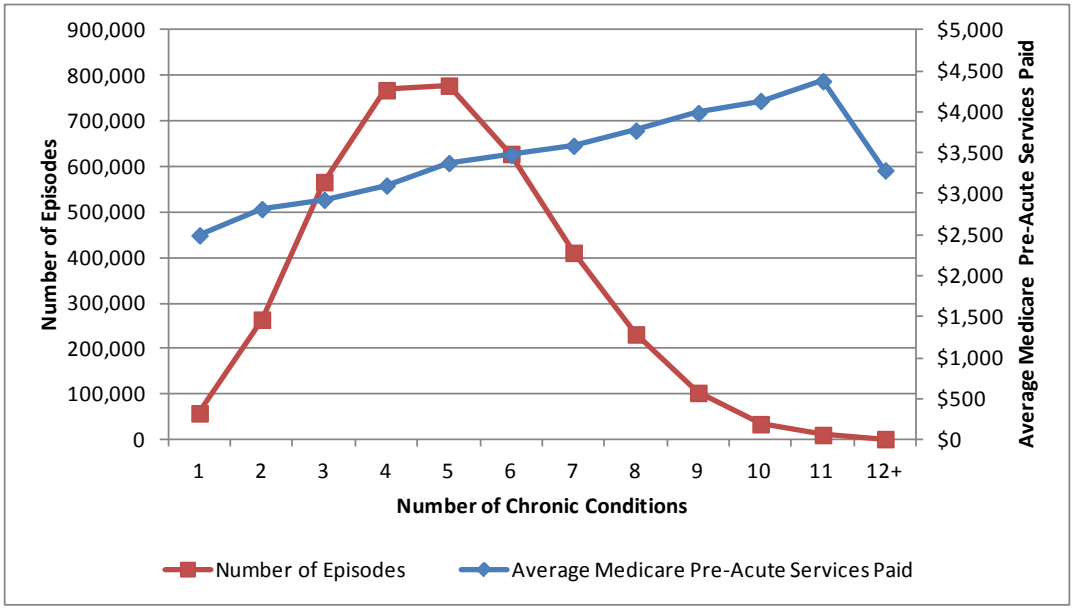
The average Medicare index acute care hospitalization payments are relatively consistent across the number of chronic conditions contained in the episodes. Interestingly, the index acute care hospitalization payments range from $7,525 for episodes with 12 or more chronic conditions to $8,265 for episodes with four chronic conditions.

Exhibit 2.12: Average Medicare Episode Paid for Index Hospitalization and Pre-Acute Services for Episodes Defined by Osteoporosis[a] for 60-Day Fixed-Length Pre-Acute Episodes (2007-2009)

Number of Chronic Conditions	Percent of Episodes	Average Medicare Episode Paid[b]	Average Index Hospitalization Paid	Average Pre-Acute Services Paid
1	1.5%	$10,140	$7,643	$2,497
2	6.9%	$10,954	$8,136	$2,817
3	14.7%	$11,107	$8,177	$2,930
4	19.9%	$11,370	$8,265	$3,104
5	20.2%	$11,634	$8,255	$3,378
6	16.3%	$11,510	$8,033	$3,477
7	10.7%	$11,464	$7,875	$3,589
8	6.0%	$11,711	$7,937	$3,774
9	2.7%	$11,939	$7,950	$3,989
10	0.9%	$11,968	$7,832	$4,135
11	0.3%	$12,341	$7,964	$4,377
12+	0.1%	$10,814	$7,525	$3,289
Overall Average	**100%**	**$11,414**	**$8,119**	**$3,295**

Source: Dobson | DaVanzo analysis of research-identifiable 5% SAF for all sites of service, 2007-2009, wage index adjusted by setting and geographic region, and standardized to 2009 dollars.
[a] For methodology used to determine primary chronic condition, see Working Paper #1.
[b] Average Medicare Episode Paid includes care from all facility-based and ambulatory care settings and excludes beneficiary co-payments.

Exhibit 2.13: Number of Episodes and Average Medicare Pre-Acute Services Paid[a] for Episodes Defined by Osteoporosis[b] for 60-Day Fixed Length Pre-Acute Episodes (2007-2009)



Source: Dobson | DaVanzo analysis of research-identifiable 5% SAF for all sites of service, 2007-2009, wage index adjusted by setting and geographic region, and standardized to 2009 dollars. All episodes have been extrapolated to reflect the universe of Medicare beneficiaries.
[b] Average Medicare Pre-Acute Services Paid includes care from all facility-based and ambulatory care settings and excludes beneficiary co-payments.
[b] For methodology used to determine primary chronic condition, see Working Paper #1.

Episode Type 2: Pre-Acute Episodes

The distribution of payments for episodes with a primary chronic condition of osteoporosis differs from the other chronic conditions presented above. As shown in Exhibit 2.14, almost two-thirds (63.6 percent) of Medicare payments for osteoporosis episodes are attributed to physician services. Another 15.5 percent of Medicare episode payments are attributed to hospitalizations (after excluding the index acute care hospitalization), and 10.3 percent are attributed to outpatient visits. This represents a larger reliance on physician services compared to the overall average across chronic conditions. Episodes for patients who live alone have a higher use of HHA, SNF, and IRF care, compared to the average patient with osteoporosis. Episodes for patients who live alone also have a slightly higher proportion of payments attributed to physician visits, but a lower proportion attributed to acute care hospitalizations (excluding the index acute care hospitalization). Episodes for patients who are over 85 years old also have a lower proportion of payments attributed to acute care hospitalizations and outpatient visits, but have a higher proportion of outpatient therapy, home health, SNF, and hospice care.

More than one-half (59.5 percent) of episode payments for patients with a hospitalization prior to the index acute care hospitalization are contained in the hospitalization. As a result, these episodes contain proportionately fewer payments for physicians and outpatient visits. These episodes do, on average, contain a slightly higher proportion of home health, SNF and IRF payments.

Exhibit 2.14: Distribution of Medicare Pre-Acute Services Paid (Excluding Index Hospitalization) by Beneficiary Demographic Characteristics for Episodes Defined by Osteoporosis[a] for 60-Day Fixed-Length Pre-Acute Episodes (2007-2009)

Beneficiary Demographic	Average Medicare Pre-Acute Services Paid[b]	Percent of Episodes	HHA	SNF	IRF	LTCH	STACH	Out-patient	Physician	ER	OP Therapy	Hospice	Other IP
Lives Alone	$3,316	27.0%	2.9%	3.7%	0.9%	0.1%	12.9%	8.7%	64.3%	3.4%	1.7%	1.0%	0.4%
Over 85 Years Old	$2,752	25.4%	2.8%	4.8%	0.7%	0.1%	11.1%	7.0%	64.0%	4.1%	2.4%	2.7%	0.4%
Female	$3,189	87.8%	1.6%	2.3%	0.6%	0.1%	14.6%	10.1%	64.5%	3.4%	1.4%	1.0%	0.4%
Resides in Rural Area	$3,295	24.4%	1.2%	2.6%	0.6%	0.1%	16.1%	13.6%	56.9%	6.0%	1.3%	1.0%	0.4%
Race Non-White	$3,495	9.4%	1.6%	1.7%	0.5%	0.3%	20.5%	11.3%	58.4%	3.1%	1.2%	0.9%	0.6%
Died During Index Hospitalization	$4,189	13.2%	2.1%	4.5%	0.6%	0.3%	17.4%	10.2%	55.2%	3.4%	2.2%	3.5%	0.6%
Dual Eligible	$3,542	19.2%	1.5%	3.2%	0.4%	0.3%	20.3%	10.1%	55.3%	4.4%	2.2%	1.3%	1.0%
Episode Contains Admission	$13,048	6.6%	1.2%	3.8%	1.9%	0.3%	59.5%	4.6%	25.4%	1.8%	0.6%	0.4%	0.5%
Overall Average	**$3,295**	**100.0%**	**1.6%**	**2.2%**	**0.6%**	**0.2%**	**15.5%**	**10.3%**	**63.6%**	**3.4%**	**1.3%**	**0.9%**	**0.4%**

Source: Dobson | DaVanzo analysis of research-identifiable 5% SAF for all sites of service, 2007-2009, wage index adjusted by setting and geographic region, and standardized to 2009 dollars.

[a] For methodology used to determine primary chronic condition, see Working Paper #1.

[b] Medicare Episode Paid includes care from all facility-based and ambulatory care settings and excludes beneficiary co-payments.

Episode Type 2: Pre-Acute Episodes

*DIABETES*CHF*

About 13.3 percent of pre-acute episodes are defined by a primary chronic condition of DIABETES*CHF. Medicare payment for DIABETES*CHF episodes totaled $52.6 billion (Exhibit 2.3). More than one-third of total episode payments ($18.1 billion) are for the pre-acute care services. Medicare payments for the index acute care hospitalization following these services are $34.5 billion (Exhibit 2.7). The distribution of episodes by number of chronic conditions is normally distributed, with an average of 6.4 chronic conditions per episode (Exhibit 2.4).

As shown in Exhibit 2.15 and 2.16, on average, DIABETES*CHF episodes with two chronic conditions (i.e., the patient has no other chronic conditions except diabetes and CHF) has the lowest average payment for pre-acute care services. The increase in the average episode payments for pre-acute care services is greatest as the number of chronic conditions increases from two to four. The average payment for pre-acute care services remains stable for patients between four and 11 chronic conditions. However, average episode payments for pre-acute services for episodes with more than 11 chronic conditions tend to decrease, which may be due to patient death or the increased use of hospice or palliative care. This trend is similar to the distribution of average Medicare episode payments by chronic conditions count for osteoporosis episodes.

Patients with 11 or more chronic conditions also tend to have lower average payments for the index acute care hospitalization. The average index acute care hospitalization payments range from $8,175 for episodes with 14 chronic conditions to $10,565 for episodes with five chronic conditions.

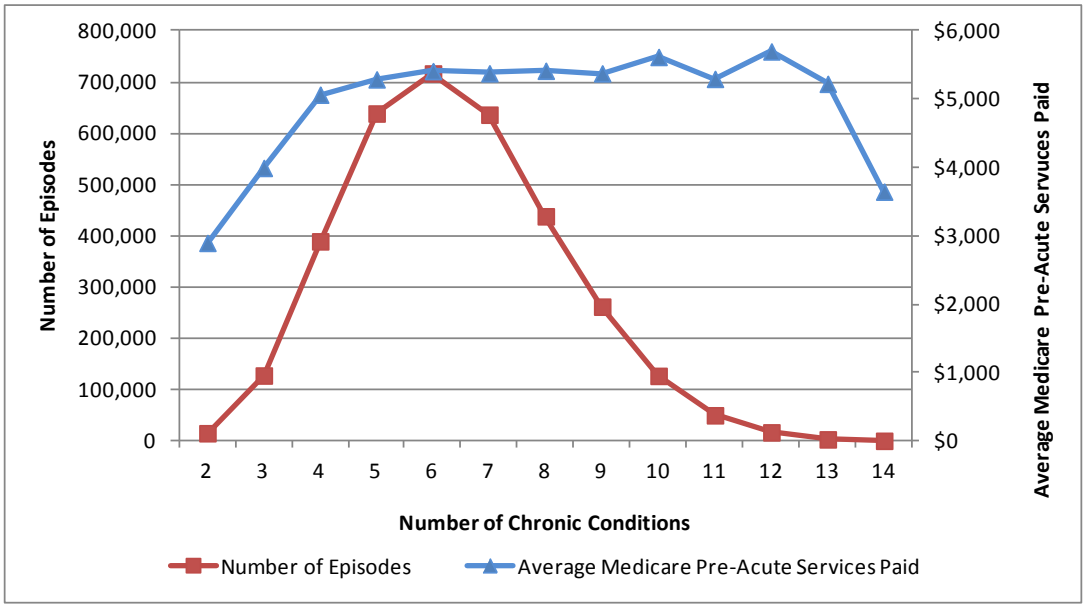
Episode Type 2: Pre-Acute Episodes

Exhibit 2.15: Average Medicare Episode Paid for Index Hospitalization and Pre-Acute Services for Episodes Defined by DIABETES*CHF[a] for 60-Day Fixed-Length Pre-Acute Episodes (2007-2009)

Number of Chronic Conditions	Percent of Episodes	Average Medicare Episode Paid[b]	Average Index Hospitalization Paid	Average Pre-Acute Services Paid
2	0.4%	$11,328	$8,430	$2,899
3	3.7%	$14,161	$10,165	$3,996
4	11.4%	$15,503	$10,435	$5,068
5	18.7%	$15,857	$10,565	$5,292
6	20.9%	$15,802	$10,389	$5,413
7	18.6%	$15,367	$9,985	$5,381
8	12.8%	$15,107	$9,690	$5,418
9	7.7%	$14,605	$9,224	$5,380
10	3.7%	$14,848	$9,228	$5,620
11	1.5%	$13,931	$8,632	$5,299
12	0.5%	$14,876	$9,175	$5,701
13	0.1%	$14,241	$9,015	$5,227
14	0.0%	$11,823	$8,175	$3,649
Overall Average	**100.0%**	**$15,367**	**$10,080**	**$5,287**

Source: Dobson | DaVanzo analysis of research-identifiable 5% SAF for all sites of service, 2007-2009, wage index adjusted by setting and geographic region, and standardized to 2009 dollars.
[a] For methodology used to determine primary chronic condition, see Working Paper #1.
[b] Average Medicare Episode Paid includes care from all facility-based and ambulatory care settings and excludes beneficiary co-payments.

Exhibit 2.16: Number of Episodes and Average Medicare Pre-Acute Services Paid[a] for Episodes Defined by DIABETES*CHF[b] for 60-Day Fixed-Length Pre-Acute Episodes (2007-2009)



Source: Dobson | DaVanzo analysis of research-identifiable 5% SAF for all sites of service, 2007-2009, wage index adjusted by setting and geographic region, and standardized to 2009 dollars. All episodes have been extrapolated to reflect the universe of Medicare beneficiaries.
[a] Average Medicare Pre-Acute Services Paid includes care from all facility-based and ambulatory care settings and excludes beneficiary co-payments.
[b] For methodology used to determine primary chronic condition, see Working Paper #1.

Episode Type 2: Pre-Acute Episodes

Similar to CHF*COPD episodes, the distribution of DIABETES*CHF payments across settings varies significantly by beneficiary demographic characteristics. As shown in Exhibit 2.17, episodes for patients who live alone have a higher use of home health and SNF care, compared to the average patient with DIABETES*CHF. Episodes for patients who live alone also have a slightly higher proportion of payments attributed to physician visits, but a lower proportion attributed to acute care hospitalizations (excluding the index acute care hospitalization). Episodes for patients who are over 85 years old have the lowest proportion of payments attributed to acute care hospitalizations other than the index acute care hospitalization. These episodes have the highest proportion of payments attributed to physician visits and also have a high proportion of outpatient therapy, home health, SNF, and hospice care.

Exhibit 2.17: Distribution of Medicare Pre-Acute Services Paid (Excluding Index Hospitalizations) by Beneficiary Demographic Characteristics for Episodes Defined by DIABETES*CHF[a] for 60-Day Fixed-Length Pre-Acute Episodes (2007-2009)

Beneficiary Demographic	Average Medicare Pre-Acute Services Paid[b]	Percent of Episodes	HHA	SNF	IRF	LTCH	STACH	Out-patient	Physician	ER	OP Therapy	Hospice	Other IP
Lives Alone	$5,003	24.4%	2.6%	3.9%	0.8%	0.3%	22.6%	15.0%	49.3%	2.8%	1.5%	0.9%	0.2%
Over 85 Years Old	$3,690	22.1%	2.5%	5.4%	0.6%	0.2%	17.9%	9.0%	55.6%	3.3%	2.2%	2.9%	0.2%
Female	$4,873	60.2%	1.7%	2.9%	0.6%	0.3%	22.6%	16.3%	49.9%	2.9%	1.3%	1.3%	0.2%
Resides in Rural Area	$5,049	24.2%	1.0%	2.6%	0.5%	0.3%	23.6%	19.3%	44.6%	5.1%	1.2%	1.5%	0.2%
Race Non-White	$6,713	24.7%	1.2%	1.9%	0.5%	0.4%	28.3%	22.8%	40.6%	2.2%	0.9%	1.1%	0.2%
Died During Index Hospitalization	$6,398	27.9%	1.5%	3.2%	0.5%	0.4%	23.7%	17.7%	47.0%	2.4%	1.4%	2.1%	0.2%
Dual Eligible	$6,043	30.4%	1.3%	2.8%	0.5%	0.5%	26.8%	19.9%	42.3%	2.9%	1.6%	1.2%	0.3%
Episode Contains Admission	$17,195	12.6%	1.0%	2.6%	1.0%	0.4%	59.3%	9.3%	23.7%	1.4%	0.6%	0.5%	0.2%
Overall Average	**$5,287**	**100.0%**	**1.4%**	**2.3%**	**0.6%**	**0.3%**	**24.4%**	**17.5%**	**48.5%**	**2.7%**	**1.1%**	**1.0%**	**0.2%**

Source: Dobson | DaVanzo analysis of research-identifiable 5% SAF for all sites of service, 2007-2009, wage index adjusted by setting and geographic region, and standardized to 2009 dollars.

[a] For methodology used to determine primary chronic condition, see Working Paper #1.

[a] Average Medicare Pre-Acute Services Paid includes care from all facility-based and ambulatory care settings and excludes beneficiary co-payments.

Episode Type 2: Pre-Acute Episodes

*CHF*RENAL*

More than five percent of pre-acute episodes have a primary chronic condition of CHF*RENAL. Medicare payment for CHF*RENAL episodes totaled $21.6 billion (Exhibit 2.3). About 32 percent of total episode payments for CHF*RENAL episodes ($7.0 billion) are for the pre-acute care services, while the index acute care hospitalizations following these services have a total Medicare payment of $14.6 billion (Exhibit 2.7). The distribution of episodes by number of chronic conditions is normally distributed, with an average of 5.8 chronic conditions per episode (Exhibit 2.4).

For the three chronic conditions presented previously, the average payment for the pre-acute care services typically increases as the number of chronic conditions contained in an episode increases. However, as shown in Exhibit 2.18 and 2.19, average pre-acute care service payments per episode decrease as the number of chronic conditions included in the episode increases. CHF*RENAL episodes with two chronic conditions (i.e., the patient has no other chronic conditions except CHF and renal failure) have the highest average payment for pre-acute care services ($7,407), which decreases to $3,784 for episodes with more than 13 chronic conditions. The decrease in the average episode payments as the number of chronic conditions increases may be due to patient death or the increased use of hospice or palliative care.

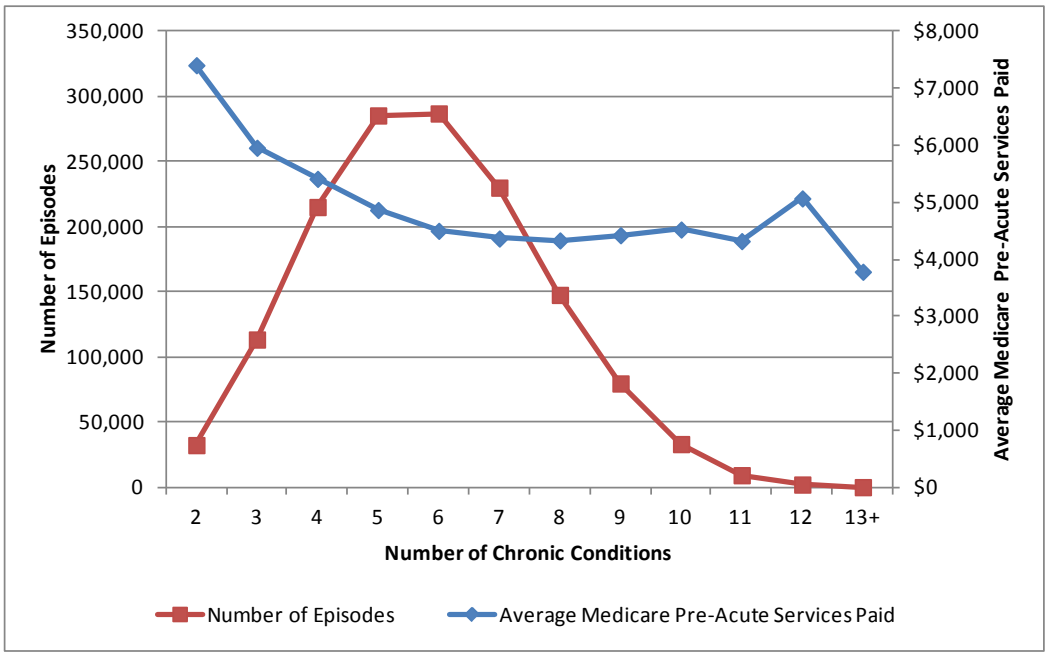
The average index acute care hospitalization payments also decrease as the number of chronic conditions contained in the episode increase. The index acute care hospitalization payments range from $13,000 for episodes with two chronic conditions to $7,229 for episodes with more than 13 chronic conditions. Due to the clinical severity of renal failure, a large proportion of patients with CHF*RENAL episodes died during the index acute care hospitalization (Exhibit 2.20). This suggests that this trend in decreasing average episode payment may be due to the receipt of hospice and palliative care in the pre-service period, which ultimately leads to an index acute care hospitalization and death.

Exhibit 2.18: Average Medicare Episode Paid for Index Hospitalization and Pre-Acute Services for Episodes Defined by CHF*RENAL[a] for 60-Day Fixed-Length Pre-Acute Episodes (2007-2009)

Number of Chronic Conditions	Percent of Episodes	Average Medicare Episode Paid[b]	Average Index Hospitalization Paid	Average Pre-Acute Services Paid
2	2.3%	$20,407	$13,000	$7,407
3	7.9%	$17,630	$11,672	$5,959
4	15.0%	$17,011	$11,598	$5,413
5	19.9%	$15,427	$10,560	$4,867
6	20.0%	$14,335	$9,833	$4,502
7	16.0%	$13,818	$9,451	$4,366
8	10.3%	$13,308	$8,975	$4,333
9	5.6%	$13,323	$8,898	$4,425
10	2.3%	$13,059	$8,535	$4,524
11	0.7%	$12,247	$7,926	$4,322
12	0.2%	$13,226	$8,157	$5,070
13+	0.0%	$11,013	$7,229	$3,784
Total	**100.0%**	**$15,060**	**$10,212**	**$4,849**

Source: Dobson | DaVanzo analysis of research-identifiable 5% SAF for all sites of service, 2007-2009, wage index adjusted by setting and geographic region, and standardized to 2009 dollars.
[a] For methodology used to determine primary chronic condition, see Working Paper #1.
[b] Average Medicare Episode Paid includes care from all facility-based and ambulatory care settings and excludes beneficiary co-payments.

Exhibit 2.19: Total Number of Episodes and Average Medicare Pre-Acute Services Paid[a] for Episodes Defined by CHF*RENAL[b] for Fixed-Length 60-Day Pre-Acute Episodes (2007-2009)



Source: Dobson | DaVanzo analysis of research-identifiable 5% SAF for all sites of service, 2007-2009, wage index adjusted by setting and geographic region, and standardized to 2009 dollars. All episodes have been extrapolated to reflect the universe of Medicare beneficiaries.
[a] Average Medicare Pre-Acute Services Paid includes care from all facility-based and ambulatory care settings and excludes beneficiary co-payments.
[b] For methodology used to determine primary chronic condition, see Working Paper #1.

Episode Type 2: Pre-Acute Episodes

Exhibit 2.20 shows the distribution of Medicare episode payments for CHF*RENAL episodes across care settings for select beneficiary demographic characteristics. The distribution of payments by setting is consistent with episodes for most of the chronic conditions presented previously. One-half of the payments for CHF*RENAL services are attributed to physician services, while the 15.6 percent are attributed to outpatient services. Facility-based care and home health services together comprise 5.0 percent of payments, with SNF representing 2.8 percent of payments and HHA representing 1.5 percent. Episodes for patients who live alone have a similar distribution of payments across settings but have a higher proportion of episode payments in HHA, SNF, and IRF settings and a lower proportion of episode payments in outpatient visits. Episodes for patients who are over 85 years old have a high proportion of SNF payments (5.7 percent) and home health (2.6 percent) compared to the overall average.

