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 #1: Creating and Benchmarking Episodes: Baseline Statistics of Episode Frequency and Patient Diagnoses

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Working Paper #1: Creating and Benchmarking Episodes: Baseline Statistics on Episode Frequency and Patient Diagnoses

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

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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 first 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
- 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 ultimate 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. The purpose of this first working paper is to present: 1) the methodology for developing the three episode definitions that serve as the basis of the study, and 2) the baseline statistics for each episode type.

In order to understand how home health is provided to Medicare beneficiaries at different stages of patient care, our final report will include simulations that model the effect of home health care on Medicare payments and, for example, hospital readmissions, under different payment policies and delivery of care models.

Currently under Medicare's home health prospective payment system, home health agencies receive payment for a 60-day episode of care for each beneficiary. If a beneficiary is still eligible for home health care after the end of the first episode, a second episode can begin. There are no limits to the number of episodes a beneficiary who remains eligible for the home health benefit can receive in a single year.[3]

For this project, we have constructed a data platform that allowed us to link patient-level Medicare claims files across care settings. Using these data, we created three types of episodes, and calculated descriptive statistics. We also conducted data queries of the type of patients home health care is currently treating, including the distribution of the diagnoses and patient characteristics within specific episode types (not to be confused with the home health unit of payment under Medicare, which is the 60-day episode).

Episodes in a Historical Context

For over twenty years, researchers have sought to operationalize the construct of "episodes" to better understand cost and utilization patterns. "Illness episodes" follow the individual from the start to the end of his or her illness. Although this type of episode is

[3] "Home Health PPS: Overview." Centers for Medicare & Medicaid Services. Available at: http://www.cms.gov/HomeHealthPPS/

theoretically appealing, it presents a variety of analytic problems, as individuals rarely seek treatment the moment their symptoms begin, nor do they cease their treatment the moment their symptoms or illness end. Many terminate their treatment early. Furthermore, many episodes of illness are not accompanied by contact with a health care provider at all. This is particularly true in the case of acute, self-limited conditions, such as the common cold. Individuals with such conditions often do not seek formal treatment from the health care delivery system. Finally, many individuals have multiple comorbidities; thus, they are not identified with a single illness.

"Treatment episodes," are, by nature, defined by contact with health care providers, usually in either inpatient or outpatient settings. These episodes are generally comprised of some number of days of inpatient hospital care, in one or more hospital stays, and/or number of outpatient visits. Episode length is usually measured in days. Often, clinical criteria are used to distinguish between successive episodes. By these definitions, treatment episodes will most often be shorter than illness episodes, since they are likely to begin after the symptoms of illness appear and finish before the individual may have fully recovered. Screening procedures or preventive health treatments can shorten the time of treatment episodes and can have substantive impacts on health care use and costs if their effects are felt within a short time after receipt. Understanding the nature of treatment episodes enables health care providers and policymakers to predict the likely demands on the health care system.

Another important conceptual issue is deciding whether an episode should