Episodes that contain a hospital admission during the pre-acute episode prior to the index acute care hospitalization have a greater proportion of the episode payments (59.4 percent) to the acute care hospital services (excluding the index acute care hospitalization) compared to just 23.1 percent of payments for episodes overall. As a result, the average Medicare episode payment for episodes that contain an admission prior to the index is significantly higher than the overall average ($16,106 compared to $4,849). Therefore, the proportion of payments attributed to physician services is lower than the overall average.

Exhibit 2.20: Distribution of Medicare Pre-Acute Services Paid (Excluding Index Hospitalization) by Beneficiary Demographic Characteristics for Episodes Defined by CHF*RENAL[a] for 60-Day Fixed-Length Pre-Acute Episodes (2007-2009)

Beneficiary Demographic	Average Medicare Pre-Acute Services Paid[b]	Percent of Episodes	HHA	SNF	IRF	LTCH	STACH	Out-patient	Physician	ER	OP Therapy	Hospice	Other IP
Lives Alone	$4,313	27.5%	2.8%	5.0%	0.7%	0.2%	20.2%	12.3%	52.0%	3.1%	1.5%	1.7%	0.4%
Over 85 Years Old	$3,602	42.3%	2.6%	5.7%	0.8%	0.1%	18.2%	8.6%	55.0%	3.4%	2.1%	3.2%	0.3%
Female	$4,390	60.7%	1.8%	3.6%	0.5%	0.2%	21.2%	13.7%	52.2%	3.2%	1.4%	2.0%	0.3%
Resides in Rural Area	$4,608	23.9%	1.1%	3.4%	0.5%	0.2%	22.4%	16.6%	46.8%	5.7%	1.1%	1.8%	0.4%
Race Non-White	$6,355	15.7%	1.0%	1.3%	0.4%	0.4%	28.4%	24.7%	38.8%	2.4%	0.7%	1.4%	0.4%
Died During Index Hospitalization	$5,350	39.0%	1.6%	3.9%	0.6%	0.2%	22.4%	14.0%	50.4%	2.7%	1.4%	2.6%	0.3%
Dual Eligible	$5,542	21.1%	1.0%	3.3%	0.2%	0.4%	26.1%	20.2%	41.8%	3.0%	1.7%	1.9%	0.6%
Episode Contains Admission	$16,106	11.7%	0.9%	3.3%	1.0%	0.3%	59.4%	8.6%	23.6%	1.5%	0.5%	0.5%	0.3%
Total	**$4,849**	**100.0%**	**1.5%**	**2.8%**	**0.5%**	**0.2%**	**23.1%**	**15.6%**	**50.5%**	**2.9%**	**1.1%**	**1.5%**	**0.3%**

Source: Dobson | DaVanzo analysis of research-identifiable 5% SAF for all sites of service, 2007-2009, wage index adjusted by setting and geographic region, and standardized to 2009 dollars.

[a] For methodology used to determine primary chronic condition, see Working Paper #1.

[b] Medicare Medicare Pre-Acute Services Paid includes care from all facility-based and ambulatory care settings and excludes beneficiary co-payments.

Episode Type 3: Nine-Month Non-Post-Acute Care Community-Based Episodes

Brief Review of Episode Definition[14]

This is the only episode type that is not initiated by an index acute care hospital stay. This episode type is initiated by a community admission to home health, and captures all non-post-acute care community-based (facility and non-facility based) that patients receive following discharge from their first community home health admission. This episode type was constructed to include all care within nine months following the first home health episode discharge (Exhibit 3.1). By investigating the health care utilization and payments over a long period of time, we are better able to assess the potential impact of coordination and continuity of care across settings.

Exhibit 3.1: Description of Non-Post-Acute Care Community-Based Episode

[14] For a complete review of the episode definition, see *Working Paper 1: Creating and Benchmarking Episodes: Baseline Statistics of Episode Frequency and Patient Diagnoses.*

Episode Type 3: Non-Post-Acute Episodes

Similar to Episode Type 2, these episodes are clinically defined by the patients' primary chronic conditions. These were determined by mapping each chronic condition identified in the patients' CCW claims data onto one of the HCCs used to determine expected payments in the Medicare Advantage program and ranked in order of severity. Patients with three select disease interactions were ranked as the highest risk. For example, patients with both congestive heart failure (CHF) and chronic obstructive pulmonary disease (COPD) were ranked with a higher severity index than single conditions. The other two interacted conditions include diabetes and CHF (DIABETES*CHF), and CHF and renal failure (CHF*RENAL).

For patients who do not have one of these three disease interaction categories, a patient's "primary chronic condition" is determined by their highest community ranked chronic condition. That is, if a patient has more than one chronic condition, their primary chronic condition is the one with the highest community risk score. Therefore, in order to have a single mutually exclusive primary chronic condition for each patient, patients are only assigned to one primary chronic condition category. That is, a patient episode with a diagnosis of diabetes is often contained within a higher ranked "primary chronic condition" than others. We present a crosswalk of CCW chronic conditions to HCCs in Appendix A.

The Medicare episode payment data presented for the non-post-acute care community-based episodes include the Medicare payment for the first home health episode and all care following the patient's first home health discharge.

Across all three years, there are 2,990,540 total episodes with a total of $73.1 billion in Medicare payments. The numbers of episodes and Medicare episode payments reflected in Episode Type 3 have been adjusted since the first working paper was released. These adjustments include additional data refinement and the creation of a 60-day look-back period prior to the admission to the index home health episode. As a result, similar to the data run-off issues faced in the post-acute care episodes, only non-post-acute care community-based episodes with nine months of claims data available were included in our analyses. The patient's first home health episode discharge must have occurred between March 1, 2007 and March 31, 2009 to be included in this analysis. Therefore, 2008 is the only year that contains a full year of patient episodes. Exhibit 3.2 shows the total number of episodes and Medicare payments by year.

Episode Type 3: Non-Post-Acute Episodes

Exhibit 3.2: Number of Episodes and Medicare Episode Paid for Nine-Month Fixed-Length Non-Post-Acute Care Community-Based Episodes (2007-2009)

Year	Number of Episodes	Medicare Episode Paid[a]	Total Medicare Fee-for-Service Expenditures[b]	Percent of Total Medicare Fee-for-Service Expenditures
2007	1,073,440	$25,306,872,100	$299,900,000,000	8.4%
2008	1,506,320	$37,234,684,760	$308,300,000,000	12.1%
2009	410,780	$10,559,099,420	$325,400,000,000	3.2%
Total	**2,990,540**	**$73,100,656,280**	**n/a**	**n/a**

Source: Dobson | DaVanzo analysis of research-identifiable 5% SAF for all sites of service, 2007-2009, wage index adjusted by setting and geographic region, and standardized to 2009 dollars. All episodes have been extrapolated to reflect the universe of Medicare beneficiaries.

[a] Medicare Episode Paid includes care from all facility-based and ambulatory care settings and excludes beneficiary co-payments.

[b] Congressional Budget Office, March Baselines for Medicare, 2008-2010.

Distribution of Episodes and Medicare Payments by Primary Chronic Condition

Exhibit 3.3 shows the distribution of episodes and Medicare episode payments by primary chronic condition, sorted from highest to lowest community risk score. This mutually exclusive assignment of diagnoses allows us to conduct analyses by chronic condition without duplicating the number of episodes or any Medicare payments. The episode is assigned according to the most severe chronic condition. For example, an osteoporosis episode will often contain numerous less-severe conditions.

As with Episode Type 2, CHF*COPD is the most prevalent primary chronic condition, representing 23.4 percent of episodes and 33.7 percent of total Medicare episode payments. Osteoporosis and DIABETES*CHF remain the second and third most prevalent primary chronic conditions, representing 18.9 percent and 15.5 percent of all non-post-acute care community-based episodes, respectively. More than 80 percent of all non-post-acute care community-based episodes are contained within the top seven highest ranked primary chronic conditions. This suggests that home health serves chronically-ill patients who are at high community risk without having a hospital admission prior to their receiving home health. Only 1.4 percent of all non-post acute episodes have none of the listed chronic conditions. These patients may be frail, which prevents their leaving their home easily. This chapter will investigate the mix of services and Medicare payments for this type of community episode.

Episode Type 3: Non-Post-Acute Episodes

Exhibit 3.3: Distribution of Episodes and Medicare Episode Paid by Primary Chronic Condition[a] for Nine-Month Fixed-Length Non-Post-Acute Care Community-Based Episodes (2007-2009)

Primary Chronic Condition	Number of Episodes	Percent of Episodes	Medicare Episode Paid[b] (in millions)	Percent Medicare Episode Paid
CHF*COPD	699,540	23.4%	$24,663	33.7%
DIABETES*CHF	463,620	15.5%	$13,868	19.0%
CHF*RENAL	159,960	5.3%	$4,493	6.1%
Lung Cancer	38,400	1.3%	$1,030	1.4%
Osteoporosis	563,980	18.9%	$10,709	14.6%
COPD	186,140	6.2%	$3,937	5.4%
Rheumatoid Arthritis/Osteoarthritis	384,560	12.9%	$6,659	9.1%
Hip/Pelvic Fracture	14,080	0.5%	$360	0.5%
Heart Failure	72,580	2.4%	$1,199	1.6%
Alzheimer's Disease	90,800	3.0%	$1,494	2.0%
Alzheimer's Disease and Related Disorders or Senile	62,760	2.1%	$1,061	1.5%
Stroke/Transient Ischemic Attack	27,820	0.9%	$503	0.7%
Colorectal Cancer	7,140	0.2%	$212	0.3%
Depression	62,820	2.1%	$1,060	1.4%
Acute Myocardial Infarction	1,180	0.0%	$22	0.0%
Ischemic Heart Disease	50,320	1.7%	$671	0.9%
Atrial Fibrillation	3,740	0.1%	$58	0.1%
Chronic Kidney Disease	15,820	0.5%	$279	0.4%
Female Breast Cancer	3,720	0.1%	$67	0.1%
Prostate Cancer	2,400	0.1%	$23	0.0%
Endometrial Cancer	300	0.0%	$5	0.0%
Diabetes	24,500	0.8%	$206	0.3%
Glaucoma	4,680	0.2%	$34	0.0%
Cataract	8,840	0.3%	$70	0.1%
None	40,840	1.4%	$417	0.6%
Total	**2,990,540**	**100.0%**	**$73,101**	**100.0%**

Source: Dobson | DaVanzo analysis of research-identifiable 5% SAF for all sites of service, 2007-2009, wage index adjusted by setting and geographic region, and standardized to 2009 dollars. All episodes have been extrapolated to reflect the universe of Medicare beneficiaries.

[a] For methodology used to determine primary chronic condition, see Working Paper #1.

[b] Medicare Episode Paid includes care from all facility-based and ambulatory care settings and excludes beneficiary co-payments.

Episode Type 3: Non-Post-Acute Episodes

Exhibit 3.4 and Exhibit 3.5 show the average number of chronic conditions and Medicare episode payments by primary chronic condition. The average non-post-acute care community-based episode has 5.5 chronic conditions, more than the average number of chronic conditions for patients in the pre-acute care episodes (5.1 chronic conditions). This suggests that home health is able to serve patients from the community who have a variety of clinical needs. Many of these home health patients do not experience an admission to a hospital during the nine-months. For example, one-third of CHF*COPD episodes do not contain an acute care hospitalization.

A nine-month fixed length non-post-acute care community-based episode has an average Medicare episode payment of $24,444, with more than one-quarter (28.2 percent) of the payments attributed to home health care throughout the episode (including the index home health episode). Generally, the total Medicare episode payment and home health proportion of the episode payment decreased as the community risk score of the primary chronic condition decreases. Hip/pelvic fracture, colorectal cancer, female breast cancer, and endometrial cancer are the exception to that trend.

As noted in Exhibit 3.4 and 3.5, more than 80 percent of the non-post-acute care community-based episodes have one of the top seven high-risk primary chronic conditions. All of these conditions, with the exception of rheumatoid arthritis/osteoarthritis, have more chronic conditions on average per episode than the overall average across chronic conditions. The average Medicare episode payment for home health services decreases slightly as the community risk of the primary chronic condition (and the number of chronic conditions) decreases. For example, CHF*COPD episodes receive an average home health payment of $8,142 compared to $3,703 for Prostate Cancer. Given that one average home health episode receives a Medicare payment of roughly $3,000[15], this suggests that patients with higher community risk are receiving two, or as many as three, home health episodes during the whole nine-month episode length. Episodes with lower community risk primary chronic conditions are more likely receiving one home health episode.

On average, 43.2 percent of episodes contain an acute care hospitalization while 27.1 percent of episodes contain a patient death. Higher proportions of episodes for high-risk chronic conditions contain acute care hospitalizations or patient death. In almost one-third (34.9 percent) of CHF*COPD episodes, and 44.1 percent of CHF*RENAL episodes, the patient died. As would be expected, episodes in which the chronic condition is cancer have the highest proportion of patient deaths, such as lung cancer (70.6 percent), colorectal cancer (48.2 percent), and endometrial cancer (53.3 percent). The average Medicare episode payment does not appear to be directly related to the proportion of episodes with deaths.

[15] Dobson | DaVanzo analysis of research-identifiable 5% SAF for all sites of service, 2007-2009.

Episode Type 3: Non-Post-Acute Episodes

Exhibit 3.4: Average Number of Chronic Conditions and Medicare Episode Paid by Primary Chronic Condition[a] for Nine-Month Fixed-Length Non-Post-Acute Care Community-Based Episodes (2007-2009)

Primary Chronic Condition	Percent of Episodes	Average Number Chronic Conditions	Average Medicare Episode Paid[b]	Average Home Health Paid	Percent of Episodes that Contain	
					Acute Care Hospitalization	Patient Death
CHF*COPD	23.4%	7.8	$35,256	$8,142	61.4%	34.9%
DIABETES*CHF	15.5%	6.8	$29,913	$7,795	49.9%	27.6%
CHF*RENAL	5.3%	6.6	$28,088	$6,355	59.5%	44.1%
Lung Cancer	1.3%	5.5	$26,814	$4,615	54.6%	70.6%
Osteoporosis	18.9%	5.7	$18,988	$6,475	34.4%	16.9%
COPD	6.2%	5.1	$21,151	$7,108	37.3%	22.5%
Rheumatoid Arthritis/Osteoarthritis	12.9%	4.5	$17,316	$6,735	29.6%	18.1%
Hip/Pelvic Fracture	0.5%	4.9	$25,598	$5,910	54.1%	40.1%
Heart Failure	2.4%	4.1	$16,519	$5,407	34.2%	38.1%
Alzheimer's Disease	3.0%	4.3	$16,458	$5,516	32.3%	38.0%
Alzheimer's Disease and Related Disorders or Senile	2.1%	3.4	$16,898	$5,643	30.9%	32.2%
Stroke/Transient Ischemic Attack	0.9%	3.4	$18,094	$6,051	34.4%	21.1%
Colorectal Cancer	0.2%	3.0	$29,712	$3,928	40.3%	48.2%
Depression	2.1%	2.4	$16,868	$5,325	26.2%	13.8%
Acute Myocardial Infarction	0.0%	4.0	$18,266	$4,252	52.5%	37.3%
Ischemic Heart Disease	1.7%	2.5	$13,337	$4,628	20.0%	15.5%
Atrial Fibrillation	0.1%	2.3	$15,415	$4,682	23.0%	25.1%
Chronic Kidney Disease	0.5%	2.1	$17,634	$4,425	32.5%	28.6%
Female Breast Cancer	0.1%	1.6	$18,144	$2,888	21.5%	34.4%
Prostate Cancer	0.1%	1.8	$9,718	$3,703	12.5%	28.3%
Endometrial Cancer	0.0%	2.1	$17,579	$4,374	N/A	53.3%
Diabetes	0.8%	1.4	$8,389	$4,710	8.5%	12.6%
Glaucoma	0.2%	1.4	$7,293	$3,994	8.1%	12.0%
Cataract	0.3%	1.0	$7,969	$3,845	N/A	7.5%
None	1.4%	0.0	$10,210	$4,616	13.0%	18.0%
Overall Average	**100.0%**	**5.5**	**$24,444**	**$6,899**	**43.2%**	**27.1%**

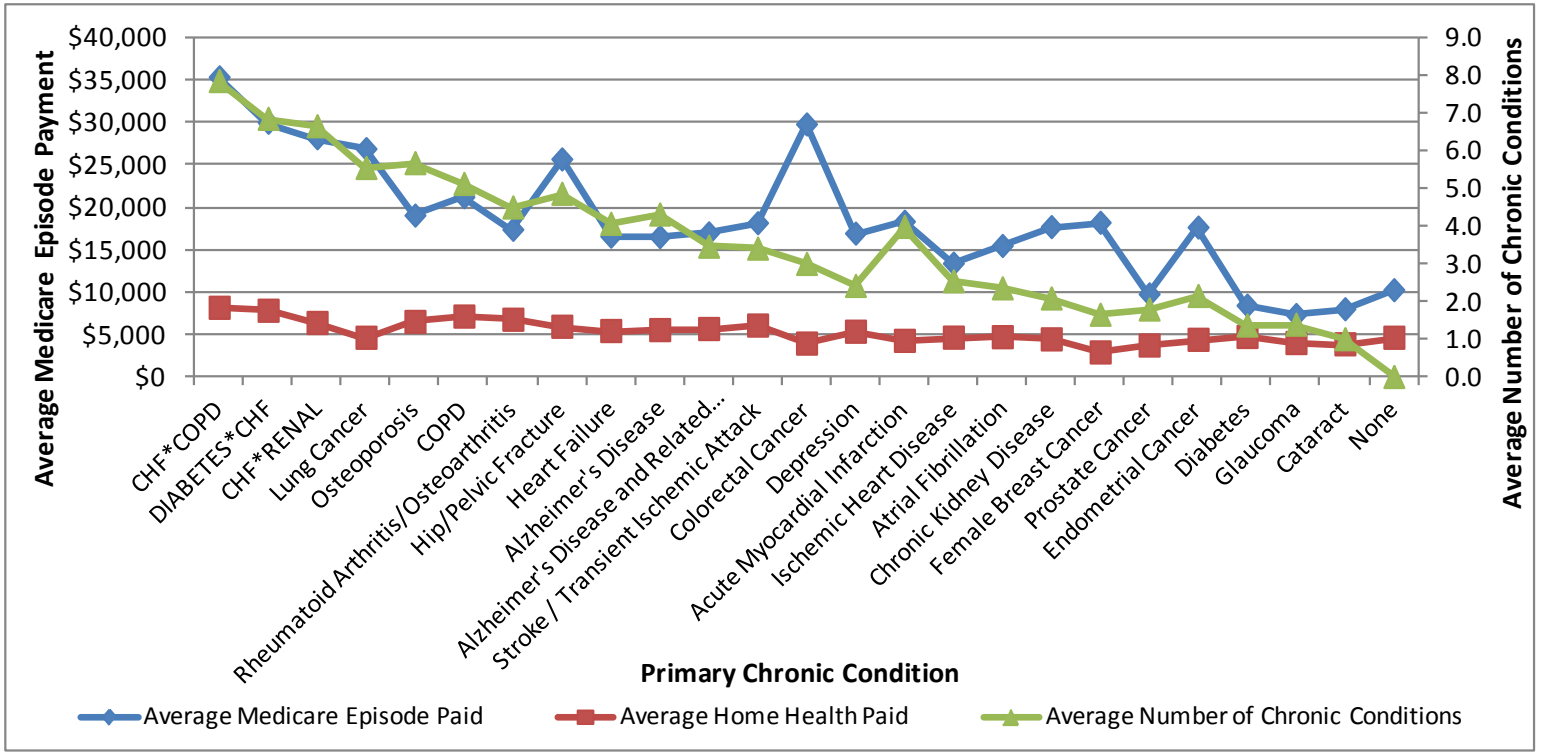
Source: Dobson | DaVanzo analysis of research-identifiable 5% SAF for all sites of service, 2007-2009, wage index adjusted by setting and geographic region, and standardized to 2009 dollars.

[a] For methodology used to determine primary chronic condition, see Working Paper #1.

[b] Average Medicare Episode Paid includes care from all facility-based and ambulatory care settings and excludes beneficiary co-payments.

Episode Type 3: Non-Post-Acute Episodes

Exhibit 3.5: Average Number of Chronic Conditions and Average Medicare Episode Paid[a] by Primary Chronic Condition[b] for Nine-Month Fixed-Length Non-Post-Acute Care Community-Based Episodes (2007-2009)



Source: Dobson | DaVanzo analysis of research-identifiable 5% SAF for all sites of service, 2007-2009, wage index adjusted by setting and geographic region, and standardized to 2009 dollars. All episodes have been extrapolated to reflect the universe of Medicare beneficiaries.

[a] For methodology used to determine primary chronic condition, see Working Paper #1.

[b] Average Medicare Episode Paid includes care from all facility-based and ambulatory care settings and excludes beneficiary co-payments.

Episode Type 3: Non-Post-Acute Episodes

Exhibit 3.6 shows the distribution of episodes by primary chronic condition by the care settings included in the episodes. Across all chronic conditions, 97.5 percent of episodes contained at least one physician visit. This indicates that a very small proportion of patients are not having physician visits. After receiving home health services, 43.2 percent of episodes contain an acute care hospitalization, which leads to a SNF stay for 17.4 percent of episodes.

As home health eligibility requires the patient to meet the Medicare program's homebound requirement, the proportion of episodes that contain outpatient therapy (12.5 percent) suggests that patients in these episodes are becoming rehabilitated and ambulatory, making it feasible to receive outpatient therapy. More than two-thirds of episodes contain outpatient visits.

The distribution of episodes by setting varies significantly by primary chronic condition. A larger proportion of patients in CHF*COPD and CHF*RENAL episodes receive services in the SNF, compared to the average. These primary chronic conditions also have a higher proportion of episodes with acute care hospitalizations, ER visits, and hospice services. This suggests that home health is serving clinically complex patients (these episodes represent 7.8 and 6.6 chronic conditions, on average, respectively).

Episode Type 3: Non-Post-Acute Episodes

Exhibit 3.6: Distribution of Episodes by Care Setting by Primary Chronic Condition[a] for Nine-Month Fixed-Length Non-Post-Acute Care Community-Based Episodes (2007-2009)

Primary Chronic Condition	Percent of Episodes	HHA	SNF	IRF	LTCH	STACH	Out-patient	Physician	ER	OP Therapy	Hospice	Other IP
CHF*COPD	23.4%	100.0%	25.5%	4.1%	2.8%	61.4%	73.1%	98.8%	45.0%	12.8%	10.1%	2.2%
DIABETES*CHF	15.5%	100.0%	19.8%	3.6%	1.7%	49.9%	71.3%	98.7%	40.1%	11.9%	8.4%	1.3%
CHF*RENAL	5.3%	100.0%	26.9%	3.3%	1.3%	59.5%	70.9%	98.6%	39.8%	13.3%	15.1%	1.9%
Lung Cancer	1.3%	100.0%	16.4%	2.3%	0.9%	54.6%	75.1%	96.2%	31.7%	8.8%	39.8%	0.9%
Osteoporosis	18.9%	100.0%	15.3%	2.8%	0.5%	34.4%	69.3%	98.9%	34.8%	15.8%	7.5%	1.6%
COPD	6.2%	100.0%	13.0%	2.0%	1.0%	37.3%	64.3%	96.1%	35.9%	11.5%	9.3%	2.9%
Rheumatoid Arthritis/Osteoarthritis	12.9%	100.0%	12.2%	2.0%	0.5%	29.6%	64.3%	97.5%	31.3%	12.5%	7.7%	1.6%
Hip/Pelvic Fracture	0.5%	100.0%	34.1%	4.5%	N/A	54.1%	60.4%	96.9%	38.4%	12.5%	17.5%	N/A
Heart Failure	2.4%	100.0%	11.6%	1.1%	0.6%	34.2%	61.5%	95.7%	32.3%	9.6%	17.6%	1.6%
Alzheimer's Disease	3.0%	100.0%	13.6%	1.1%	0.4%	32.3%	53.0%	95.0%	32.7%	9.8%	20.5%	3.2%
Alzheimer's Disease or Senile	2.1%	100.0%	12.4%	1.8%	0.8%	30.9%	59.6%	93.5%	33.5%	11.2%	15.8%	1.5%
Stroke / Transient Ischemic Attack	0.9%	100.0%	7.5%	3.5%	N/A	34.4%	66.6%	97.4%	34.1%	13.9%	8.4%	N/A
Colorectal Cancer	0.2%	100.0%	N/A	N/A	N/A	40.3%	72.5%	96.9%	20.4%	4.2%	29.1%	N/A
Depression	2.1%	100.0%	5.6%	1.4%	1.0%	26.2%	68.4%	94.8%	34.3%	10.9%	6.2%	4.0%
Acute Myocardial Infarction	0.0%	100.0%	N/A	N/A	N/A	52.5%	62.7%	94.9%	20.3%	N/A	N/A	N/A
Ischemic Heart Disease	1.7%	100.0%	3.1%	0.8%	N/A	20.0%	61.2%	91.6%	20.8%	7.0%	7.2%	N/A
Atrial Fibrillation	0.1%	100.0%	N/A	N/A	N/A	23.0%	75.4%	96.8%	16.6%	8.6%	10.7%	N/A
Chronic Kidney Disease	0.5%	100.0%	4.9%	N/A	N/A	32.5%	68.5%	92.7%	26.7%	7.2%	12.3%	N/A
Female Breast Cancer	0.1%	100.0%	N/A	N/A	N/A	21.5%	73.7%	98.4%	N/A	8.6%	27.4%	N/A
Prostate Cancer	0.1%	100.0%	N/A	N/A	N/A	N/A	64.2%	95.0%	15.0%	N/A	14.2%	N/A
Endometrial Cancer	0.0%	100.0%	N/A	N/A	N/A	N/A	80.0%	100.0%	N/A	N/A	N/A	N/A
Diabetes	0.8%	100.0%	N/A	N/A	N/A	8.5%	54.9%	83.7%	17.8%	4.2%	5.3%	N/A
Glaucoma	0.2%	100.0%	N/A	N/A	N/A	8.1%	53.0%	94.4%	17.1%	N/A	N/A	N/A
Cataract	0.3%	100.0%	N/A	N/A	N/A	7.2%	58.4%	93.4%	14.5%	11.3%	N/A	N/A
None	1.4%	100.0%	2.7%	0.6%	N/A	13.0%	48.1%	79.5%	19.6%	9.2%	8.6%	N/A
Total	**100.0%**	**100.0%**	**17.4%**	**2.8%**	**1.3%**	**43.2%**	**68.1%**	**97.5%**	**36.9%**	**12.5%**	**10.2%**	**1.8%**

Source: Dobson | DaVanzo analysis of research-identifiable 5% SAF for all sites of service, 2007-2009, wage index adjusted by setting and geographic region, and standardized to 2009 dollars.

[a] For methodology used to determine primary chronic condition, see Working Paper #1.

Episode Type 3: Non-Post-Acute Episodes

Exhibit 3.7 shows the distribution of average Medicare episode payments and percent of Medicare episode payments across care settings for each primary chronic condition. On average, payments to HHAs represent 28.2 percent of total episode payments, or $6,899 per episode. Hospital inpatient payments for the acute care hospitalizations represent nearly the same proportion of total episode payments (28.1 percent), or $6,863 of the total average payment of $24,444. The percent of the total episode payment paid to home health varies significantly by chronic condition and ranges from 56.1 percent for diabetes to 13.2 percent for colorectal cancer. The individual home health payment ranges from $8,142 for CHF*COPD episodes to $2,888 for female breast cancer episodes.

Physician services represent 15.9 percent of the total episode payment, which ranges from 35.7 percent in female breast cancer to 11.4 percent on Alzheimer's Disease.

Footnotes for Exhibit 3.7:

Source: Dobson | DaVanzo analysis of research-identifiable 5% SAF for all sites of service, 2007-2009, wage index adjusted by setting and geographic region, and standardized to 2009 dollars.

[a] For methodology used to determine primary chronic condition, see Working Paper #1.

[b] Average Medicare Episode Paid includes care from all facility-based and ambulatory care settings and excludes beneficiary co-payments.

Episode Type 3: Non-Post-Acute Episodes

Exhibit 3.7: Distribution of Average Medicare Episode Paid and Percent of Medicare Episode Paid By Primary Chronic Condition[a] for Nine-Month Fixed-Length Non-Post-Acute Care Community-Based Episode (2007-2009)

Primary Chronic Condition	Percent of Episodes	Average Medicare Episode Paid[b]	HHA	SNF	IRF	LTCH	STACH	Out-patient	Physician	ER	OP Therapy	Hospice	Other IP
CHF*COPD	23.4%	$35,256	$8,142	$4,045	$804	$1,113	$12,068	$1,848	$5,460	$418	$242	$859	$257
			23.1%	11.5%	2.3%	3.2%	34.2%	5.2%	15.5%	1.2%	0.7%	2.4%	0.7%
DIABETES*CHF	15.5%	$29,913	$7,795	$3,163	$724	$642	$9,034	$2,417	$4,773	$320	$194	$693	$156
			26.1%	10.6%	2.4%	2.1%	30.2%	8.1%	16.0%	1.1%	0.6%	2.3%	0.5%
CHF*RENAL	5.3%	$28,088	$6,355	$4,091	$624	$393	$9,384	$1,338	$4,069	$311	$215	$1,098	$209
			22.6%	14.6%	2.2%	1.4%	33.4%	4.8%	14.5%	1.1%	0.8%	3.9%	0.7%
Lung Cancer	1.3%	$26,814	$4,615	$2,002	$468	$301	$7,670	$2,471	$6,161	$253	$121	$2,643	$109
			17.2%	7.5%	1.7%	1.1%	28.6%	9.2%	23.0%	0.9%	0.4%	9.9%	0.4%
Osteoporosis	18.9%	$18,988	$6,475	$2,401	$517	$160	$3,861	$861	$3,200	$251	$278	$772	$213
			34.1%	12.6%	2.7%	0.8%	20.3%	4.5%	16.9%	1.3%	1.5%	4.1%	1.1%
COPD	6.2%	$21,151	$7,108	$1,905	$384	$340	$5,101	$1,230	$3,349	$292	$208	$810	$423
			33.6%	9.0%	1.8%	1.6%	24.1%	5.8%	15.8%	1.4%	1.0%	3.8%	2.0%
Rheumatoid Arthritis/ Osteoarthritis	12.9%	$17,316	$6,735	$1,837	$375	$133	$3,332	$861	$2,701	$212	$193	$745	$193
			38.9%	10.6%	2.2%	0.8%	19.2%	5.0%	15.6%	1.2%	1.1%	4.3%	1.1%
Hip/Pelvic Fracture	0.5%	$25,598	$5,910	$5,643	$842	$59	$7,087	$845	$2,994	$232	$204	$1,271	$510
			23.1%	22.0%	3.3%	0.2%	27.7%	3.3%	11.7%	0.9%	0.8%	5.0%	2.0%
Heart Failure	2.4%	$16,519	$5,407	$1,494	$206	$199	$3,918	$762	$2,347	$221	$140	$1,644	$179
			32.7%	9.0%	1.2%	1.2%	23.7%	4.6%	14.2%	1.3%	0.9%	9.9%	1.1%
Alzheimer's Disease	3.0%	$16,458	$5,516	$2,025	$195	$165	$3,184	$434	$1,876	$226	$156	$2,307	$374
			33.5%	12.3%	1.2%	1.0%	19.3%	2.6%	11.4%	1.4%	0.9%	14.0%	2.3%
Alzheimer's Disease & Senile	2.1%	$16,898	$5,643	$1,924	$357	$326	$3,528	$664	$2,241	$235	$161	$1,579	$240
			33.4%	11.4%	2.1%	1.9%	20.9%	3.9%	13.3%	1.4%	1.0%	9.3%	1.4%
Stroke/Transient Ischemic Attack	0.9%	$18,094	$6,051	$1,076	$670	$187	$4,650	$1,394	$2,916	$220	$251	$585	$94
			33.4%	5.9%	3.7%	1.0%	25.7%	7.7%	16.1%	1.2%	1.4%	3.2%	0.5%
Colorectal Cancer	0.2%	$29,712	$3,928	$999	$70	$292	$6,781	$6,784	$8,978	$125	$90	$1,667	$0
			13.2%	3.4%	0.2%	1.0%	22.8%	22.8%	30.2%	0.4%	0.3%	5.6%	0.0%

Episode Type 3: Non-Post-Acute Episodes

Exhibit 3.7 continued: Distribution of Average Medicare Episode Paid and Percent of Medicare Episode Paid by Primary Chronic Condition[a] for Nine-Month Fixed-Length Non-Post-Acute Care Community-Based Episode (2007-2009)

Primary Chronic Condition	Percent of Episodes	Average Medicare Episode Paid[b]	HHA	SNF	IRF	LTCH	STACH	Out-patient	Physician	ER	OP Therapy	Hospice	Other IP
Depression	2.1%	$16,868	$5,325	$719	$259	$298	$4,074	$1,863	$2,949	$303	$120	$502	$457
			31.6%	4.3%	1.5%	1.8%	24.1%	11.0%	17.5%	1.8%	0.7%	3.0%	2.7%
Acute Myocardial Infarction	0.0%	$18,266	$4,252	$792	$0	$0	$6,754	$2,328	$3,506	$409	$49	$177	$0
			23.3%	4.3%	0.0%	0.0%	37.0%	12.7%	19.2%	2.2%	0.3%	1.0%	0.0%
Ischemic Heart Disease	1.7%	$13,337	$4,628	$323	$129	$149	$2,815	$1,712	$2,807	$118	$73	$564	$19
			34.7%	2.4%	1.0%	1.1%	21.1%	12.8%	21.0%	0.9%	0.6%	4.2%	0.1%
Atrial Fibrillation	0.1%	$15,415	$4,682	$559	$113	$397	$4,075	$1,418	$3,203	$84	$62	$822	$0
			30.4%	3.6%	0.7%	2.6%	26.4%	9.2%	20.8%	0.5%	0.4%	5.3%	0.0%
Chronic Kidney Disease	0.5%	$17,634	$4,425	$548	$105	$337	$4,816	$2,570	$3,457	$156	$100	$925	$194
			25.1%	3.1%	0.6%	1.9%	27.3%	14.6%	19.6%	0.9%	0.6%	5.2%	1.1%
Female Breast Cancer	0.1%	$18,144	$2,888	$181	$0	$79	$2,004	$3,540	$6,485	$75	$51	$2,841	$0
			15.9%	1.0%	0.0%	0.4%	11.0%	19.5%	35.7%	0.4%	0.3%	15.7%	0.0%
Prostate Cancer	0.1%	$9,718	$3,703	$0	$0	$0	$1,205	$666	$2,884	$47	$31	$1,182	$0
			38.1%	0.0%	0.0%	0.0%	12.4%	6.9%	29.7%	0.5%	0.3%	12.2%	0.0%
Endometrial Cancer	0.0%	$17,579	$4,374	$0	$0	$0	$4,755	$1,066	$3,542	$147	$50	$3,645	$0
			24.9%	0.0%	0.0%	0.0%	27.0%	6.1%	20.1%	0.8%	0.3%	20.7%	0.0%
Diabetes	0.8%	$8,389	$4,710	$199	$105	$21	$1,004	$511	$1,302	$96	$48	$380	$14
			56.1%	2.4%	1.3%	0.3%	12.0%	6.1%	15.5%	1.1%	0.6%	4.5%	0.2%
Glaucoma	0.2%	$7,293	$3,994	$36	$0	$0	$550	$626	$1,667	$84	$73	$262	$0
			54.8%	0.5%	0.0%	0.0%	7.5%	8.6%	22.9%	1.2%	1.0%	3.6%	0.0%
Cataract	0.3%	$7,969	$3,845	$421	$110	$104	$661	$866	$1,394	$51	$119	$396	$0
			48.3%	5.3%	1.4%	1.3%	8.3%	10.9%	17.5%	0.6%	1.5%	5.0%	0.0%
None	1.4%	$10,210	$4,616	$287	$117	$201	$1,809	$880	$1,352	$126	$106	$685	$30
			45.2%	2.8%	1.1%	2.0%	17.7%	8.6%	13.2%	1.2%	1.0%	6.7%	0.3%
Overall Average	**100.0%**	**$24,444**	**$6,899**	**$2,697**	**$549**	**$487**	**$6,863**	**$1,448**	**$3,876**	**$293**	**$212**	**$896**	**$224**
			28.2%	**11.0%**	**2.2%**	**2.0%**	**28.1%**	**5.9%**	**15.9%**	**1.2%**	**0.9%**	**3.7%**	**0.9%**

Episode Type 3: Non-Post-Acute Episodes

Distribution of Episodes and Medicare Payments for Select Primary Chronic Conditions

In the remainder of this chapter, we analyze the non-post-acute care community-based episode payments for select primary chronic conditions in more detail. These sections contain descriptive statistics on the number of chronic conditions within these episodes and the allocation of Medicare episode payments by care setting. These episode payments include the index home health episode and all subsequent services.

*CHF*COPD*

Similar to the pre-acute care episodes, CHF*COPD is the most common primary chronic condition among the non-post-acute care community-based episodes and has the highest community risk score. This chronic condition represents almost one-quarter (23.4 percent) of all non-post-acute care community-based services. Medicare payment for CHF*COPD episodes totaled $24.6 billion from 2007 to 2009 (Exhibit 3.3). Less than one-quarter of total episode payments for CHF*COPD episodes ($5.7 billion) are for home health services, while all other services comprise the remaining $19.0 billion in Medicare payments (Exhibit 3.7). The distribution of episodes by chronic conditions is normally distributed, with an average of 7.8 chronic conditions per episode (Exhibit 3.4).

As shown in Exhibits 3.8 and 3.9, CHF*COPD episodes have an average Medicare episode payment of $35,256, with $8,141 (23.1 percent) being attributed to home health services. There is a linear relationship between the number of chronic conditions and the total Medicare episode payment – as the number of chronic conditions increases, the average Medicare episode payment increases as well.

On average, CHF*COPD episodes with two chronic conditions (i.e., the patient has no other chronic conditions except CHF and COPD) have the lowest average payment for non-post-acute services. Episodes defined by CHF*COPD with no other chronic conditions have $4,929 of the total average episode payment of $16,807 (29.3 percent) going to home health services. Episodes for patients with more than 14 chronic conditions have the highest average payment for home health (average home health payment of $11,364), which comprises 18.3 percent of the average Medicare episode payment.

The average payment for other services (non-home health services such as physician visits or facility-based care) within the non-post-acute care community-based episode increases significantly as the number of chronic conditions increases. Other services range from $11,878 for episodes with two chronic conditions to $50,830 for episodes with more than 14 chronic conditions.

As the number of chronic conditions increases, so does the percent of episodes that contains an acute care hospitalization. However, the proportion of episodes that contain a patient death does not appear to be directly related to the number of chronic conditions. On average, 33.6 percent of CHF*COPD episodes contain an acute care hospitalization, and 34.9 percent of episodes contain patient deaths.

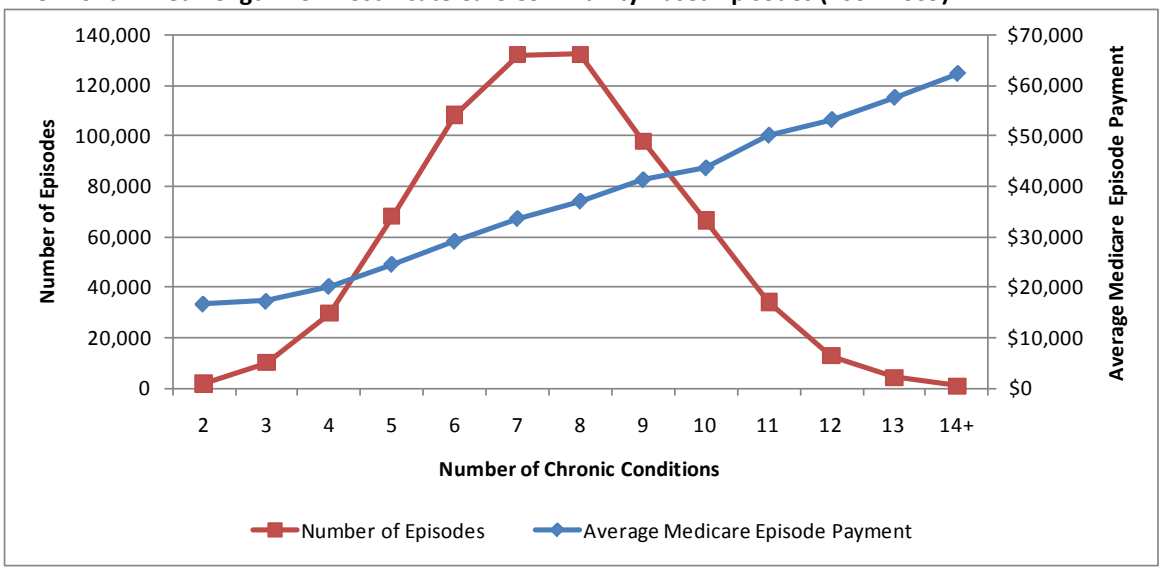
Episode Type 3: Non-Post-Acute Episodes

Exhibit 3.8: Average Medicare Episode Paid for Home Health and Other Services for Episodes Defined by CHF*COPD[a] for Nine-Month Fixed-Length Non-Post-Acute Care Community-Based Episodes (2007-2009)

Number of Chronic Conditions	Percent of Episodes	Average Medicare Episode Paid[b]	Average Home Health Paid	Average Other Services Paid	Percent of Episodes that Contain	
					Acute Care Hospitalization	Patient Death
2	0.3%	$16,807	$4,929	$11,878	N/A	59.6%
3	1.5%	$17,347	$5,407	$11,940	N/A	40.5%
4	4.3%	$20,283	$5,809	$14,474	17.2%	36.2%
5	9.7%	$24,644	$6,361	$18,283	22.1%	38.2%
6	15.5%	$29,193	$7,337	$21,856	26.8%	35.0%
7	18.9%	$33,661	$7,828	$25,833	31.0%	35.5%
8	18.9%	$37,099	$8,629	$28,470	36.2%	34.3%
9	14.0%	$41,298	$8,954	$32,344	40.7%	32.5%
10	9.5%	$43,635	$9,812	$33,823	43.3%	33.5%
11	4.9%	$50,069	$9,915	$40,154	49.1%	35.5%
12	1.8%	$53,155	$10,155	$43,001	54.9%	30.3%
13	0.6%	$57,519	$10,041	$47,478	54.8%	36.2%
14+	0.1%	$62,223	$11,394	$50,830	57.8%	46.7%
Overall Average	**100.0%**	**$35,256**	**$8,142**	**$27,114**	**33.6%**	**34.9%**

Source: Dobson | DaVanzo analysis of research-identifiable 5% SAF for all sites of service, 2007-2009, wage index adjusted by setting and geographic region, and standardized to 2009 dollars.
[a] For methodology used to determine primary chronic condition, see Working Paper #1.
[b] Average Medicare Episode Paid includes care from all facility-based and ambulatory care settings and excludes beneficiary co-payments.

Exhibit 3.9: Number of Episodes and Medicare Episode Paid[a] for Episodes Defined by CHF*COPD[b] for Nine-Month Fixed-Length Non-Post-Acute Care Community-Based Episodes (2007-2009)



Source: Dobson | DaVanzo analysis of research-identifiable 5% SAF for all sites of service, 2007-2009, wage index adjusted by setting and geographic region, and standardized to 2009 dollars. All episodes have been extrapolated to reflect the universe of Medicare beneficiaries.
[a] Average Medicare Episode Paid includes care from all facility-based and ambulatory care settings and excludes beneficiary co-payments.
[b] For methodology used to determine primary chronic condition, see Working Paper #1.

Episode Type 3: Non-Post-Acute Episodes

Exhibit 3.10 shows the distribution of payments across care settings for select beneficiary demographic characteristics. Across all CHF*COPD episodes almost one-quarter (23.1 percent) of episode payments are for home health services, and more than one-third (34.2 percent) of episode payments are for hospital admissions. Another 15.5 percent of episode payments are for physician services. Non-post-acute care community-based episodes have a higher reliance on facility-based post-acute care settings than pre-acute episodes, as 11.5 percent of episode payments are for SNF services, while 3.2 percent and 2.3 percent of payments are for LTCH and IRF services, respectively.

Episodes for patients who live alone have a slightly higher proportion of episode payments for SNF settings, but a comparable proportion of payments for home health, IRF, acute care hospitalizations, and physician visits. The episode composition for patients who are over 85 years old have the highest proportion of SNF services, and a lower proportion of hospital admission payments and physician visits.

Episodes that contain a hospital admission during the non-post-acute care community-based episode have a small proportion of Medicare episode payments for home health services (only 16.9 percent of payments compared to 23.1 percent of all episodes). Hospital admission payments for these episodes account for 40.3 percent of payments, and physician visits account for 14.6 percent of payments.

Exhibit 3.10: Distribution of Medicare Episode Paid by Beneficiary Demographic Characteristics for Episodes Defined by CHF*COPD[a] for 9-Month Fixed-Length Non-Post-Acute Care Community-Based Episodes (2007-2009)

Beneficiary Demographic	Average Medicare Episode Paid[b]	Percent of Episodes	HHA	SNF	IRF	LTCH	STACH	Out-patient	Physician	ER	OP Therapy	Hospice	Other IP
Lives Alone	$35,436	51.0%	23.9%	13.3%	2.3%	2.7%	32.9%	4.7%	15.5%	1.2%	0.7%	2.1%	0.8%
Over 85 Years Old	$30,421	31.8%	24.3%	16.0%	2.2%	2.2%	32.0%	2.7%	13.9%	1.1%	0.8%	4.2%	0.5%
Female	$34,521	66.4%	23.9%	12.3%	2.3%	3.1%	33.5%	4.7%	15.2%	1.2%	0.7%	2.4%	0.7%
Resides in Rural Area	$32,289	20.7%	21.9%	12.5%	2.2%	2.5%	35.1%	6.2%	13.5%	1.9%	0.6%	2.7%	0.9%
Race Non-White	$39,216	22.2%	27.5%	6.1%	1.9%	3.9%	34.1%	7.2%	16.1%	1.0%	0.6%	1.0%	0.5%
Died During Episode	$43,044	34.9%	15.3%	12.5%	2.0%	4.5%	41.2%	4.2%	14.1%	0.9%	0.5%	4.1%	0.6%
Dual Eligible	$37,947	36.8%	25.7%	8.9%	1.8%	3.4%	33.8%	6.3%	15.6%	1.3%	0.8%	1.4%	0.9%
Episode Contains Hospital Admission	$48,691	61.4%	16.9%	13.4%	2.6%	3.7%	40.3%	4.4%	14.6%	1.1%	0.5%	1.9%	0.7%
Overall Average	**$35,256**	**100.0%**	**23.1%**	**11.5%**	**2.3%**	**3.2%**	**34.2%**	**5.2%**	**15.5%**	**1.2%**	**0.7%**	**2.4%**	**0.7%**

Source: Dobson | DaVanzo analysis of research-identifiable 5% SAF for all sites of service, 2007-2009, wage index adjusted by setting and geographic region, and standardized to 2009 dollars.

[a] For methodology used to determine primary chronic condition, see Working Paper #1.

[b] Average Medicare Episode Paid includes care from all facility-based and ambulatory care settings and excludes beneficiary co-payments.

Episode Type 3: Non-Post-Acute Episodes

Osteoporosis

Osteoporosis is the second most common primary chronic condition for non-post-acute care community-based episodes and defines 18.9 percent of all non-post-acute care community-based episodes. Medicare payment for osteoporosis episodes totaled $10.7 billion (Exhibit 3.3). About 34.1 percent of total episode payments for osteoporosis episodes ($3.7 billion) are for home health services, while other services represent $7.1 billion in episode payments (Exhibit 3.7). The distribution of episodes by chronic condition is normally distributed, with an average of 5.7 chronic conditions per episode (Exhibit 3.4).

As shown in Exhibit 3.11 and Exhibit 3.12, osteoporosis episodes have an average Medicare episode payment of $18,988, with $6,475 (34.1 percent) going to home health services. There is a steep linear relationship between the number of chronic conditions and the total Medicare episode payment – as the number of chronic conditions increases, there is a corresponding monotonic increase in Medicare episode payment.

On average, osteoporosis episodes with only one chronic condition (i.e., the patient only has osteoporosis) have the lowest average payment for home health and other services. Episodes defined by only osteoporosis (one chronic condition) have $4,559 of the total average episode payment (49.3 percent of $9,250) going to home health services. Episodes for patients with 10 chronic conditions have the highest average payment for home health services (average home health payment of $9,609), which represents 27.5 percent of the total average episode payment of $34,937.

The average payment for Other services within the non-post-acute care community-based episode increases significantly as the number of chronic conditions increases. Other services range from $4,691 for episodes with one chronic condition to $32,224 for episodes with 12 chronic conditions.

On average, 11.3 percent of osteoporosis episodes contain an acute care hospitalization, and 16.9 percent contain a patient death. Similar to CHF*COPD, as the number of chronic conditions within an Osteoporosis episode increases, the proportion of episodes with an acute care hospitalization also increases. About three percent (3.4 percent) of episodes with two chronic conditions and 36.8 percent of episodes with 11 chronic conditions contain an acute care hospitalization. The proportion of episodes containing a patient death ranges from 12.7 percent for episodes with two chronic conditions to 21.2 percent of episodes with 10 chronic conditions. As the proportion of episodes with an acute care hospitalization increases, the average Medicare episode payment increases as well. The proportion of patient deaths does not seem to be directly related to the average episode payment.

Episode Type 3: Non-Post-Acute Episodes

Exhibit 3.11: Average Medicare Episode Paid for Home Health and Other Services for Episodes Defined by Osteoporosis[a] for Nine-Month Fixed-Length Non-Post-Acute Care Community-Based Episodes (2007-2009)

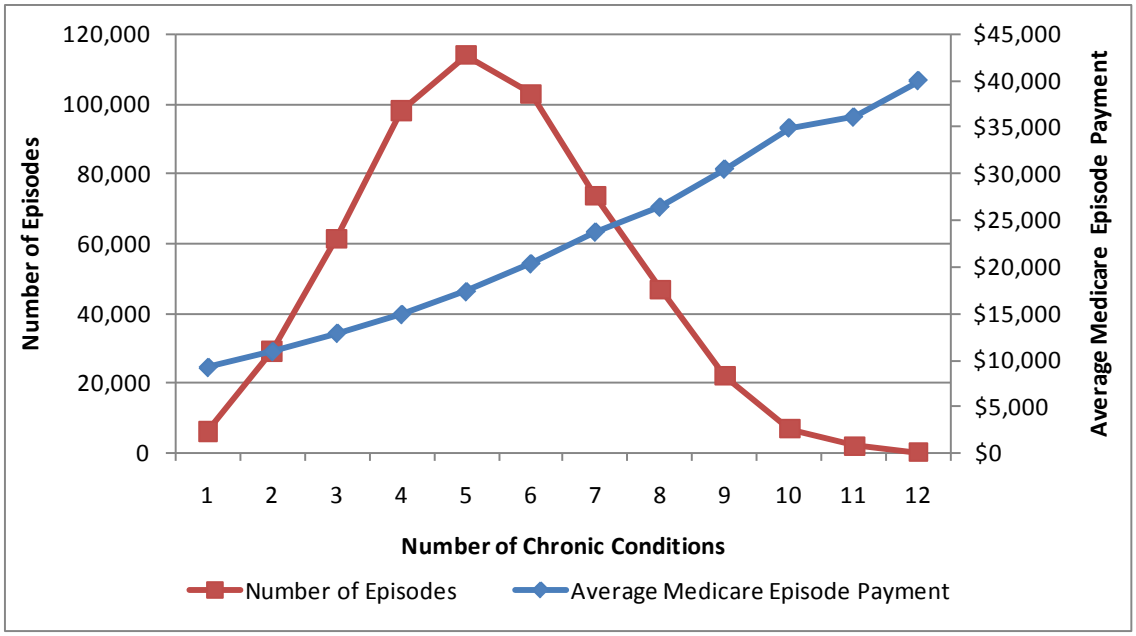
Number of Chronic Conditions	Percent of Episodes	Average Medicare Episode Paid[b]	Average Home Health Paid	Average Other Services Paid	Percent of Episodes that Contain Acute Care Hospitalization	Percent of Episodes that Contain Patient Death
1	1.1%	$9,250	$4,559	$4,691	N/A	N/A
2	5.2%	$10,945	$4,687	$6,259	3.4%	12.7%
3	10.9%	$12,915	$5,254	$7,660	4.8%	14.2%
4	17.4%	$14,925	$5,657	$9,269	7.1%	15.1%
5	20.2%	$17,366	$6,200	$11,166	8.8%	17.0%
6	18.2%	$20,360	$6,824	$13,536	12.2%	18.2%
7	13.1%	$23,762	$7,407	$16,355	16.7%	20.0%
8	8.3%	$26,440	$8,068	$18,373	19.1%	18.3%
9	3.9%	$30,513	$8,594	$21,919	25.2%	19.5%
10	1.3%	$34,937	$9,609	$25,328	32.0%	21.2%
11	0.4%	$36,090	$7,635	$28,456	36.8%	14.2%
12	0.1%	$40,004	$7,780	$32,224	N/A	N/A
Overall Average	**100.0%**	**$18,988**	**$6,475**	**$12,513**	**11.3%**	**16.9%**

Source: Dobson | DaVanzo analysis of research-identifiable 5% SAF for all sites of service, 2007-2009, wage index adjusted by setting and geographic region, and standardized to 2009 dollars.

[a] For methodology used to determine primary chronic condition, see Working Paper #1.

[b] Average Medicare Episode Paid includes care from all facility-based and ambulatory care settings and excludes beneficiary co-payments.

Exhibit 3.12: Number of Episodes and Average Medicare Episode Paid[a] for Episodes Defined by Osteoporosis[b] for Nine-Month Fixed-Length Non-Post-Acute Care Community-Based Episodes (2007-2009)



Source: Dobson | DaVanzo analysis of research-identifiable 5% SAF for all sites of service, 2007-2009, wage index adjusted by setting and geographic region, and standardized to 2009 dollars. All episodes have been extrapolated to reflect the universe of Medicare beneficiaries.

[a] Average Medicare Episode Paid includes care from all facility-based and ambulatory care settings and excludes beneficiary co-payments.

[b] For methodology used to determine primary chronic condition, see Working Paper #1. .

Episode Type 3: Non-Post-Acute Episodes

Exhibit 3.13 shows the distribution of payments across care settings for select beneficiary demographic characteristics. Of the chronic conditions examined in this chapter, osteoporosis non-post-acute care community-based episodes have the largest proportion of episode payments going to home health – more than one-third (34.1 percent) of episode payments. The proportion of payments attributed to physician visits is also higher than most, and represents 16.9 percent of payments. These episodes have a relatively high reliance on facility-based post-acute care settings (12.6 percent of episode payments are for SNF services and 2.7 percent for IRF services).

Similar to CHF*COPD episodes, osteoporosis episodes for patients who live alone have a slightly higher proportion of episode payments going to SNF settings, but a comparable proportion of payments go to home health, IRF, hospitalizations, and physician visits. The episode composition for patients who are over 85 years old also has a higher proportion of SNF services.

Episodes that contain a hospital admission have a different distribution of episode payments by setting than those without a hospitalization. On average, only 20.4 percent of payments are for home health services, compared to 34.1 percent of all episodes. Hospital admission payments account for 31.9 percent, SNF services account for 19.4 percent, and physician visits account for 13.9 percent of Medicare episode payments.

Exhibit 3.13: Distribution of Average Medicare Episode Paid by Beneficiary Demographic Characteristic for Episodes Defined by Osteoporosis[a] for Nine-Month Fixed-Length Non-Post-Acute Care Community-Based Episodes (2007-2009)

Beneficiary Demographic	Average Medicare Episode Paid[b]	Percent of Episodes	HHA	SNF	IRF	LTCH	STACH	Out-patient	Physician	ER	OP Therapy	Hospice	Other IP
Lives Alone	$19,235	52.4%	34.2%	14.2%	2.8%	0.6%	19.9%	4.2%	16.8%	1.4%	1.6%	3.1%	1.2%
Over 85 Years Old	$18,319	39.8%	33.8%	17.1%	2.3%	0.4%	19.9%	2.6%	14.2%	1.4%	1.5%	6.1%	0.8%
Female	$18,537	90.2%	34.6%	12.9%	2.7%	0.6%	19.8%	4.4%	16.7%	1.4%	1.5%	4.2%	1.1%
Resides in Rural Area	$18,969	17.6%	31.9%	14.2%	3.0%	0.8%	21.6%	5.9%	14.3%	1.8%	1.3%	4.1%	1.1%
Race Non-White	$18,517	15.9%	44.8%	6.9%	2.0%	1.0%	18.5%	5.6%	16.2%	1.0%	1.3%	2.0%	0.7%
Died During Episode	$25,676	16.9%	21.7%	16.2%	1.8%	1.3%	28.7%	2.7%	12.7%	1.2%	1.0%	11.6%	1.3%
Dual Eligible	$19,559	26.4%	40.1%	9.3%	2.0%	1.1%	19.1%	5.5%	16.5%	1.4%	1.6%	2.1%	1.3%
Episode Contains Hospital Admission	$35,170	34.4%	20.4%	19.4%	4.0%	1.2%	31.9%	2.9%	13.9%	1.1%	1.0%	3.1%	1.0%
Overall Average	**$18,988**	**100.0%**	**34.1%**	**12.6%**	**2.7%**	**0.8%**	**20.3%**	**4.5%**	**16.9%**	**1.3%**	**1.5%**	**4.1%**	**1.1%**

Source: Dobson | DaVanzo analysis of research-identifiable 5% SAF for all sites of service, 2007-2009, wage index adjusted by setting and geographic region, and standardized to 2009 dollars.

[a] For methodology used to determine primary chronic condition, see Working Paper #1.

[b] Average Medicare Episode Paid includes care from all facility-based and ambulatory care settings and excludes beneficiary co-payments.

Episode Type 3: Non-Post-Acute Episodes

*DIABETES*CHF*

DIABETES*CHF episodes comprise 15.5 percent of all non-post-acute care community-based episodes. Medicare payment for DIABETES*CHF episodes totaled $13.9 billion (Exhibit 3.3). More than one-quarter of total episode payments ($3.6 billion) are for home health services, while other services account for $10.3 billion (Exhibit 3.7). The distribution of episodes by chronic conditions is normally distributed, with an average of 6.8 chronic conditions per episode (Exhibit 3.4).

As shown in Exhibits 3.14 and 3.15, DIABETES*CHF episodes have an average Medicare episode payment of $29,913, with $7,795 (26.1 percent) going to home health services. On average, DIABETES*CHF episodes with only two chronic conditions (i.e., the patient only has diabetes and CHF) have the lowest average payment for home health ($5,895), and also for the other services ($5,938) in the episode. Episodes with two chronic conditions have an average episode payment for home health services that is approximately three-quarters of the overall average episode payment for home health services. Episodes for patients with 13 chronic conditions have an average home health payment of $10,514 and a total episode payment of $58,146.

The average payment for other services within the non-post-acute care community-based episodes increases significantly as the number of chronic conditions increases. Other services range from $5,938 for episodes with two chronic conditions to $47,632 for episodes with more than 13 chronic conditions.

On average, 23.0 percent of DIABETES*CHF episodes contain an acute care hospitalization, and 27.6 percent contain a patient death. The proportion of DIABETES*CHF episodes that contain an acute care hospitalization ranges from 12.6 percent for episodes with four chronic conditions to 67.7 percent of episodes with more than 13 chronic conditions. The proportion of episodes that contain a patient death ranges from 23.1 percent for episodes with four chronic conditions to 32.0 percent for episodes with 10 chronic conditions. Consistent with the findings above, as the proportion of episodes with an acute care hospitalization increases, the average Medicare episode payment increases. The proportion of patient deaths does not seem to be directly related to the average Medicare episode payment.

Episode Type 3: Non-Post-Acute Episodes

Exhibit 3.14: Average Medicare Episode Paid for Home Health and Other Services for Episodes Defined by DIABETES*CHF[a] for Nine-Month Fixed-Length Non-Post-Acute Care Community-Based Episodes (2007-2009)

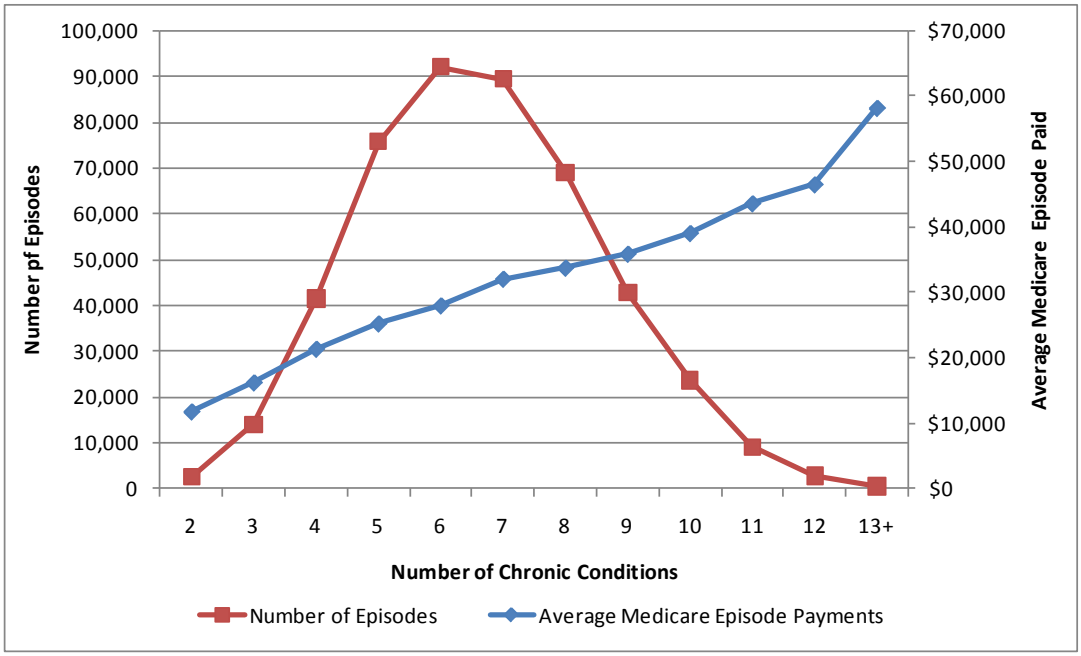
Number of Chronic Conditions	Percent of Episodes	Average Medicare Episode Paid[b]	Average Home Health Paid	Average Other Services Paid	Percent of Episodes that Contain Acute Care Hospitalization	Percent of Episodes that Contain Patient Death
2	0.5%	$11,832	$5,895	$5,938	N/A	N/A
3	3.0%	$16,259	$6,118	$10,141	N/A	26.0%
4	9.0%	$21,391	$6,775	$14,616	12.6%	23.1%
5	16.3%	$25,258	$7,121	$18,137	16.3%	27.7%
6	19.9%	$28,010	$7,644	$20,366	20.0%	26.2%
7	19.3%	$32,076	$7,945	$24,131	25.4%	27.9%
8	14.9%	$33,763	$8,464	$25,299	28.1%	27.9%
9	9.2%	$35,895	$8,596	$27,299	31.0%	31.0%
10	5.1%	$39,049	$8,724	$30,325	34.9%	32.0%
11	2.0%	$43,582	$9,196	$34,386	45.1%	31.5%
12	0.6%	$46,481	$9,779	$36,702	48.9%	30.2%
13+	0.1%	$58,146	$10,514	$47,632	67.7%	N/A
Overall Average	**100.0%**	**$29,913**	**$7,795**	**$22,118**	**23.0%**	**27.6%**

Source: Dobson | DaVanzo analysis of research-identifiable 5% SAF for all sites of service, 2007-2009, wage index adjusted by setting and geographic region, and standardized to 2009 dollars.

[b] For methodology used to determine primary chronic condition, see Working Paper #1.

[a] Average Medicare Episode Paid includes care from all facility-based and ambulatory care settings and excludes beneficiary co-payments.

Exhibit 3.15: Number of Episodes and Average Medicare Episode Paid[a] for Episodes Defined by DIABETES*CHF[b] for Nine-Month Fixed-Length Non-Post-Acute Care Community-Based Episodes (2007-2009)



Source: Dobson | DaVanzo analysis of research-identifiable 5% SAF for all sites of service, 2007-2009, wage index adjusted by setting and geographic region, and standardized to 2009 dollars. All episodes have been extrapolated to reflect the universe of Medicare beneficiaries.

[a] Average Medicare Episode Paid includes care from all facility-based and ambulatory care settings and excludes beneficiary co-payments.

[b] For methodology used to determine primary chronic condition, see Working Paper #1.

Episode Type 3: Non-Post-Acute Episodes

Exhibit 3.16 shows the distribution of payments across care settings for select beneficiary demographic characteristics. More than one-quarter (26.1 percent) of episode payments are for home health services, and 16.0 percent of episode payments are for physician visits. Non-post-acute care community-based episodes for DIABETES*CHF episodes have a relatively high reliance on facility-based post-acute care settings, as 10.6 percent of episode payments are for SNF services, and 2.4 percent of payments are for IRF services.

The distribution of payments for DIABETES*CHF episodes for patients who live alone has a similar proportion of home health, SNF, and IRF care compared to the average patient with DIABETES*CHF. Patients who live alone also have a similar proportion of payments for hospitalizations. Episodes for patients who are over 85 years old have a lower proportion of payments attributed to acute care hospitalizations and outpatient visits, but have a higher proportion of home health and SNF services.

Almost one-half (49.9 percent) of DIABETES*CHF episodes contain a hospital admission during the non-post acute episode. These episodes have a somewhat different distribution of episode payments by setting than those without a hospitalization. On average, 17.2 percent of payments are for home health services, compared to 26.1 percent of all episodes. Hospital admission payments account for 38.5 percent of payments and physician visits account for 14.7 percent of payments.

Episode Type 3: Non-Post-Acute Episodes

Exhibit 3.16: Distribution of Medicare Episode Paid by Beneficiary Demographic Characteristics for Episodes Defined by DIABETES*CHF[a] for Nine-Month Fixed-Length Non-Post-Acute Care Community-Based Episodes (2007-2009)

Beneficiary Demographic	Average Medicare Episode Paid[b]	Percent of Episodes	HHA	SNF	IRF	LTCH	STACH	Out-patient	Physician	ER	OP Therapy	Hospice	Other IP
Lives Alone	$29,334	46.5%	27.2%	12.7%	2.7%	1.7%	28.5%	7.2%	15.7%	1.2%	0.8%	1.8%	0.6%
Over 85 Years Old	$25,785	31.3%	28.8%	15.5%	2.2%	1.3%	28.3%	3.5%	13.8%	1.1%	0.8%	4.3%	0.4%
Female	$28,951	70.1%	27.2%	11.1%	2.3%	2.0%	29.2%	7.6%	15.8%	1.1%	0.7%	2.3%	0.5%
Resides in Rural Area	$29,684	18.8%	24.1%	11.7%	2.4%	2.2%	29.7%	10.2%	14.2%	1.6%	0.8%	2.3%	0.6%
Race Non-White	$32,948	31.3%	27.8%	6.3%	2.3%	2.7%	30.8%	11.1%	16.1%	1.0%	0.4%	1.2%	0.4%
Died During Episode	$39,244	27.6%	16.5%	11.9%	2.0%	3.1%	39.6%	6.0%	14.6%	0.9%	0.5%	4.5%	0.5%
Dual Eligible	$31,815	36.2%	27.8%	7.6%	2.1%	2.3%	30.2%	10.0%	16.3%	1.2%	0.6%	1.3%	0.6%
Episode Contains Hospital Admission	$47,031	49.9%	17.2%	13.3%	2.9%	2.6%	38.5%	6.9%	14.7%	0.9%	0.5%	1.8%	0.4%
Overall Average	**$29,913**	**100.0%**	**26.1%**	**10.6%**	**2.4%**	**2.1%**	**30.2%**	**8.1%**	**16.0%**	**1.1%**	**0.6%**	**2.3%**	**0.5%**

Source: Dobson | DaVanzo analysis of research-identifiable 5% SAF for all sites of service, 2007-2009, wage index adjusted by setting and geographic region, and standardized to 2009 dollars.

[a] For methodology used to determine primary chronic condition, see Working Paper #1

[b] Average Medicare Episode Paid includes care from all facility-based and ambulatory care settings and excludes beneficiary co-payments.

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Episode Type 3: Non-Post-Acute Episodes

*CHF*RENAL*

More than five percent (5.3 percent) of non-post-acute care community-based episodes have a primary chronic condition of CHF*RENAL. Medicare payment for CHF*RENAL episodes totaled $4.5 billion (Exhibit 3.3). Almost one-quarter (22.6 percent) of total episode payments for CHF*RENAL episodes ($1.0 billion) are for the home health services, while other services represent $3.5 billion in episode payments (Exhibit 3.7). The distribution of episodes by chronic conditions is normally distributed, with an average of 6.6 chronic conditions per episode (Exhibit 3.4).

As shown in Exhibits 3.17 and 3.18, CHF*RENAL episodes have an average Medicare episode payment of $28,088, with $6,355 (22.6 percent) going to home health services. On average, CHF*RENAL episodes with only two chronic conditions (i.e., the patient only has CHF and renal failure) has the lowest average payment for home health, and other services. These episodes have an average home health payment of $3,958, which represents 17.2 percent of the total average episode payment ($23,012). Episodes for patients with 11 chronic conditions have the highest average payment for home health (average home health payment of $9,468), or 22.8 percent of the total average episode payment of $41,615.

The average payment for other services within the non-post acute care episode increases significantly as the number of chronic conditions increases. Other services range from $16,671 for episodes with three chronic conditions to $32,148 for episodes with 11 chronic conditions. Episodes with 12 chronic conditions have an average payment that approximates the average payment for episodes with eight chronic conditions.

On average, 27.6 percent of CHF*RENAL episodes contain an acute care hospitalization, and 44.1 percent contain a patient death. The proportion of CHF*RENAL episodes that contain an acute care hospitalization ranges from 17.5 percent for episodes with three chronic conditions to 42.5 percent of episodes with 11 chronic conditions. As the proportion of episodes with an acute care hospitalization increases, the average Medicare episode payment increases as well. However, as the number of chronic conditions increases, the proportion of episodes that contain a patient death decreases. More than one-half (54.4 percent) of CHF*RENAL episodes with only two chronic conditions contain a patient death, while 37.9 percent of episodes with nine chronic conditions contain a patient death. While the average episode payment increases with the number of chronic conditions contained in the episode, this is the only primary chronic condition that we investigated that showed a strong inverse association between number of chronic conditions or average episode payment and death. This relationship may be attributed to the additional cost of dialysis and other care for renal failure patients that accumulate over the full nine months for surviving patients.

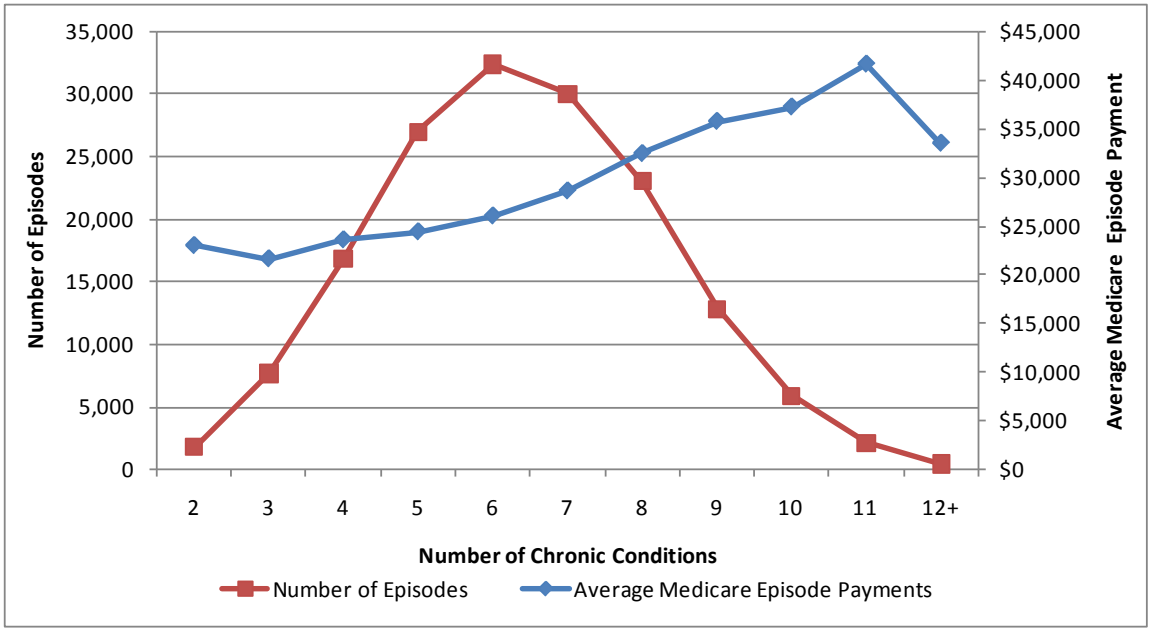
Episode Type 3: Non-Post-Acute Episodes

Exhibit 3.17: Average Medicare Episode Paid for Home Health and Other Services for Episodes Defined by CHF*RENAL[a] for Nine-Month Fixed-Length Non-Post-Acute Care Community-Based Episodes (2007-2009)

Number of Chronic Conditions	Percent of Episodes	Average Medicare Episode Paid[b]	Average Home Health Paid	Average Other Services Paid	Percent of Episodes that Contain Acute Care Hospitalization	Percent of Episodes that Contain Patient Death
2	1.1%	$23,012	$3,958	$19,054	N/A	54.4%
3	4.8%	$21,652	$4,981	$16,671	17.5%	53.5%
4	10.5%	$23,598	$5,354	$18,244	20.8%	50.7%
5	16.9%	$24,420	$5,696	$18,723	22.2%	46.6%
6	20.2%	$26,045	$6,237	$19,808	26.8%	43.9%
7	18.8%	$28,612	$6,428	$22,184	28.7%	42.9%
8	14.4%	$32,445	$7,173	$25,272	34.0%	38.5%
9	8.0%	$35,743	$7,412	$28,331	35.6%	37.9%
10	3.7%	$37,221	$8,217	$29,004	40.3%	46.1%
11	1.3%	$41,615	$9,468	$32,148	42.5%	N/A
12	0.3%	$33,503	$8,949	$24,553	N/A	N/A
Overall Average	**100.0%**	**$28,088**	**$6,355**	**$21,733**	**27.6%**	**44.1%**

Source: Dobson | DaVanzo analysis of research-identifiable 5% SAF for all sites of service, 2007-2009, wage index adjusted by setting and geographic region, and standardized to 2009 dollars.
[a] For methodology used to determine primary chronic condition, see Working Paper #1.
[b] Average Medicare Episode Paid includes care from all facility-based and ambulatory care settings and excludes beneficiary co-payments.

Exhibit 3.18: Number of Episodes and Average Medicare Episode Paid[a] for Episodes Defined by CHF*RENAL[b] for Nine-Month Fixed Length Non-Post-Acute Care Community-Based Episodes (2007-2009)



Source: Dobson | DaVanzo analysis of research-identifiable 5% SAF for all sites of service, 2007-2009, wage index adjusted by setting and geographic region, and standardized to 2009 dollars. All episodes have been extrapolated to reflect the universe of Medicare beneficiaries.
[a] Average Medicare Episode Paid includes care from all facility-based and ambulatory care settings and excludes beneficiary co-payments.
[b] For methodology used to determine primary chronic condition, see Working Paper #1.

Episode Type 3: Non-Post-Acute Episodes

Exhibit 3.19 shows the distribution of payments across care settings for select beneficiary demographic characteristics. Almost one-quarter (22.6 percent) of the episode payments are for home health services, and 14.5 percent of episode payments are for physician visits. Non-post-acute care community-based episodes have a relatively high reliance on facility-based post-acute care settings, as 14.6 percent of Medicare episode payments are for SNF services, and 2.2 percent of payments are for IRF services.

The distribution of payments for CHF*RENAL episodes for patients who live alone has a higher proportion of SNF care compared to the average patient with DIABETES*CHF. Patients who live alone also have a similar proportion of payments for hospitalizations. Episodes for patients who are over 85 years old have a lower proportion of payments attributed to acute care hospitalizations and outpatient visits, but have a higher proportion of home health and SNF services.

More than one-half (59.5 percent) of all CHF*RENAL episodes contain an acute care hospitalization during the non-post-acute care community-based episode. Episodes that contain a hospital admission during the non-post-acute care community-based episode have a different distribution of episode payments by setting than those without a hospitalization. On average, 16.7 percent of payments going to home health services, compared to 22.6 percent of all episodes. Hospital admission payments account for 39.5 percent of Medicare episode payments and physician visits account for 13.4 percent of payments.

Episode Type 3: Non-Post-Acute Episodes

Exhibit 3.19: Distribution of Average Medicare Episode Paid by Beneficiary Demographic Characteristics for Episodes Defined by CHF*RENAL[a] for Nine-Month Fixed-Length Non-Post-Acute Care Community-Based Episodes (2007-2009)

Beneficiary Demographic	Average Medicare Episode Paid[b]	Percent of Episodes	HHA	SNF	IRF	LTCH	STACH	Out-patient	Physician	ER	OP Therapy	Hospice	Other IP
Lives Alone	$28,259	50.4%	22.6%	16.5%	2.1%	1.4%	32.3%	4.6%	14.5%	1.2%	0.8%	3.3%	0.7%
Over 85 Years Old	$25,947	58.7%	24.1%	16.7%	2.1%	1.0%	32.2%	2.9%	13.6%	1.1%	0.8%	5.0%	0.6%
Female	$27,622	71.6%	23.6%	15.4%	2.1%	1.3%	32.8%	4.0%	14.1%	1.1%	0.8%	4.1%	0.7%
Resides in Rural Area	$26,984	19.5%	23.0%	13.9%	1.6%	1.1%	33.0%	6.7%	12.6%	1.7%	0.8%	4.4%	1.2%
Race Non-White	$30,474	15.3%	24.0%	8.7%	2.5%	2.1%	36.1%	8.2%	13.7%	1.1%	0.4%	2.5%	0.7%
Died During Episode	$32,249	44.1%	17.2%	15.0%	1.8%	1.8%	38.8%	3.8%	13.6%	0.9%	0.6%	5.8%	0.8%
Dual Eligible	$30,218	20.8%	22.4%	12.5%	1.5%	2.2%	35.2%	6.8%	13.8%	1.2%	0.9%	2.5%	0.8%
Episode Contains Hospital Admission	$39,914	59.5%	16.7%	17.0%	2.6%	1.6%	39.5%	3.9%	13.4%	1.0%	0.6%	3.1%	0.7%
Overall Average	**$28,088**	**100.00%**	**22.6%**	**14.6%**	**2.2%**	**1.4%**	**33.4%**	**4.8%**	**14.5%**	**1.1%**	**0.8%**	**3.9%**	**0.7%**

Source: Dobson | DaVanzo analysis of research-identifiable 5% SAF for all sites of service, 2007-2009, wage index adjusted by setting and geographic region, and standardized to 2009 dollars.

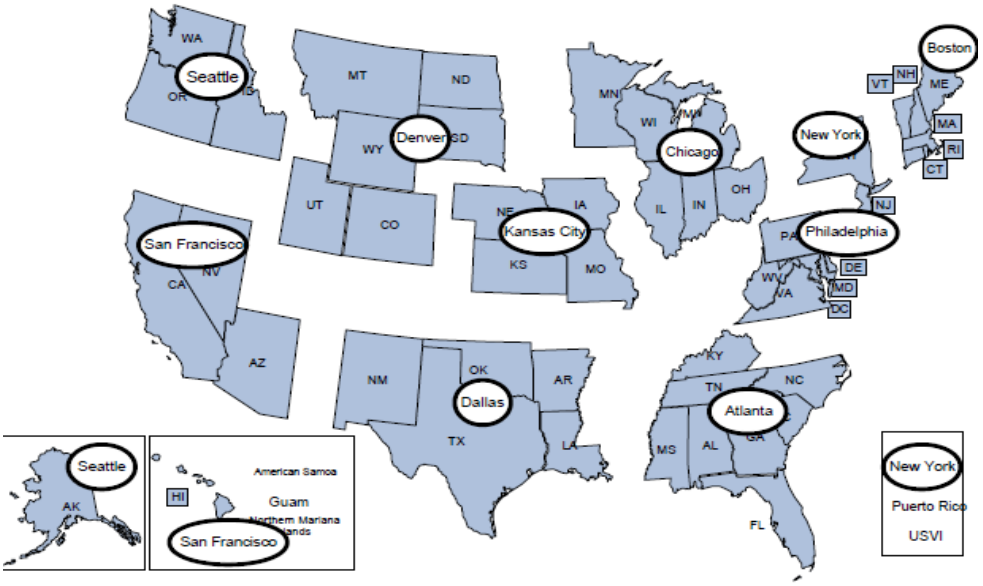
[a] For methodology used to determine primary chronic condition, see Working Paper #1.

[b] Average Medicare Episode Paid includes care from all facility-based and ambulatory care settings and excludes beneficiary co-payments.

Regional Variation

To explore the variation in utilization and payments by region for different first setting episodes (Type 1 – Post-Acute) and care settings within episodes (Type 2 – Pre-Acute and Type 3 – Non-Post-Acute), we conducted an analysis of episode payments by CMS region. We chose the 10 CMS regions (see Exhibit 4.1 below) because they represent smaller geographic regions than broader census areas, without compromising data presentation due to sample size issues. All Medicare payment amounts have been wage adjusted to remove the effect of geographic location. Medicare payments have been standardized by the appropriate wage index for the labor-related portion for each type of provider.

Exhibit 4.1: Map of Ten CMS Regions



Source: Centers for Medicare & Medicaid Services

Regional Variation in Episode Type 1: Post-Acute Care

Exhibit 4.2 shows the distribution of episodes and average episode payments by each of the 10 CMS regions for 60-day fixed-length post-acute episodes. As an indexed measure, Region II (New York) has the highest average number of post-acute care episodes per 1,000 fee-for-service beneficiaries (1.09) while Region X (Seattle) has the lowest (0.82). Across all regions, Region I (Boston) has the highest proportion of HHA and SNF first setting episodes, with HHA representing 17.3 percent of all episodes, and SNF representing 22.6 percent (compared to the overall average of 12.4 percent and 16.2 percent, respectively). Only 43.9 percent of episodes in Region I have a first setting of Community. However, Region VIII (Denver) has the lowest proportion of HHA first setting episodes (9.0 percent) and a high proportion of SNF first setting episodes (19.4 percent). Atlanta is a medium intensity-of-use region for both SNF and HHA first setting episodes (near the overall average for both) and has the smallest spread between frequency of HHA and SNF first setting episodes (12.9 and 14.2 percent, respectively). The overall correlation between average Medicare episode payments in HHA and SNF first setting episodes is 0.636, suggesting a positive relationship between spending in the two settings across regions.

The use of LTCHs is relatively small, but utilization varies significantly in magnitude (0.2 percent in New York to 1.9 percent in Dallas – nearly a factor of 10), which suggests that use of LTCHs may be supply driven. Similar trends, although not as dramatic, can be observed for IRFs.

Across regions, differences can be observed between the frequency distribution of first setting episodes (Exhibit 4.2) and the distribution of Medicare episode payments (Exhibit 4.3) similar to the analyses presented in Chapter 1 above. Across all of the regions, the frequency of HHA first setting episodes is comparable to the percent of total payments across episodes, but payments in SNF first setting episodes exceed their frequency in every region. The largest difference is in Boston, where SNF first setting episodes represent 22.6 percent of all episodes (Exhibit 4.2) but 32.6 percent of episode payments (Exhibit 4.3). Expenditures for IRF first setting episodes are more than twice as high as their proportion of first setting episodes, and LTCH first setting episodes represent payments three to four times as high as their episodes frequencies across regions. These statistics reflect the relative payment levels across first setting episodes.

Overall, the regional variation in episode payments by *care* setting is substantially less than the variation in episode payments by first setting episodes, but there is some notable variation for specific settings (Exhibit 4.4). Average payments for HHA across episodes that include home health range from $2,205 in Boston to $2,794 in Dallas, and represent between 2.4 percent of total episode payments (Seattle) to 3.9 percent of episode payments (Boston). Average payments for SNF care are relatively consistent across

regions, but the proportion of episode payments for SNF care ranges from 7.8 percent in Dallas to 14.0 percent in Boston. Episode payments on readmissions account for between 13.9 percent (Denver) and 18.4 percent (New York) of total episode payments. However, the index acute care hospitalization accounts for roughly one-half of total episode payments across all regions.

Exhibit 4.2: Average Medicare Episode Paid and *Percent of Episodes* by CMS Region by *First Setting* for 60-day Fixed-Length Post Acute Episodes (2007-2009)

Region	Indexed Number of Episodes per 1,000 FFS Beneficiaries	Average Medicare Episode Paid[a]	HHA	SNF	IRF	LTCH	STACH	Comm-unity	ER	OP Therapy	Hospice	Other IP	No Care[b]
Region I - Boston	0.93	$19,554	$18,618 17.3%	$28,247 22.6%	$45,596 2.5%	$76,209 0.8%	$28,244 2.1%	$13,384 43.9%	$15,157 2.9%	$14,491 1.2%	$16,688 1.2%	$25,740 0.7%	$15,263 4.8%
Region II - New York	1.09	$20,707	$20,733 14.3%	$31,040 18.3%	$44,575 3.1%	$82,150 0.2%	$30,751 2.7%	$15,374 50.9%	$16,575 2.0%	$18,783 0.9%	$18,071 1.4%	$26,316 0.3%	$17,467 5.9%
Region III - Philadelphia	1.08	$19,872	$21,206 13.4%	$29,916 17.0%	$43,293 3.0%	$100,119 0.4%	$30,868 3.0%	$14,305 50.7%	$16,239 2.9%	$15,083 1.4%	$17,711 1.8%	$23,672 0.3%	$15,517 5.9%
Region IV - Atlanta	1.01	$19,019	$20,242 12.9%	$29,438 14.2%	$45,216 2.7%	$105,888 0.5%	$29,090 2.8%	$14,158 54.0%	$16,123 3.1%	$15,560 1.3%	$18,968 2.4%	$21,922 0.4%	$14,466 5.8%
Region V - Chicago	1.06	$19,176	$20,096 11.2%	$28,660 17.8%	$44,143 2.4%	$105,500 0.5%	$28,995 2.7%	$14,224 52.9%	$16,373 3.0%	$14,231 1.8%	$17,134 1.9%	$23,394 0.4%	$13,610 5.2%
Region VI - Dallas	0.91	$19,981	$20,777 11.4%	$28,145 11.5%	$42,404 4.4%	$72,308 1.9%	$30,377 2.8%	$14,914 54.6%	$17,083 3.2%	$15,765 1.3%	$17,585 2.3%	$24,513 0.4%	$14,122 6.2%
Region VII - Kansas City	1.08	$18,230	$20,107 10.1%	$26,870 17.6%	$44,258 2.3%	$107,251 0.4%	$28,398 2.8%	$13,607 53.8%	$15,840 3.1%	$14,045 2.2%	$15,580 2.0%	$20,449 0.4%	$13,615 5.3%
Region VIII - Denver	0.91	$18,096	$18,641 9.0%	$26,600 19.4%	$41,528 2.5%	$102,458 0.3%	$27,326 2.5%	$13,728 52.9%	$16,249 3.3%	$13,508 2.1%	$16,375 1.9%	$21,373 0.3%	$12,986 5.7%
Region IX - San Francisco	0.89	$20,862	$21,208 12.5%	$31,631 14.8%	$46,319 2.4%	$88,629 0.9%	$31,962 2.5%	$16,023 54.1%	$17,428 3.1%	$18,623 0.9%	$17,390 2.1%	$25,078 0.3%	$15,994 6.5%
Region X - Seattle	0.82	$18,395	$19,265 9.2%	$29,374 16.7%	$43,245 1.6%	$123,706 0.2%	$29,741 2.5%	$14,282 54.7%	$15,903 4.2%	$13,786 1.4%	$15,346 2.2%	$26,185 0.4%	$13,912 7.0%
Overall Average	**1.00**	**$19,492**	**$20,339 12.4%**	**$29,205 16.2%**	**$44,153 2.8%**	**$89,854 0.6%**	**$29,685 2.7%**	**$14,466 52.7%**	**$16,347 3.0%**	**$15,228 1.4%**	**$17,642 2.0%**	**$23,561 0.4%**	**$14,747 5.8%**

Source: Dobson | DaVanzo analysis of research-identifiable 5% SAF for all sites of service, 2007-2009, wage index adjusted by setting and geographic region, and standardized to 2009 dollars.

[a] Average Medicare Episode Paid includes care from all facility-based and ambulatory care settings and excludes beneficiary co-payments.

[b] Episodes include deaths during index admission.

Correlation between Average HHA Episode Paid and Average SNF Episode Paid is .636.

Exhibit 4.3: Average Medicare Episode Paid and *Percent of Medicare Episode Paid* by CMS Region by *First Setting* for 60-day Fixed-Length Post Acute Episodes (2007-2009)

Region	Indexed Number of Episodes per 1,000 FFS Beneficiaries	Average Medicare Episode Paid[a]	HHA	SNF	IRF	LTCH	STACH	Comm-unity	ER	OP Therapy	Hospice	Other IP	No Care[b]
Region I-Boston	0.93	$19,554	$18,618	$28,247	$45,596	$76,209	$28,244	$13,384	$15,157	$14,491	$16,688	$25,740	$15,263
			16.5%	32.6%	5.8%	3.1%	3.1%	30.1%	2.3%	0.9%	1.0%	0.9%	3.7%
Region II-New York	1.09	$20,707	$20,733	$31,040	$44,575	$82,150	$30,751	$15,374	$16,575	$18,783	$18,071	$26,316	$17,467
			14.3%	27.4%	6.6%	0.8%	4.0%	37.8%	1.6%	0.8%	1.2%	0.4%	5.0%
Region III-Philadelphia	1.08	$19,872	$21,206	$29,916	$43,293	$100,119	$30,868	$14,305	$16,239	$15,083	$17,711	$23,672	$15,517
			14.3%	25.6%	6.6%	2.2%	4.6%	36.5%	2.4%	1.1%	1.6%	0.4%	4.6%
Region IV-Atlanta	1.01	$19,019	$20,242	$29,438	$45,216	$105,888	$29,090	$14,158	$16,123	$15,560	$18,968	$21,922	$14,466
			13.8%	21.9%	6.4%	2.5%	4.3%	40.2%	2.6%	1.1%	2.4%	0.5%	4.4%
Region V-Chicago	1.06	$19,176	$20,096	$28,660	$44,143	$105,500	$28,995	$14,224	$16,373	$14,231	$17,134	$23,394	$13,610
			11.8%	26.7%	5.5%	2.8%	4.1%	39.3%	2.6%	1.3%	1.7%	0.5%	3.7%
Region VI-Dallas	0.91	$19,981	$20,777	$28,145	$42,404	$72,308	$30,377	$14,914	$17,083	$15,765	$17,585	$24,513	$14,122
			11.8%	16.2%	9.3%	7.0%	4.2%	40.7%	2.7%	1.0%	2.0%	0.5%	4.4%
Region VII-Kansas City	1.08	$18,230	$20,107	$26,870	$44,258	$107,251	$28,398	$13,607	$15,840	$14,045	$15,580	$20,449	$13,615
			11.1%	25.9%	5.6%	2.3%	4.3%	40.2%	2.7%	1.7%	1.7%	0.5%	4.0%
Region VIII-Denver	0.91	$18,096	$18,641	$26,600	$41,528	$102,458	$27,326	$13,728	$16,249	$13,508	$16,375	$21,373	$12,986
			9.3%	28.6%	5.8%	1.7%	3.8%	40.1%	3.0%	1.5%	1.7%	0.4%	4.1%
Region IX-San Francisco	0.89	$20,862	$21,208	$31,631	$46,319	$88,629	$31,962	$16,023	$17,428	$18,623	$17,390	$25,078	$15,994
			12.7%	22.4%	5.2%	3.8%	3.8%	41.5%	2.6%	0.8%	1.7%	0.4%	4.9%
Region X-Seattle	0.82	$18,395	$19,265	$29,374	$43,245	$123,706	$29,741	$14,282	$15,903	$13,786	$15,346	$26,185	$13,912
			9.6%	26.6%	3.8%	1.2%	4.0%	42.5%	3.7%	1.1%	1.8%	0.5%	5.3%
Overall Average	**1.00**	**$19,492**	**$20,339**	**$29,205**	**$44,153**	**$89,854**	**$29,685**	**$14,466**	**$16,347**	**$15,228**	**$17,642**	**$23,561**	**$14,747**
			12.9%	**24.3%**	**6.3%**	**2.9%**	**4.1%**	**39.1%**	**2.5%**	**1.1%**	**1.8%**	**0.5%**	**4.4%**

Source: Dobson | DaVanzo analysis of research-identifiable 5% SAF for all sites of service, 2007-2009, wage index adjusted by setting and geographic region, and standardized to 2009 dollars.

[a] Average Medicare Episode Paid includes care from all facility-based and ambulatory care settings and excludes beneficiary co-payments.

[b] Episodes include deaths during index admission.

Correlation between Average HHA Episode Paid and Average SNF Episode Paid is .636.

Exhibit 4.4: Average Medicare Episode Paid and *Percent of Medicare Episode Paid* by CMS Region by *Care Setting* for 60-day Fixed-Length Post Acute Episodes (2007-2009)

Region	Indexed Number of Episodes per 1,000 FFS Beneficiaries	Average Medicare Episode Paid[a]	HHA	SNF	IRF	LTCH	STACH	Index	Out-patient	Physician	ER	OP Therapy	Hospice	Other IP
Region I - Boston	0.93	$19,554	$2,205 3.9%	$10,119 14.0%	$17,102 2.7%	$26,219 1.5%	$13,038 15.8%	$8,745 44.7%	$828 2.7%	$2,433 12.4%	$700 0.8%	$620 0.2%	$3,512 0.6%	$10,128 0.8%
Region II - New York	1.09	$20,707	$2,222 3.0%	$10,104 11.0%	$16,667 3.1%	$24,438 0.4%	$14,642 18.4%	$9,572 46.2%	$997 2.3%	$2,923 14.0%	$512 0.3%	$650 0.1%	$3,487 0.6%	$10,980 0.4%
Region III - Philadelphia	1.08	$19,872	$2,344 3.1%	$10,038 10.6%	$16,679 3.2%	$32,475 1.1%	$14,308 17.8%	$9,239 46.5%	$1,023 2.8%	$2,600 12.9%	$683 0.6%	$840 0.3%	$3,468 0.8%	$9,781 0.4%
Region IV - Atlanta	1.01	$19,019	$2,756 3.6%	$10,752 9.9%	$17,655 3.2%	$35,900 1.3%	$13,166 16.2%	$8,873 46.7%	$1,033 2.7%	$2,645 13.8%	$644 0.6%	$935 0.3%	$4,357 1.2%	$9,093 0.4%
Region V - Chicago	1.06	$19,176	$2,393 2.8%	$10,531 12.2%	$16,545 2.8%	$35,240 1.5%	$13,066 16.5%	$8,777 45.8%	$937 2.9%	$2,542 13.1%	$734 0.8%	$755 0.3%	$3,372 0.8%	$8,920 0.4%
Region VI - Dallas	0.91	$19,981	$2,794 3.2%	$10,016 7.8%	$16,740 4.7%	$30,777 4.8%	$13,348 15.3%	$9,168 45.9%	$1,114 2.7%	$2,630 13.1%	$674 0.7%	$984 0.3%	$3,786 1.0%	$9,691 0.5%
Region VII - Kansas City	1.08	$18,230	$2,462 2.6%	$9,891 11.9%	$17,164 3.0%	$34,040 1.1%	$12,519 16.3%	$8,456 46.4%	$990 3.4%	$2,305 12.6%	$763 1.0%	$749 0.4%	$3,191 0.8%	$8,667 0.5%
Region VIII - Denver	0.91	$18,096	$2,563 2.7%	$10,117 13.5%	$16,284 2.9%	$35,711 0.9%	$12,082 13.9%	$8,668 47.9%	$1,050 3.6%	$2,182 11.9%	$812 1.1%	$607 0.3%	$3,486 0.8%	$8,035 0.3%
Region IX - San Francisco	0.89	$20,862	$2,383 2.9%	$10,751 9.8%	$18,164 3.0%	$33,741 2.2%	$14,679 16.0%	$10,040 48.1%	$1,028 2.1%	$2,957 14.0%	$611 0.5%	$775 0.2%	$3,662 0.8%	$9,906 0.4%
Region X - Seattle	0.82	$18,395	$2,278 2.4%	$10,721 11.5%	$16,933 1.9%	$35,919 0.5%	$13,522 14.7%	$9,427 51.2%	$971 3.0%	$2,259 12.2%	$894 1.2%	$593 0.2%	$3,244 0.8%	$10,572 0.4%
Overall Average	**1.00**	**$19,492**	**$2,482 3.1%**	**$10,361 10.8%**	**$17,031 3.2%**	**$32,553 1.7%**	**$13,508 16.4%**	**$9,070 46.5%**	**$998 2.7%**	**$2,614 13.3%**	**$687 0.7%**	**$800 0.3%**	**$3,711 0.9%**	**$9,478 0.4%**

Source: Dobson | DaVanzo analysis of research-identifiable 5% SAF for all sites of service, 2007-2009, wage index adjusted by setting and geographic region, and standardized to 2009 dollars.

[a] Average Medicare Episode Paid includes care from all facility-based and ambulatory care settings and excludes beneficiary co-payments.

Correlation between Average HHA Episode Paid and Average SNF Episode Paid is .026.

Regional Variation

Exhibit 4.5 shows the percent of episodes and average episode payment of MS-DRG 470 post-acute care episodes by CMS region. We limit the presentation of first settings due to sample size restrictions. The indexed number of MS-DRG 470 episodes per 1,000 FFS beneficiaries ranges from 0.80 in Region II (New York) to 1.31 in Region VIII (Denver), which shows greater variation across regions than the overall episodes average. The range of average Medicare episode payments is also greater for MS-DRG 470 – major joint replacement or reattachment of lower extremity without MCC – than overall, with a minimum of $19,714 average Medicare episode paid in Seattle to a maximum of $26,639 average Medicare episode paid in Region II (New York). Almost 40 percent (38.0 percent) of these episodes are SNF first setting episodes and over 30 percent of episodes (32.4 percent) have a first setting of HHA.

There is also much greater variation in the mixture of HHA and SNF first setting episodes across regions: Boston has 23.8 percent HHA and 63.2 percent SNF first setting episodes, Region III (Philadelphia) has 37.5 percent HHA and 37.7 percent SNF first setting episodes, and Region VI (Dallas) has 38.1 percent HHA and 19.5 percent SNF first setting episodes. Region X (San Francisco) has the highest relative proportion of HHA first setting episodes (38.3 percent compared to the overall average of 32.4 percent). As noted above, the overall correlation between average Medicare episode payments in HHA and SNF first setting episodes is 0.636 (Exhibit 4.2) The correlation between average Medicare episode payments in HHA and SNF first setting episodes for MS-DRG 470 is 0.811, suggesting a stronger positive relationship than the overall average across MS-DRGs, meaning as SNF payments rise so do home health payments, relative to other settings, for MS-DRG 470.

Exhibit 4.5: Average Medicare Episode Paid and *Percent of Episodes* by CMS Region by *Select First Settings* for MS-DRG 470 for 60-day Fixed-Length Post Acute Episodes (2007-2009)

Region	Indexed Number of Episodes per 1,000 FFS Beneficiaries	Average Medicare Episode Paid[a]	HHA	SNF	IRF	Comm-unity	OP Therapy
Region I - Boston	0.90	$24,727	$17,797 23.8%	$26,428 63.2%	$33,770 8.8%	$18,588 2.9%	$16,146 0.7%
Region II - New York	0.80	$26,639	$19,671 19.6%	$27,750 45.4%	$32,616 22.6%	$24,033 9.7%	$17,901 1.9%
Region III - Philadelphia	0.98	$23,904	$18,759 37.5%	$27,684 37.7%	$33,617 12.0%	$18,905 8.8%	$16,885 2.9%
Region IV - Atlanta	0.96	$23,305	$18,190 37.8%	$27,257 38.9%	$34,609 10.6%	$17,973 7.5%	$15,064 4.2%
Region V - Chicago	1.13	$22,062	$17,522 26.5%	$25,940 42.8%	$32,839 8.2%	$16,598 13.9%	$14,432 6.8%
Region VI - Dallas	0.93	$23,696	$18,708 38.1%	$27,790 19.5%	$33,487 22.4%	$17,733 12.7%	$15,572 5.2%
Region VII - Kansas City	1.22	$21,208	$17,433 32.8%	$26,395 33.0%	$33,834 7.7%	$15,755 15.0%	$14,742 9.8%
Region VIII - Denver	1.31	$20,612	$17,078 25.5%	$25,186 36.5%	$32,411 7.2%	$14,946 19.6%	$15,088 8.9%
Region IX - San Francisco	0.93	$22,595	$17,782 38.3%	$27,733 35.1%	$34,581 7.5%	$17,915 15.1%	$16,124 1.9%
Region X - Seattle	1.09	$19,714	$16,736 30.2%	$25,992 33.4%	$30,446 3.8%	$14,678 25.2%	$14,210 4.5%
Overall Average	**1.00**	**$22,986**	**$18,068 32.4%**	**$26,861 38.0%**	**$33,538 11.4%**	**$17,340 11.9%**	**$15,103 4.8%**

Source: Dobson | DaVanzo analysis of research-identifiable 5% SAF for all sites of service, 2007-2009, wage index adjusted by setting and geographic region, and standardized to 2009 dollars.

[a] Average Medicare Episode Paid includes care from all facility-based and ambulatory care settings and excludes beneficiary co-payments.

Correlation between Average HHA Episode Paid and Average SNF Episode Paid is .811.

Regional Variation

Exhibit 4.6 shows percent of episodes and average episode payment by region of MS-DRG 291 – heart failure and shock with MCC – for select first setting episodes. We only present select first settings due to sample size restrictions (i.e., we do not present findings for IRFs or OP Therapy). The distribution of first setting episodes and payments for MS-DRG 291 is more similar to the overall average across all MS-DRGs than MS-DRG 470, but there are several important differences. The range of indexed episodes per 1,000 FFS beneficiaries is 0.68 in Region VIII (Denver) to 1.25 in Region IV (Philadelphia). In addition, the range of average Medicare episode payments is greater for MS-DRG 291 than overall, with a minimum of $17,817 average Medicare episode paid in Region VIII (Denver) to a maximum of $24,752 average Medicare episode paid in New York, a difference of nearly 40 percent.

Almost one-quarter (24.1 percent) of episodes in Region I (Boston) are HHA first setting episodes. This is significantly higher than the overall proportion of HHA first setting episodes of 15.2 percent. Another 26.4 percent of episodes in this region are SNF first setting episodes. Again, Atlanta is a medium-cost region and has the smallest difference between HHA and SNF first setting episodes at 14.6 percent and 15.0 percent, respectively. The correlation between average Medicare episode payments in HHA and SNF first setting episodes for MS-DRG 291 is .895, suggesting an even stronger positive relationship between HHA and SNF payments than for MS-DRG 470.

Exhibit 4.6: Average Medicare Episode Paid and *Percent of Episodes* by CMS Region by *Select First Settings* for MS-DRG 291 for 60-day Fixed-Length Post Acute Episodes (2007-2009)

Region	Indexed Number of Episodes per 1,000 FFS Beneficiaries	Average Medicare Episode Paid[a]	HHA	SNF	Comm-unity	ER	Hospice	No Care[b]
Region I - Boston	0.89	$22,066	$18,736 24.1%	$27,005 26.4%	$20,074 36.0%	$25,741 2.4%	$12,249 1.8%	$12,056 5.3%
Region II - New York	1.18	$24,752	$21,685 18.2%	$33,511 22.3%	$22,468 43.1%	$22,813 1.3%	$16,022 3.1%	$12,033 6.3%
Region III - Philadelphia	1.23	$22,200	$20,688 16.9%	$29,914 18.3%	$19,299 45.8%	$18,260 2.4%	$14,349 3.5%	$15,781 6.3%
Region IV - Atlanta	1.02	$20,954	$19,802 14.6%	$28,037 15.0%	$18,907 50.8%	$22,281 2.7%	$18,036 4.2%	$11,225 6.4%
Region V - Chicago	1.07	$21,148	$20,160 15.3%	$28,073 18.2%	$18,646 47.4%	$23,643 2.1%	$14,482 4.4%	$12,024 6.3%
Region VI - Dallas	0.87	$21,904	$22,026 11.7%	$29,524 13.7%	$18,345 52.0%	$25,800 2.0%	$13,965 3.7%	$10,927 7.2%
Region VII - Kansas City	0.97	$19,816	$18,396 11.7%	$23,975 22.2%	$18,330 47.1%	$22,205 1.7%	$13,160 3.4%	$13,485 8.3%
Region VIII - Denver	0.68	$17,817	$18,085 11.1%	$22,629 23.8%	$15,487 45.2%	$20,740 2.9%	$13,446 5.2%	$7,164 7.6%
Region IX - San Francisco	0.90	$21,702	$19,996 13.8%	$28,744 14.0%	$19,724 53.5%	$21,068 2.7%	$15,771 3.7%	$11,153 6.6%
Region X - Seattle	0.67	$18,664	$17,959 10.7%	$24,928 18.3%	$15,915 49.7%	$15,901 3.0%	$14,239 5.3%	$9,718 7.4%
Overall Average	**1.00**	**$21,572**	**$20,211 15.2%**	**$28,551 17.8%**	**$19,127 48.0%**	**$22,124 2.3%**	**$15,412 3.8%**	**$12,024 6.6%**

Source: Dobson | DaVanzo analysis of research-identifiable 5% SAF for all sites of service, 2007-2009, wage index adjusted by setting and geographic region, and standardized to 2009 dollars.

[a] Average Medicare Episode Paid includes care from all facility-based and ambulatory care settings and excludes beneficiary co-payments.

[b] Episodes include deaths during index admission.

Correlation between Average HHA Episode Paid and Average SNF Episode Paid is .895.

Regional Variation in Episode Type 2: Pre-Acute Care

Exhibit 4.7 shows the distribution of episodes and average episode payments by setting across all primary chronic conditions for each of the 10 CMS regions for 60-day fixed-length pre-acute episodes. While there are many consistencies across episode payments and utilization of settings in the pre-acute episode, there are also important differences in the distribution across regions. As both the post-acute and pre-acute episodes are based on the same index acute care hospitalization, the frequency distribution of episodes by CMS region is the same. The average pre-acute Medicare episode payment ranges from $12,606 (Region I – Boston) to $14,625 (Region IX – San Francisco). Across all regions, Boston has the highest proportion of beneficiaries that use home health care (5.0 percent), and also has the lowest average HHA payments at $1,368 per episode that includes home health care.

The use of home health care is consistently higher than SNF care across all 10 CMS regions during the 60 day period before an acute care hospitalization. That is to be expected because pre-acute care is primarily community-based. SNF utilization ranges from 1.4 percent of episodes (Seattle) to 2.1 percent of episodes (Region VII – Kansas City). Boston has the lowest average SNF payments per episode at $4,688, while San Francisco has the highest average SNF payments at $5,559 per episode.

The correlation between average payments for HHA (in episodes that include home health care) and average payments for SNF (in episodes that include SNF care) across the CMS regions is 0.774, which suggests a positive relationship between payments in the two settings. In other words, CMS regions that have high average HHA payments are more likely to have high average SNF payments per pre-acute episode, and vice versa. This finding is consistent with Episode Type 1.

Across regions, differences can be observed between the frequency distribution of care episodes and the distribution of Medicare episode payments similar to the analyses presented in Chapter 2 above (Exhibit 4.8). The proportion of episode payments for HHA ranges from 0.3 percent in Denver and Seattle to 0.5 percent in Boston and Atlanta. The proportion of episode payments represented by HHA is approximately 10 percent of the proportion of episodes that include home health care (e.g., in Boston, 5.0 percent of episodes include home health care but this care only represents 0.5 percent of episode payments). Expenditures on SNF care are approximately one-third to one-half as large as the proportion of episodes that include SNF care. While there is regional variation in utilization of different care settings, it is interesting to note that there is little regional variation in the proportion of payments represented by the other care settings. The index acute care hospitalization represents approximately two-thirds of total episode payments across the regions.

Regional Variation

Exhibit 4.9 shows the distribution of CHF*COPD episodes and average Medicare episode payments by setting for each of the 10 CMS regions. Several care settings are not presented due to small sample sizes. The indexed number of episodes per 1,000 FFS beneficiaries is more spread out than for the overall average, ranging from 0.66 in Region X (Seattle) to 1.17 in Region II (New York). The variation in pre-acute CHF*COPD average Medicare episode paid is greater than the overall average, consistent with observations made of Episode Type 1. The average pre-acute Medicare episode payment ranges from $13,104 (Region VIII – Denver) to $16,296 (Region IX – San Francisco). Across all regions, Boston again has the highest proportion of beneficiaries that use home health care (8.4 percent) and the lowest average HHA payments at $1,365 per episode that includes home health care. Region IV (Atlanta) has the highest average HHA payments at $1,666 per episode. The use of home health care is approximately twice the amount of SNF care used in CHF*COPD pre-acute episodes, though SNF use is higher in CHF*COPD episodes than the overall average. SNF utilization ranges from 2.4 percent of episodes (Atlanta) to 3.6 percent of episodes (Denver). There is greater regional variation in both utilization and payments for CHF*COPD episodes than pre-acute episodes overall.

Similar findings can be seen in the distribution of episodes and average Medicare episode payments by setting for osteoporosis (Exhibit 4.10), DIABETES*CHF (Exhibit 4.11), and CHF*RENAL (Exhibit 4.12). Seattle generally has the lowest indexed number of episodes per 1,000 FFS beneficiaries and New York the highest. The range of average Medicare episode payments across the CMS regions is greater for each primary chronic condition than overall across all conditions. Boston is a relatively low-cost region for both HHA and SNF care settings, and has the highest proportion of pre-acute episodes that include home health care. Home health is used approximately twice (up to three times) as much as SNF care, on average, across the primary chronic conditions.

It is also important to note that the correlation between average payments for HHA (in episodes that include home health care) and average payments for SNF (in episodes that include SNF care) varies by primary chronic condition. While the overall average is 0.774, the correlation ranges from 0.214 (osteoporosis) to 0.582 (CHF*COPD), which suggests that the relationship between spending on HHA and SNF is stronger at the overall level than within primary chronic conditions. While this finding appears inconsistent with the findings in Episode Type 1, the correlation in Episode Type 2 is between average spending *within* each type of care setting, as opposed to the average Medicare episode payments *across* care settings that is being measure in Episode Type 1.

Exhibit 4.7: Average Medicare Episode Paid and *Percent of Episodes* by CMS Region by *Care Setting* for 60-day Fixed-Length Pre-Acute Episodes (2007-2009)

Region	Indexed Number of Episodes per 1,000 FFS Beneficiaries	Average Medicare Episode Paid[a]	HHA	SNF	IRF	STACH	Index	Out-patient	Physician	ER	OP Therapy	Hospice	Other IP
Region I - Boston	0.94	$12,606	$1,368 5.0%	$4,688 1.9%	$12,265 0.1%	$8,575 9.2%	$8,771 100.0%	$868 63.6%	$2,085 99.6%	$681 21.0%	$592 6.2%	$5,646 0.5%	$6,402 0.5%
Region II - New York	1.09	$14,057	$1,453 4.2%	$5,086 2.0%	$10,690 0.2%	$9,723 11.0%	$9,608 100.0%	$1,052 50.5%	$2,537 99.3%	$500 14.0%	$633 3.9%	$5,149 0.5%	$7,516 0.3%
Region III - Philadelphia	1.08	$13,564	$1,527 3.9%	$5,192 1.9%	$11,972 0.2%	$9,174 11.1%	$9,274 100.0%	$1,097 54.4%	$2,283 98.7%	$677 18.3%	$800 5.7%	$5,730 0.7%	$6,883 0.3%
Region IV - Atlanta	1.01	$13,249	$1,667 3.9%	$5,371 1.5%	$12,545 0.2%	$8,935 10.7%	$8,892 100.0%	$1,118 50.2%	$2,396 99.5%	$644 19.6%	$971 5.2%	$6,494 1.4%	$6,562 0.3%
Region V - Chicago	1.06	$13,043	$1,540 3.7%	$5,379 2.0%	$12,571 0.2%	$8,945 11.1%	$8,798 100.0%	$1,007 60.2%	$2,233 98.8%	$733 21.4%	$729 6.6%	$4,877 0.5%	$5,779 0.3%
Region VI - Dallas	0.91	$13,650	$1,484 3.6%	$5,118 1.7%	$13,797 0.3%	$9,357 10.4%	$9,184 100.0%	$1,181 51.5%	$2,364 99.4%	$679 21.2%	$1,075 5.0%	$6,607 1.4%	$7,586 0.3%
Region VII - Kansas City	1.08	$12,684	$1,588 2.9%	$5,404 2.1%	$12,722 0.2%	$8,645 11.1%	$8,479 100.0%	$1,038 64.6%	$2,097 99.4%	$768 26.5%	$690 7.2%	$5,605 0.6%	$5,964 0.3%
Region VIII - Denver	0.91	$12,671	$1,645 2.6%	$5,550 2.0%	$11,323 0.2%	$8,410 9.6%	$8,710 100.0%	$1,096 63.1%	$2,003 99.1%	$839 27.1%	$555 6.3%	$5,334 0.6%	$4,940 0.2%
Region IX - San Francisco	0.89	$14,625	$1,542 3.7%	$5,559 1.7%	$13,508 0.2%	$10,118 10.5%	$10,069 100.0%	$1,067 46.1%	$2,635 99.0%	$611 18.0%	$809 3.6%	$5,293 0.7%	$6,206 0.3%
Region X - Seattle	0.82	$13,544	$1,511 2.6%	$5,540 1.4%	$13,670 0.1%	$9,546 9.2%	$9,472 100.0%	$1,021 58.9%	$2,159 99.3%	$915 27.1%	$528 4.7%	$4,443 0.5%	$6,153 0.1%
Overall Average	**1.00**	**$13,411**	**$1,546 3.7%**	**$5,285 1.8%**	**$12,570 0.2%**	**$9,158 10.7%**	**$9,102 100.0%**	**$1,064 54.6%**	**$2,330 99.2%**	**$688 20.2%**	**$799 5.4%**	**$5,961 0.9%**	**$6,536 0.3%**

Source: Dobson | DaVanzo analysis of research-identifiable 5% SAF for all sites of service, 2007-2009, wage index adjusted by setting and geographic region, and standardized to 2009 dollars.

[a] Average Medicare Episode Paid includes care from all facility-based and ambulatory care settings and excludes beneficiary co-payments.

Correlation between Average Episode Paid for HHA and Average Episode Paid for SNF is .774.

Exhibit 4.8: Average Medicare Episode Paid and *Percent of Medicare Episode Paid* by CMS Region by *Care Setting* for 60-day Fixed-Length Pre-Acute Episodes (2007-2009)

Region	Indexed Number of Episodes per 1,000 FFS Beneficiaries	Average Medicare Episode Paid[a]	HHA	SNF	IRF	STACH	Index	Out-patient	Physician	ER	OP Therapy	Hospice	Other IP
Region I - Boston	0.94	$12,606	$1,368 0.5%	$4,688 0.7%	$12,265 0.1%	$8,575 6.2%	$8,771 69.6%	$868 4.4%	$2,085 16.5%	$681 1.1%	$592 0.3%	$5,646 0.2%	$6,402 0.3%
Region II - New York	1.09	$14,057	$1,453 0.4%	$5,086 0.7%	$10,690 0.1%	$9,723 7.6%	$9,608 68.3%	$1,052 3.8%	$2,537 17.9%	$500 0.5%	$633 0.2%	$5,149 0.2%	$7,516 0.2%
Region III - Philadelphia	1.08	$13,564	$1,527 0.4%	$5,192 0.7%	$11,972 0.2%	$9,174 7.5%	$9,274 68.4%	$1,097 4.4%	$2,283 16.6%	$677 0.9%	$800 0.3%	$5,730 0.3%	$6,883 0.1%
Region IV - Atlanta	1.01	$13,249	$1,667 0.5%	$5,371 0.6%	$12,545 0.2%	$8,935 7.2%	$8,892 67.1%	$1,118 4.2%	$2,396 18.0%	$644 1.0%	$971 0.4%	$6,494 0.7%	$6,562 0.2%
Region V - Chicago	1.06	$13,043	$1,540 0.4%	$5,379 0.8%	$12,571 0.2%	$8,945 7.6%	$8,798 67.5%	$1,007 4.6%	$2,233 16.9%	$733 1.2%	$729 0.4%	$4,877 0.2%	$5,779 0.1%
Region VI - Dallas	0.91	$13,650	$1,484 0.4%	$5,118 0.6%	$13,797 0.3%	$9,357 7.1%	$9,184 67.3%	$1,181 4.5%	$2,364 17.2%	$679 1.1%	$1,075 0.4%	$6,607 0.7%	$7,586 0.2%
Region VII - Kansas City	1.08	$12,684	$1,588 0.4%	$5,404 0.9%	$12,722 0.2%	$8,645 7.6%	$8,479 66.8%	$1,038 5.3%	$2,097 16.4%	$768 1.6%	$690 0.4%	$5,605 0.3%	$5,964 0.1%
Region VIII - Denver	0.91	$12,671	$1,645 0.3%	$5,550 0.9%	$11,323 0.2%	$8,410 6.4%	$8,710 68.7%	$1,096 5.5%	$2,003 15.7%	$839 1.8%	$555 0.3%	$5,334 0.3%	$4,940 0.1%
Region IX - San Francisco	0.89	$14,625	$1,542 0.4%	$5,559 0.6%	$13,508 0.2%	$10,118 7.3%	$10,069 68.8%	$1,067 3.4%	$2,635 17.8%	$611 0.8%	$809 0.2%	$5,293 0.3%	$6,206 0.1%
Region X - Seattle	0.82	$13,544	$1,511 0.3%	$5,540 0.6%	$13,670 0.1%	$9,546 6.5%	$9,472 69.9%	$1,021 4.4%	$2,159 15.8%	$915 1.8%	$528 0.2%	$4,443 0.2%	$6,153 0.1%
Overall Average	**1.00**	**$13,411**	**$1,546 0.4%**	**$5,285 0.7%**	**$12,570 0.2%**	**$9,158 7.3%**	**$9,102 67.9%**	**$1,064 4.3%**	**$2,330 17.2%**	**$688 1.0%**	**$799 0.3%**	**$5,961 0.4%**	**$6,536 0.1%**

Source: Dobson | DaVanzo analysis of research-identifiable 5% SAF for all sites of service, 2007-2009, wage index adjusted by setting and geographic region, and standardized to 2009 dollars.

[a] Average Medicare Episode Paid includes care from all facility-based and ambulatory care settings and excludes beneficiary co-payments.

Correlation between Average Episode Paid for HHA and Average Episode Paid for SNF is .774.

Exhibit 4.9: Average Medicare Episode Paid and *Percent of Episodes* by CMS Region by *Care Setting* for Episodes Defined by CHF*COPD[a] for 60-day Fixed-Length Pre-Acute Episodes (2007-2009)

Region	Indexed Number of Episodes per 1,000 FFS Beneficiaries	Average Medicare Episode Paid[b]	HHA	SNF	IRF	STACH	Index	Out-patient	Physician	ER	OP Therapy	Hospice
Region I - Boston	0.86	$13,656	$1,365 8.4%	$4,663 3.3%	$10,671 0.1%	$8,614 13.3%	$9,089 100.0%	$933 65.8%	$2,228 99.8%	$710 23.1%	$721 7.1%	$5,789 0.7%
Region II - New York	1.17	$15,664	$1,466 6.6%	$4,928 3.5%	$11,240 0.2%	$9,772 16.3%	$10,134 100.0%	$1,114 51.6%	$2,901 99.8%	$526 14.9%	$710 5.0%	$5,479 0.5%
Region III - Philadelphia	1.09	$14,984	$1,502 6.4%	$5,347 3.2%	$12,067 0.3%	$9,419 17.5%	$9,596 100.0%	$1,212 57.9%	$2,477 98.5%	$745 20.6%	$885 6.7%	$6,147 0.9%
Region IV - Atlanta	1.04	$14,436	$1,666 6.3%	$5,261 2.4%	$11,800 0.2%	$9,038 16.7%	$9,082 100.0%	$1,198 52.8%	$2,568 99.6%	$696 22.5%	$1,132 6.1%	$6,779 2.0%
Region V - Chicago	1.09	$14,405	$1,496 6.2%	$5,310 3.3%	$12,270 0.3%	$9,092 17.1%	$9,085 100.0%	$1,120 61.9%	$2,451 99.5%	$774 24.3%	$912 7.3%	$5,364 0.7%
Region VI - Dallas	0.90	$14,888	$1,419 5.6%	$5,091 3.1%	$14,076 0.4%	$9,376 16.0%	$9,394 100.0%	$1,261 53.4%	$2,511 99.7%	$734 23.9%	$1,269 6.3%	$6,788 2.0%
Region VII - Kansas City	1.07	$13,742	$1,510 4.7%	$5,024 3.5%	$12,701 0.2%	$8,789 17.5%	$8,594 100.0%	$1,150 67.6%	$2,189 99.6%	$807 29.8%	$752 7.7%	$5,803 0.8%
Region VIII - Denver	0.74	$13,104	$1,641 4.3%	$5,402 3.6%	$13,117 0.3%	$8,379 15.5%	$8,474 100.0%	$1,088 65.1%	$1,947 99.6%	$875 32.9%	$630 7.5%	$5,168 0.8%
Region IX - San Francisco	0.86	$16,296	$1,493 6.0%	$5,725 3.0%	$13,024 0.3%	$10,218 16.2%	$10,611 100.0%	$1,130 46.5%	$2,929 99.6%	$642 20.9%	$929 4.7%	$5,308 0.8%
Region X - Seattle	0.66	$14,634	$1,595 4.2%	$5,685 2.6%	$15,256 0.2%	$9,772 14.6%	$9,667 100.0%	$1,095 60.9%	$2,231 99.6%	$1,022 33.2%	$599 5.7%	$4,530 0.6%
Overall Average	**1.00**	**$14,712**	**$1,523 6.1%**	**$5,229 3.1%**	**$12,494 0.3%**	**$9,271 16.5%**	**$9,384 100.0%**	**$1,152 56.6%**	**$2,531 99.4%**	**$733 22.9%**	**$943 6.4%**	**$6,279 1.2%**

Source: Dobson | DaVanzo analysis of research-identifiable 5% SAF for all sites of service, 2007-2009, wage index adjusted by setting and geographic region, and standardized to 2009 dollars.

[a] For methodology used to determine primary chronic condition, see Working Paper #1.

[b] Average Medicare Episode Paid includes care from all facility-based and ambulatory care settings and excludes beneficiary co-payments.

Correlation between Average Episode Paid for HHA and Average Episode Paid for SNF is .582.

Exhibit 4.10: Average Medicare Episode Paid and *Percent of Episodes* by CMS Region by *Care Setting* for Episodes Defined by Osteoporosis[a] for 60-day Fixed-Length Pre-Acute Episodes (2007-2009)

Region	Indexed Number of Episodes per 1,000 FFS Beneficiaries	Average Medicare Episode Paid[b]	HHA	SNF	STACH	Index	Outpatient	Physician	ER	OP Therapy	Hospice
Region I - Boston	1.00	$10,986	$1,460 4.3%	$5,632 1.4%	$7,658 5.8%	$7,918 100.0%	$562 63.5%	$1,916 100.0%	$625 19.5%	$479 7.0%	$5,438 0.3%
Region II - New York	1.13	$11,489	$1,501 3.1%	$5,240 1.3%	$7,991 6.4%	$8,272 100.0%	$582 49.3%	$2,189 99.6%	$459 12.9%	$498 4.0%	$4,980 0.3%
Region III - Philadelphia	1.11	$11,449	$1,634 3.0%	$4,715 1.3%	$7,962 6.6%	$8,246 100.0%	$626 53.2%	$2,048 99.2%	$595 16.4%	$697 6.4%	$5,757 0.4%
Region IV - Atlanta	0.99	$11,308	$1,797 3.3%	$5,537 1.1%	$7,322 6.4%	$7,983 100.0%	$623 48.1%	$2,214 99.8%	$580 16.6%	$890 5.8%	$6,587 0.7%
Region V - Chicago	1.01	$11,025	$1,573 3.1%	$5,626 1.6%	$7,423 7.2%	$7,792 100.0%	$626 59.2%	$1,977 98.8%	$680 19.2%	$625 7.7%	$5,087 0.4%
Region VI - Dallas	0.87	$11,743	$1,569 3.0%	$5,226 1.2%	$8,293 6.2%	$8,320 100.0%	$702 50.3%	$2,163 99.6%	$601 18.5%	$963 5.8%	$6,652 0.9%
Region VII - Kansas City	1.06	$10,976	$1,821 2.5%	$6,177 1.9%	$7,779 7.3%	$7,619 100.0%	$722 63.5%	$1,880 99.6%	$696 24.6%	$670 8.5%	$6,384 0.6%
Region VIII - Denver	1.01	$11,368	$1,850 2.8%	$5,238 1.6%	$7,240 6.4%	$8,123 100.0%	$797 61.5%	$1,893 99.3%	$755 23.8%	$654 8.0%	$6,216 0.4%
Region IX - San Francisco	0.96	$12,269	$1,650 3.0%	$5,690 1.2%	$8,374 6.7%	$8,782 100.0%	$583 44.7%	$2,368 99.6%	$578 15.7%	$721 3.7%	$5,527 0.5%
Region X - Seattle	0.82	$12,045	$1,590 2.8%	$5,574 1.1%	$8,689 6.2%	$8,698 100.0%	$715 58.3%	$2,023 99.6%	$804 24.9%	$531 5.9%	$4,336 0.4%
Overall Average	**1.00**	**$11,414**	**$1,646 3.1%**	**$5,470 1.3%**	**$7,761 6.6%**	**$8,119 100.0%**	**$638 53.3%**	**$2,106 99.5%**	**$624 18.0%**	**$713 6.1%**	**$6,031 0.5%**

Source: Dobson | DaVanzo analysis of research-identifiable 5% SAF for all sites of service, 2007-2009, wage index adjusted by setting and geographic region, and standardized to 2009 dollars.

[a] For methodology used to determine primary chronic condition, see Working Paper #1.

[b] Average Medicare Episode Paid includes care from all facility-based and ambulatory care settings and excludes beneficiary co-payments.

Correlation between Average Episode Paid for HHA and Average Episode Paid for SNF is .214.

Exhibit 4.11: Average Medicare Episode Paid and *Percent of Episodes* by CMS Region by *Care Setting* for Episodes Defined by DIABETES*CHF[a] for 60-day Fixed-Length Pre-Acute Episodes (2007-2009)

Region	Indexed Number of Episodes per 1,000 FFS Beneficiaries	Average Medicare Episode Paid[b]	HHA	SNF	STACH	Index	Outpatient	Physician	ER	OP Therapy	Hospice
Region I - Boston	0.83	$14,383	$1,413 5.9%	$4,715 2.5%	$9,792 10.8%	$9,702 100.0%	$1,185 65.5%	$2,373 99.7%	$699 20.9%	$726 7.5%	$5,100 0.6%
Region II - New York	1.46	$16,139	$1,509 5.0%	$5,237 2.3%	$10,939 12.9%	$10,762 100.0%	$1,544 52.9%	$2,802 99.7%	$500 14.3%	$751 4.1%	$4,727 0.4%
Region III - Philadelphia	1.11	$15,468	$1,479 5.1%	$5,246 2.4%	$9,668 13.0%	$10,272 100.0%	$1,600 59.3%	$2,527 99.2%	$653 18.9%	$901 7.4%	$5,838 0.8%
Region IV - Atlanta	0.95	$15,155	$1,667 4.8%	$5,330 2.0%	$10,049 12.6%	$9,765 100.0%	$1,749 55.6%	$2,623 99.7%	$655 20.9%	$1,006 6.5%	$6,421 1.5%
Region V - Chicago	1.04	$14,677	$1,607 4.9%	$5,304 2.6%	$10,008 12.7%	$9,596 100.0%	$1,384 63.2%	$2,443 99.1%	$731 21.6%	$839 7.7%	$4,798 0.6%
Region VI - Dallas	0.96	$15,654	$1,577 4.8%	$5,173 2.3%	$10,233 12.7%	$10,025 100.0%	$1,845 56.8%	$2,616 99.5%	$677 23.8%	$1,193 6.4%	$6,627 1.7%
Region VII - Kansas City	0.90	$14,342	$1,675 3.6%	$5,551 2.4%	$9,048 12.9%	$9,318 100.0%	$1,416 68.4%	$2,320 99.7%	$786 28.6%	$809 8.7%	$5,581 0.7%
Region VIII - Denver	0.73	$14,483	$1,754 3.5%	$6,242 2.8%	$9,163 12.3%	$9,442 100.0%	$1,643 68.6%	$2,171 99.2%	$841 30.7%	$630 7.3%	$5,503 0.7%
Region IX - San Francisco	0.93	$16,887	$1,572 4.4%	$5,485 2.0%	$11,562 12.5%	$11,306 100.0%	$1,717 51.8%	$2,864 99.2%	$583 18.5%	$834 3.9%	$5,605 0.5%
Region X - Seattle	0.68	$15,649	$1,351 3.5%	$5,831 2.1%	$10,092 12.8%	$10,484 100.0%	$1,516 64.0%	$2,367 99.6%	$913 30.4%	$593 6.1%	$4,431 0.5%
Overall Average	**1.00**	**$15,363**	**$1,574 4.8%**	**$5,317 2.3%**	**$10,189 12.6%**	**$10,077 100.0%**	**$1,583 58.6%**	**$2,578 99.4%**	**$680 20.9%**	**$896 6.5%**	**$5,960 0.9%**

Source: Dobson | DaVanzo analysis of research-identifiable 5% SAF for all sites of service, 2007-2009, wage index adjusted by setting and geographic region, and standardized to 2009 dollars.

[a] For methodology used to determine primary chronic condition, see Working Paper #1.

[b] Average Medicare Episode Paid includes care from all facility-based and ambulatory care settings and excludes beneficiary co-payments.

Correlation between Average Episode Paid for HHA and Average Episode Paid for SNF is .426.

Exhibit 4.12: Average Medicare Episode Paid and *Percent of Episodes* by CMS Region by *Care Setting* for Episodes Defined by CHF*RENAL[a] for 60-day Fixed-Length Pre-Acute Episodes (2007-2009)

Region	Indexed Number of Episodes per 1,000 FFS Beneficiaries	Average Medicare Episode Paid[b]	HHA	SNF	STACH	Index	Outpatient	Physician	ER	OP Therapy	Hospice
Region I - Boston	1.07	$14,290	$1,366	$4,786	$9,544	$9,883	$1,170	$2,203	$665	$660	$5,070
			6.5%	2.6%	10.3%	100.0%	64.8%	99.7%	19.9%	6.7%	0.6%
Region II - New York	1.06	$16,261	$1,253	$5,164	$10,147	$11,223	$1,367	$2,747	$518	$694	$5,263
			4.8%	2.5%	11.9%	100.0%	53.0%	99.8%	14.5%	4.4%	0.7%
Region III - Philadelphia	1.11	$15,227	$1,621	$5,611	$9,720	$10,397	$1,341	$2,433	$687	$838	$5,247
			4.8%	2.6%	12.2%	100.0%	53.8%	99.1%	18.1%	6.8%	1.1%
Region IV - Atlanta	0.93	$15,130	$1,623	$5,314	$9,636	$10,099	$1,510	$2,573	$597	$1,009	$6,675
			5.1%	2.1%	11.6%	100.0%	52.5%	99.4%	19.7%	6.0%	1.9%
Region V - Chicago	1.11	$14,214	$1,588	$5,775	$8,851	$9,702	$1,162	$2,284	$734	$761	$4,583
			4.5%	2.9%	11.4%	100.0%	61.5%	98.6%	22.1%	6.9%	0.8%
Region VI - Dallas	0.88	$15,476	$1,483	$5,014	$10,314	$10,304	$1,491	$2,490	$701	$1,178	$6,860
			4.7%	2.4%	12.2%	100.0%	53.1%	99.6%	23.2%	6.0%	2.0%
Region VII - Kansas City	1.08	$14,181	$1,658	$5,682	$9,055	$9,388	$1,351	$2,208	$708	$845	$5,322
			3.7%	3.1%	12.3%	100.0%	65.3%	99.9%	27.7%	8.8%	0.9%
Region VIII - Denver	0.98	$13,820	$1,460	$5,027	$8,150	$9,248	$1,367	$2,161	$830	$547	$4,259
			3.5%	2.7%	11.9%	100.0%	63.4%	99.7%	29.5%	5.6%	1.5%
Region IX - San Francisco	0.90	$16,459	$1,578	$4,885	$10,323	$11,284	$1,405	$2,882	$620	$993	$4,523
			4.6%	2.3%	11.6%	100.0%	48.3%	99.1%	18.7%	4.1%	1.1%
Region X - Seattle	0.90	$14,903	$1,420	$5,448	$8,920	$10,396	$1,227	$2,223	$855	$504	$4,759
			4.2%	2.3%	11.4%	100.0%	62.1%	99.7%	27.7%	5.4%	0.7%
Overall Average	**1.00**	**$15,061**	**$1,534**	**$5,364**	**$9,561**	**$10,212**	**$1,344**	**$2,465**	**$678**	**$861**	**$5,789**
			4.7%	**2.5%**	**11.7%**	**100.0%**	**56.4%**	**99.3%**	**20.9%**	**6.1%**	**1.2%**

Source: Dobson | DaVanzo analysis of research-identifiable 5% SAF for all sites of service, 2007-2009, wage index adjusted by setting and geographic region, and standardized to 2009 dollars.

[a] For methodology used to determine primary chronic condition, see Working Paper #1.

[b] Average Medicare Episode Paid includes care from all facility-based and ambulatory care settings and excludes beneficiary co-payments.

Correlation between Average Episode Paid for HHA and Average Episode Paid for SNF is .529.

Regional Variation in Episode Type 3: Non-Post-Acute Community-Based Care

Exhibit 4.13 shows the distribution of episodes and average episode payments by setting across all primary chronic conditions for each of the 10 CMS regions for nine-month fixed-length non-post-acute care community-based episodes. As the non-post-acute care community-based episodes are based on an index home health episode, as opposed to an index acute care hospitalization, the frequency distribution of episodes across CMS regions is much greater than in Episode Types 1 and 2. As an indexed measure, Region VI (Dallas) has the highest average number of non-post-acute care community-based episodes per 1,000 fee-for-service beneficiaries (1.52) while Region VII (Kansas City) has the lowest (0.60).

The average Medicare episode payment ranges from $19,104 (Seattle) to $25,944 (Region VI – Dallas). As a home health episode is used as the index event, 100 percent of episodes in each CMS region contain home health care. The lowest average home health payment per episode is $4,517 in Seattle, while the highest is $8,840 in Dallas.

Across all regions, Boston has the highest proportion of beneficiaries that use SNF care (24.3 percent), while Dallas has the lowest proportion (12.2 percent). However, variation in SNF payments per episode is substantially less than for home health payments, ranging from $14,411 in Region VIII (Kansas City) to $16,463 in San Francisco. Variation in payments is also not substantial for IRF, outpatient, ER, or outpatient therapy.

There is significant variation in the use of hospice, which ranges from 8.2 percent of episodes in Dallas to 15.8 percent of episodes in Seattle likely due to supply differences. Average payments per episode for hospice range from $6,956 in Boston to $10,066 in Atlanta.

The correlation between average Medicare payments for HHA (in episodes that include home health care) and average Medicare payments for SNF (in episodes that include SNF care) across the CMS regions is 0.092, and is not significant. This indicates that there is no relationship between average episode spending on HHA and average episode spending on SNF across the regions. This finding differs from the relationships of home health and SNF Medicare payments found in Episode Types 1 and 2.

Unlike the pre-acute episodes, there are significant differences in the distribution of Medicare episode payments in non-post-acute care community-based episodes across care settings (Exhibit 4.14). The proportion of episode payments for HHA ranges from 21.1 percent in New York to 34.1 percent in Dallas. The proportion of episode payments for SNF care is less than the proportion of episodes that include SNF care, ranging from 6.9 percent in Dallas (where 12.2 percent of episodes include SNF care) to 17.2 percent in Boston (where 24.3 percent of episodes include SNF care) (Exhibit 4.13). The proportion of episode payments on SNF care is approximately one-half as large as the

proportion of episodes that include SNF care across the regions. The proportion of episode payments on IRF care is similar to the proportion of episodes that include IRF care across regions. However, the proportion of episode payments represented by hospital admissions is lower than the proportion of episodes with a hospital admission across regions, ranging from 24.1 percent in Dallas (where 39.2 percent of episodes include a hospital admission) to 35.5 percent in New York (where 45.4 percent of episodes include a hospital admission).

Exhibit 4.15 shows the distribution of CHF*COPD episodes and average episode payments by care setting for each of the 10 CMS regions. Several care settings are not presented due to small sample sizes. The frequency distribution of CHF*COPD episodes per 1,000 fee-for-service beneficiaries is similar to the overall average, as Region VI – Dallas – has the highest average indexed number of episodes per 1,000 fee-for-service beneficiaries (1.43), and Region X (Seattle) has the lowest (0.48). The variation in the CHF*COPD average Medicare episode paid is greater than the overall average, consistent with observations made of Episode Types 1 and 2. The average non-post-acute community-based care Medicare episode payment ranges from $26,643 (Seattle) to $36,977 (Dallas). Average home health payments per episode range from $4,749 in Seattle to $9,871 in Dallas, consistent with the overall average but with a slightly greater range.

Across all regions, Boston has the highest proportion of beneficiaries that use SNF care (37.5 percent), while Dallas has the lowest proportion (19.2 percent). This variation in SNF utilization is greater than the overall average and can also be observed in average SNF payments per episode, which range from $13,821 in Kansas City to $17,310 in San Francisco. Variation in payments is also not substantial for IRF, outpatient, ER, or outpatient therapy. Use of hospice ranges from 8.0 percent of episodes in Region II (New York) to 15.2 percent of episodes in Region X (Seattle). Average payments per episode for hospice range from $6,737 in Boston to $10,188 in Atlanta, consistent with the overall average.

The correlation between average payments for HHA (in episodes that include home health care) and average payments for SNF (in episodes that include SNF care) across the CMS regions is -0.153, and is not significant. In general, there is greater regional variation in both utilization and payments for CHF*COPD episodes than non-post-acute care community-based episodes overall, consistent with Episode Types 1 and 2.

Similar findings can be seen in the distribution of episodes and average Medicare episode payments by setting for osteoporosis (Exhibit 4.16), DIABETES*CHF (Exhibit 4.17), and CHF*RENAL (Exhibit 4.18). The range of average Medicare episode payments across the CMS regions is greater for each primary chronic condition than overall. Variation in average SNF spending per episode within specific chronic conditions is

greater than the overall average. There is also significant variation in hospice use across regions. In addition, the correlation between average home health spending per episode and average SNF spending per episode is not significant for any primary chronic condition other than CHF*RENAL, suggesting that there is generally no relationship between the level of spending on care provided by HHAs and SNFs in non-post-acute care community-based episodes.

One important difference to note is the percentage of episodes with a hospital admission. These percentages vary considerably by primary chronic condition, but also vary across regions within primary chronic condition. For example, 34.4 percent of episodes for osteoporosis contain a hospital admission, which ranges from 29.7 percent in Dallas to 39.0 percent in Region III (Philadelphia). CHF*COPD episodes have the greatest rate of hospital admission as 61.4 percent, which ranges from 57.3 percent in Seattle to 67.6 percent in Philadelphia. This is a finding that warrants future study.

Exhibit 4.13: Average Medicare Episode Paid and *Percent of Episodes* by CMS Region by *Care Setting* for Nine-Month Fixed-Length Non-Post-Acute Care Community-Based Episodes (2007-2009)

Region	Indexed Number of Episodes per 1,000 FFS Beneficiaries	Average Medicare Episode Paid[a]	HHA	SNF	IRF	STACH	Outpatient	Physician	ER	OP Therapy	Hospice	Other IP
Region I - Boston	0.98	$21,884	$4,801	$15,528	$18,173	$14,803	$1,751	$3,357	$793	$1,296	$6,956	$12,499
			100.0%	24.3%	2.1%	44.5%	79.2%	97.1%	39.5%	15.5%	9.5%	2.0%
Region II - New York	0.73	$23,454	$4,958	$14,518	$19,271	$18,358	$2,151	$4,469	$639	$1,285	$8,075	$16,371
			100.0%	19.2%	2.3%	45.4%	61.7%	97.4%	30.5%	10.0%	8.5%	1.0%
Region III - Philadelphia	0.73	$23,605	$5,029	$14,785	$19,154	$16,175	$2,017	$3,850	$810	$1,519	$8,520	$13,282
			100.0%	20.6%	3.2%	47.7%	73.6%	95.9%	37.0%	14.0%	11.6%	1.4%
Region IV - Atlanta	1.25	$25,567	$7,752	$16,009	$19,407	$15,133	$2,258	$4,229	$796	$2,068	$10,066	$11,844
			100.0%	17.6%	2.6%	43.4%	66.6%	98.1%	36.9%	14.6%	11.3%	2.1%
Region V - Chicago	1.01	$24,446	$7,162	$15,556	$19,215	$16,351	$1,872	$3,829	$797	$1,493	$7,607	$11,208
			100.0%	17.6%	2.6%	43.8%	72.9%	97.7%	36.8%	12.6%	8.8%	1.8%
Region VI - Dallas	1.52	$25,944	$8,840	$14,735	$19,243	$15,980	$2,537	$4,048	$803	$1,855	$9,319	$13,176
			100.0%	12.2%	4.2%	39.2%	65.8%	97.7%	38.1%	8.5%	8.2%	1.9%
Region VII - Kansas City	0.60	$23,491	$5,291	$14,411	$18,841	$15,310	$2,368	$3,356	$894	$1,483	$7,229	$10,010
			100.0%	22.8%	3.3%	47.5%	77.9%	96.9%	42.6%	18.0%	11.1%	1.9%
Region VIII - Denver	0.64	$21,107	$5,835	$16,168	$17,691	$12,486	$1,656	$2,724	$823	$1,415	$9,291	$12,910
			100.0%	21.3%	2.1%	41.0%	75.0%	96.5%	38.6%	16.6%	14.9%	1.5%
Region IX - San Francisco	0.83	$23,465	$5,593	$16,463	$20,901	$17,462	$1,952	$4,356	$725	$1,321	$8,446	$14,726
			100.0%	15.5%	2.3%	42.2%	54.4%	97.1%	33.0%	8.5%	10.6%	1.6%
Region X - Seattle	0.65	$19,104	$4,517	$15,440	$21,108	$13,972	$1,540	$2,721	$977	$1,441	$8,215	$11,071
			100.0%	18.0%	1.1%	40.9%	69.7%	94.9%	44.2%	14.8%	15.8%	1.3%
Overall Average	**1.00**	**$24,445**	**$6,899**	**$15,467**	**$19,319**	**$15,898**	**$2,125**	**$3,978**	**$795**	**$1,690**	**$8,830**	**$12,414**
			100.0%	**17.4%**	**2.8%**	**43.2%**	**68.1%**	**97.5%**	**36.9%**	**12.5%**	**10.2%**	**1.8%**

Source: Dobson | DaVanzo analysis of research-identifiable 5% SAF for all sites of service, 2007-2009, wage index adjusted by setting and geographic region, and standardized to 2009 dollars.

[a] Average Medicare Episode Paid includes care from all facility-based and ambulatory care settings and excludes beneficiary co-payments.

Correlation between Average Episode Paid for HHA and Average Episode Paid for SNF is .092.

Exhibit 4.14: Average Medicare Episode Paid and *Percent of Medicare Episode Paid* by CMS Region by *Care Setting* for Nine-Month Fixed-Length Non-Post-Acute Care Community-Based Episodes (2007-2009)

Region	Indexed Number of Episodes per 1,000 FFS Beneficiaries	Average Medicare Episode Paid[a]	HHA	SNF	IRF	STACH	Outpatient	Physician	ER	OP Therapy	Hospice	Other IP
Region I - Boston	0.98	$21,884	$4,801 21.9%	$15,528 17.2%	$18,173 1.7%	$14,803 30.1%	$1,751 6.3%	$3,357 14.9%	$793 1.4%	$1,296 0.9%	$6,956 3.0%	$12,499 1.1%
Region II - New York	0.73	$23,454	$4,958 21.1%	$14,518 11.9%	$19,271 1.9%	$18,358 35.5%	$2,151 5.7%	$4,469 18.6%	$639 0.8%	$1,285 0.5%	$8,075 2.9%	$16,371 0.7%
Region III - Philadelphia	0.73	$23,605	$5,029 21.3%	$14,785 12.9%	$19,154 2.6%	$16,175 32.7%	$2,017 6.3%	$3,850 15.6%	$810 1.3%	$1,519 0.9%	$8,520 4.2%	$13,282 0.8%
Region IV - Atlanta	1.25	$25,567	$7,752 30.3%	$16,009 11.0%	$19,407 2.0%	$15,133 25.7%	$2,258 5.9%	$4,229 16.2%	$796 1.1%	$2,068 1.2%	$10,066 4.5%	$11,844 1.0%
Region V - Chicago	1.01	$24,446	$7,162 29.3%	$15,556 11.2%	$19,215 2.1%	$16,351 29.3%	$1,872 5.6%	$3,829 15.3%	$797 1.2%	$1,493 0.8%	$7,607 2.7%	$11,208 0.8%
Region VI - Dallas	1.52	$25,944	$8,840 34.1%	$14,735 6.9%	$19,243 3.1%	$15,980 24.1%	$2,537 6.4%	$4,048 15.2%	$803 1.2%	$1,855 0.6%	$9,319 2.9%	$13,176 1.0%
Region VII - Kansas City	0.60	$23,491	$5,291 22.5%	$14,411 14.0%	$18,841 2.6%	$15,310 30.9%	$2,368 7.8%	$3,356 13.8%	$894 1.6%	$1,483 1.1%	$7,229 3.4%	$10,010 0.8%
Region VIII - Denver	0.64	$21,107	$5,835 27.6%	$16,168 16.3%	$17,691 1.7%	$12,486 24.2%	$1,656 5.9%	$2,724 12.5%	$823 1.5%	$1,415 1.1%	$9,291 6.5%	$12,910 0.9%
Region IX - San Francisco	0.83	$23,465	$5,593 23.8%	$16,463 10.9%	$20,901 2.0%	$17,462 31.4%	$1,952 4.5%	$4,356 18.0%	$725 1.0%	$1,321 0.5%	$8,446 3.8%	$14,726 1.0%
Region X - Seattle	0.65	$19,104	$4,517 23.6%	$15,440 14.5%	$21,108 1.2%	$13,972 29.9%	$1,540 5.6%	$2,721 13.5%	$977 2.3%	$1,441 1.1%	$8,215 6.8%	$11,071 0.7%
Overall Average	**1.00**	**$24,445**	**$6,899 28.2%**	**$15,467 11.0%**	**$19,319 2.2%**	**$15,898 28.1%**	**$2,125 5.9%**	**$3,978 15.9%**	**$795 1.2%**	**$1,690 0.9%**	**$8,830 3.7%**	**$12,414 0.9%**

Source: Dobson | DaVanzo analysis of research-identifiable 5% SAF for all sites of service, 2007-2009, wage index adjusted by setting and geographic region, and standardized to 2009 dollars.

[a] Average Medicare Episode Paid includes care from all facility-based and ambulatory care settings and excludes beneficiary co-payments.

Correlation between Average Episode Paid for HHA and Average Episode Paid for SNF is .092.

Exhibit 4.15: Average Medicare Episode Paid and *Percent of Episodes* by CMS Region by *Care Setting* for Episodes Defined by CHF*COPD[a] for Nine-Month Fixed-Length Non-Post-Acute Care Community-Based Episodes (2007-2009)

Region	Indexed Number of Episodes per 1,000 FFS Beneficiaries	Average Medicare Episode Paid[b]	HHA	SNF	STACH	Outpatient	Physician	ER	OP Therapy	Hospice
Region I - Boston	0.83	$33,360	$5,473	$16,130	$19,681	$1,808	$4,818	$926	$1,444	$6,737
			100.0%	37.5%	65.0%	83.5%	99.0%	49.2%	14.8%	8.7%
Region II - New York	0.68	$35,539	$5,511	$15,304	$22,760	$2,485	$6,409	$747	$1,601	$7,924
			100.0%	31.3%	66.5%	67.8%	98.9%	38.1%	10.8%	8.0%
Region III - Philadelphia	0.71	$35,061	$5,691	$15,609	$20,681	$2,446	$5,404	$966	$1,746	$7,291
			100.0%	30.3%	67.6%	79.1%	97.0%	46.5%	13.6%	11.8%
Region IV - Atlanta	1.30	$35,893	$9,721	$16,247	$18,627	$2,751	$5,572	$915	$2,372	$10,188
			100.0%	24.9%	59.3%	71.4%	99.0%	44.0%	15.2%	11.3%
Region V - Chicago	1.16	$34,717	$8,275	$16,050	$20,171	$2,209	$5,467	$912	$1,591	$7,304
			100.0%	24.1%	60.8%	75.8%	99.2%	44.0%	12.3%	8.7%
Region VI - Dallas	1.43	$36,977	$9,871	$14,518	$18,752	$2,910	$5,636	$957	$2,000	$8,444
			100.0%	19.2%	59.7%	72.1%	99.0%	47.8%	9.0%	9.3%
Region VII - Kansas City	0.61	$32,295	$5,935	$13,821	$18,807	$3,086	$4,490	$1,103	$1,458	$7,012
			100.0%	31.7%	64.4%	82.9%	98.7%	52.4%	16.6%	10.0%
Region VIII - Denver	0.50	$30,642	$6,245	$16,161	$15,742	$1,957	$3,961	$1,002	$1,502	$9,620
			100.0%	34.2%	62.0%	80.9%	98.1%	50.0%	18.4%	14.9%
Region IX - San Francisco	0.81	$35,932	$6,367	$17,310	$21,754	$2,372	$6,305	$847	$1,394	$6,951
			100.0%	24.0%	62.2%	60.7%	98.9%	39.8%	8.7%	10.2%
Region X - Seattle	0.48	$26,643	$4,749	$16,640	$16,999	$1,828	$3,548	$1,236	$1,351	$8,456
			100.0%	27.2%	57.3%	76.8%	97.5%	56.5%	18.3%	15.2%
Overall Average	**1.00**	**$35,254**	**$8,141**	**$15,839**	**$19,641**	**$2,528**	**$5,523**	**$929**	**$1,892**	**$8,477**
			100.0%	**25.5%**	**61.4%**	**73.1%**	**98.8%**	**45.0%**	**12.8%**	**10.1%**

Source: Dobson | DaVanzo analysis of research-identifiable 5% SAF for all sites of service, 2007-2009, wage index adjusted by setting and geographic region, and standardized to 2009 dollars.

[a] For methodology used to determine primary chronic condition, see Working Paper #1.

[b] Average Medicare Episode Paid includes care from all facility-based and ambulatory care settings and excludes beneficiary co-payments.

Correlation between Average Episode Paid for HHA and Average Episode Paid for SNF is -.153.

Exhibit 4.16: Average Medicare Episode Paid and *Percent of Episodes* by CMS Region by *Care Setting* for Episodes Defined by Osteoporosis[a] for Nine-Month Fixed-Length Non-Post-Acute Care Community-Based Episodes (2007-2009)

Region	Indexed Number of Episodes per 1,000 FFS Beneficiaries	Average Medicare Episode Paid[b]	HHA	SNF	STACH	Outpatient	Physician	ER	OP Therapy	Hospice
Region I - Boston	1.09	$17,805	$4,617	$16,077	$11,276	$1,161	$2,858	$711	$1,206	$10,079
			100.0%	20.6%	37.1%	82.0%	99.5%	38.1%	19.6%	6.4%
Region II - New York	0.73	$16,174	$4,441	$13,692	$12,167	$1,178	$3,403	$569	$1,262	$9,953
			100.0%	15.0%	33.5%	64.6%	99.2%	29.3%	12.4%	5.3%
Region III - Philadelphia	0.71	$18,186	$4,865	$15,094	$11,406	$1,115	$3,010	$728	$1,564	$9,261
			100.0%	17.9%	39.0%	76.9%	98.0%	35.9%	17.3%	8.3%
Region IV - Atlanta	1.32	$20,363	$7,329	$16,126	$10,735	$1,400	$3,656	$727	$2,181	$11,177
			100.0%	15.3%	34.5%	67.3%	99.3%	34.4%	18.1%	8.1%
Region V - Chicago	0.84	$18,723	$6,435	$15,519	$10,959	$1,099	$2,927	$744	$1,659	$8,418
			100.0%	17.0%	36.3%	75.8%	98.8%	36.2%	16.8%	7.1%
Region VI - Dallas	1.54	$19,972	$8,460	$15,301	$11,648	$1,231	$3,127	$705	$1,852	$10,914
			100.0%	10.4%	29.7%	67.0%	99.1%	34.1%	10.5%	6.1%
Region VII - Kansas City	0.55	$18,312	$5,097	$15,304	$10,159	$1,360	$2,684	$802	$1,579	$9,505
			100.0%	20.1%	38.6%	76.1%	97.9%	40.6%	21.8%	9.6%
Region VIII - Denver	0.73	$19,223	$5,653	$16,869	$10,862	$1,107	$2,656	$729	$1,402	$10,119
			100.0%	22.6%	37.5%	75.9%	98.6%	35.5%	21.6%	10.9%
Region IX - San Francisco	0.88	$17,481	$5,106	$16,626	$12,465	$1,243	$3,498	$702	$1,365	$10,736
			100.0%	13.1%	33.1%	53.6%	98.6%	31.4%	11.0%	7.6%
Region X - Seattle	0.73	$15,919	$4,577	$14,878	$10,631	$1,213	$2,344	$835	$1,480	$10,088
			100.0%	15.5%	34.0%	69.6%	96.4%	42.6%	17.6%	12.1%
Overall Average	**1.00**	**$18,991**	**$6,476**	**$15,677**	**$11,221**	**$1,243**	**$3,236**	**$721**	**$1,763**	**$10,287**
			100.0%	**15.3%**	**34.4%**	**69.3%**	**98.9%**	**34.8%**	**15.8%**	**7.5%**

Source: Dobson | DaVanzo analysis of research-identifiable 5% SAF for all sites of service, 2007-2009, wage index adjusted by setting and geographic region, and standardized to 2009 dollars. All episodes have been extrapolated to reflect the universe of Medicare beneficiaries.

[a] For methodology used to determine primary chronic condition, see Working Paper #1.

[b] Average Medicare Episode Paid includes care from all facility-based and ambulatory care settings and excludes beneficiary co-payments.

Correlation between Average Episode Paid for HHA and Average Episode Paid for SNF is .234.

Exhibit 4.17: Average Medicare Episode Paid and *Percent of Episodes* by CMS Region by *Care Setting* for Episodes Defined by DIABETES*CHF[a] for Nine-Month Fixed-Length Non-Post-Acute Care Community-Based Episodes (2007-2009)

Region	Indexed Number of Episodes per 1,000 FFS Beneficiaries	Average Medicare Episode Paid[b]	HHA	SNF	STACH	Outpatient	Physician	ER	OP Therapy	Hospice
Region I - Boston	0.77	$26,588	$5,115	$16,075	$17,281	$2,669	$4,139	$785	$1,432	$5,884
			100.0%	28.0%	50.7%	82.0%	97.3%	44.0%	15.9%	7.2%
Region II - New York	0.93	$29,088	$5,812	$15,126	$21,172	$3,348	$5,651	$598	$1,451	$7,572
			100.0%	20.4%	52.2%	62.4%	98.9%	31.6%	8.5%	5.6%
Region III - Philadelphia	0.76	$28,643	$5,805	$14,462	$17,508	$3,123	$4,609	$781	$1,486	$9,515
			100.0%	24.4%	55.1%	74.9%	97.7%	40.2%	14.1%	9.6%
Region IV - Atlanta	1.06	$31,925	$8,326	$16,323	$17,496	$3,946	$5,183	$822	$1,785	$9,027
			100.0%	21.8%	51.9%	72.5%	99.3%	41.9%	14.2%	10.6%
Region V - Chicago	1.17	$27,916	$8,266	$16,264	$17,333	$2,674	$4,308	$772	$1,392	$6,666
			100.0%	18.9%	47.4%	74.3%	98.6%	37.6%	11.2%	7.1%
Region VI - Dallas	1.61	$33,005	$10,133	$15,263	$18,888	$4,289	$5,203	$834	$2,045	$9,652
			100.0%	13.4%	46.4%	68.8%	98.8%	43.5%	8.7%	6.7%
Region VII - Kansas City	0.55	$30,432	$5,701	$15,352	$19,607	$3,445	$4,068	$903	$1,568	$5,807
			100.0%	26.3%	55.5%	80.7%	97.9%	48.0%	19.0%	8.7%
Region VIII - Denver	0.54	$27,755	$7,036	$18,873	$13,152	$2,072	$3,429	$814	$1,249	$8,953
			100.0%	27.5%	53.3%	80.0%	97.6%	43.6%	18.3%	14.0%
Region IX - San Francisco	0.88	$27,575	$6,868	$16,882	$19,086	$2,973	$5,023	$728	$1,347	$7,709
			100.0%	16.6%	47.1%	59.8%	99.0%	33.4%	8.4%	8.0%
Region X - Seattle	0.55	$24,814	$4,790	$17,618	$16,753	$2,230	$3,350	$1,104	$2,288	$7,359
			100.0%	23.1%	50.0%	77.5%	98.0%	52.6%	15.1%	15.1%
Overall Average	**1.00**	**$29,912**	**$7,795**	**$15,972**	**$18,124**	**$3,390**	**$4,834**	**$798**	**$1,634**	**$8,264**
			100.0%	**19.8%**	**49.8%**	**71.3%**	**98.7%**	**40.1%**	**11.9%**	**8.4%**

Source: Dobson | DaVanzo analysis of research-identifiable 5% SAF for all sites of service, 2007-2009, wage index adjusted by setting and geographic region, and standardized to 2009 dollars.

[a] For methodology used to determine primary chronic condition, see Working Paper #1.

[b] Average Medicare Episode Paid includes care from all facility-based and ambulatory care settings and excludes beneficiary co-payments.

Correlation between Average Episode Paid for HHA and Average Episode Paid for SNF is –.064.

Exhibit 4.18: Average Medicare Episode Paid and *Percent of Episodes* by CMS Region by *Care Setting* for Episodes Defined by CHF*RENAL[a] for Nine-Month Fixed-Length Non-Post-Acute Care Community-Based Episodes (2007-2009)

Region	Indexed Number of Episodes per 1,000 FFS Beneficiaries	Average Medicare Episode Paid[b]	HHA	SNF	STACH	Outpatient	Physician	ER	OP Therapy	Hospice
Region I - Boston	1.09	$26,777	$5,234	$15,031	$15,285	$1,533	$3,730	$780	$1,254	$3,667
			100.0%	36.3%	58.6%	79.0%	98.8%	43.7%	14.9%	12.2%
Region II - New York	0.75	$26,637	$5,188	$15,127	$16,336	$1,646	$4,417	$659	$1,570	$5,854
			100.0%	28.1%	60.8%	62.9%	98.7%	31.9%	8.8%	14.3%
Region III - Philadelphia	0.80	$26,038	$4,988	$13,464	$15,491	$1,728	$3,513	$770	$1,216	$7,080
			100.0%	29.7%	63.9%	74.5%	97.9%	35.2%	14.5%	17.9%
Region IV - Atlanta	1.17	$28,540	$6,713	$16,041	$15,173	$1,976	$4,379	$766	$1,790	$8,336
			100.0%	26.0%	60.0%	69.7%	99.1%	41.8%	14.2%	15.8%
Region V - Chicago	1.06	$27,975	$6,431	$15,476	$16,729	$1,746	$3,886	$809	$1,546	$6,650
			100.0%	26.3%	58.7%	77.2%	97.7%	37.3%	14.5%	15.3%
Region VI - Dallas	1.28	$31,721	$8,550	$15,535	$15,568	$2,639	$4,733	$803	$2,138	$8,112
			100.0%	22.6%	58.6%	67.8%	99.4%	43.3%	10.4%	12.5%
Region VII - Kansas City	0.71	$28,254	$5,483	$14,526	$15,627	$1,729	$3,479	$830	$1,901	$5,528
			100.0%	35.6%	64.4%	82.1%	99.7%	40.6%	22.6%	14.4%
Region VIII - Denver	0.64	$24,326	$6,553	$15,772	$13,623	$1,920	$2,634	$787	$1,882	$8,680
			100.0%	24.0%	50.3%	71.9%	98.8%	42.7%	13.5%	14.6%
Region IX - San Francisco	0.87	$27,277	$5,336	$14,771	$17,015	$1,612	$4,672	$693	$985	$7,587
			100.0%	23.0%	57.9%	57.5%	98.6%	39.0%	8.8%	15.7%
Region X - Seattle	0.92	$23,718	$4,803	$14,370	$14,705	$1,280	$2,722	$1,002	$1,212	$7,388
			100.0%	29.8%	55.8%	70.2%	96.6%	43.4%	13.2%	19.6%
Overall Average	**1.00**	**$28,089**	**$6,356**	**$15,239**	**$15,772**	**$1,889**	**$4,127**	**$781**	**$1,624**	**$7,260**
			100.0%	**26.8%**	**59.5%**	**70.9%**	**98.6%**	**39.8%**	**13.2%**	**15.1%**

Source: Dobson | DaVanzo analysis of research-identifiable 5% SAF for all sites of service, 2007-2009, wage index adjusted by setting and geographic region, and standardized to 2009 dollars.

[a] For methodology used to determine primary chronic condition, see Working Paper #1.

[b] Average Medicare Episode Paid includes care from all facility-based and ambulatory care settings and excludes beneficiary co-payments.

Correlation between Average Episode Paid for HHA and Average Episode Paid for SNF is .679.

Appendix A: Determining Primary Chronic Conditions

Primary chronic conditions were determined by mapping each chronic condition onto one of the Medicare Advantage Hierarchical Chronic Conditions (HCC), and ranking the conditions from highest to lowest risk according to the HCC community risk score. Three disease interactions (e.g. patients with both congestive heart failures (CHF) and chronic obstructive pulmonary disease (COPD)) were ranked as the highest risk. Each episode was categorized by the highest risk disease interaction or chronic condition present in the episode. Two chronic conditions – glaucoma and cataracts – do not have a comparable HCC with an associated risk score, and these chronic conditions were ranked as the lowest in severity.

For a crosswalk of disease interactions and HCCs to chronic conditions, see *Exhibit A-1* below.

Exhibit A-1: HCC Factors from CY2011 Proposed Rule[a]

Disease Interaction	Description	Risk Score: Community	Chronic Condition 1	Chronic Condition 2	Chronic Condition 3
CHF*COPD	Congestive Heart Failure*Chronic Obstructive Pulmonary Disease	0.255	Heart Failure and Chronic Obstructive Pulmonary Disease		
DIABETES*CHF	Diabetes*Congestive Heart Failure	0.237	Diabetes and Heart Failure		
CHF*RENAL	Congestive Heart Failure*Renal Disease	0.201	Heart Failure and Chronic Kidney Disease		

Appendix A: Determining Primary Chronic Conditions

HCC	Description	Risk Score: Community	Chronic Condition 1	Chronic Condition 2	Chronic Condition 3
HCC9	Lung and Other Severe Cancers	1.006	Lung Cancer		
HCC39	Bone/Joint/Muscle Infections/Necrosis	0.423	Osteoporosis		
HCC111	Chronic Obstructive Pulmonary Disease	0.388	Chronic Obstructive Pulmonary Disease		
HCC40	Rheumatoid Arthritis and Inflammatory Connective Tissue Disease	0.376	Rheumatoid Arthritis/Osteoarthritis		
HCC170	Hip Fracture/Dislocation	0.363	Hip/Pelvic Fracture		
HCC85	Congestive Heart Failure	0.361	Heart Failure		
HCC52	Dementia without Complication	0.343	Alzheimer's Disease	Alzheimer's Disease and Related Disorders or Senile	
HCC100	Ischemic or Unspecified Stroke	0.333	Stroke/Transient Ischemic Attack		
HCC11	Colorectal, Bladder, and Other Cancers	0.330	Colorectal Cancer		
HCC58	Major Depressive, Bipolar, and Paranoid Disorders	0.318	Depression		
HCC86	Acute Myocardial Infarction	0.283	Acute Myocardial Infarction		
HCC87	Unstable Angina and Other Acute Ischemic Heart Disease	0.283	Ischemic Heart Disease		
HCC96	Specified Heart Arrhythmias	0.276	Atrial Fibrillation		
HCC139	Chronic Kidney Disease, Mild or Unspecified (Stages 1-2 or Unspecified)	0.227	Chronic Kidney Disease		
HCC12	Breast, Prostate, and Other Cancers and Tumors	0.180	Female Breast Cancer	Prostate Cancer	Endometrial Cancer
HCC19	Diabetes without Complication	0.124	Diabetes		
N/A	N/A	N/A	Glaucoma		
N/A	N/A	N/A	Cataract		

[a] Advance Notice of Methodological Changes for Calendar Year (CY) 2011 for Medicare Advantage (MA) Capitation Rates, Part C and Part D Payment Policies and 2011 Call Letter. February 19, 2010. Baltimore, MD: Centers for Medicare & Medicaid Services.

Appendix B: States by DHHS Regions

Exhibit B-1: List of States by U.S. Department of Health and Human Services (DHHS) Regions

Region I
- Connecticut
- Maine
- Massachusetts
- New Hampshire
- Rhode Island
- Vermont

Region II
- New Jersey
- New York
- Puerto Rico
- Virgin Islands

Region III
- Delaware
- District of Columbia
- Maryland
- Pennsylvania
- Virginia
- West Virginia

Region IV
- Alabama
- Florida
- Georgia
- Kentucky
- Mississippi
- North Carolina
- South Carolina
- Tennessee

Region V
- Illinois
- Indiana
- Michigan
- Minnesota
- Ohio
- Wisconsin

Region VI
- Arkansas
- Louisiana
- New Mexico
- Oklahoma
- Texas

Region VII
- Iowa
- Kansas
- Missouri
- Nebraska

Region VIII
- Colorado
- Montana
- North Dakota
- South Dakota
- Utah
- Wyoming

Region IX
- Arizona
- California
- Hawaii
- Nevada
- American Samoa
- Guam

Region X
- Alaska
- Idaho
- Oregon
- Washington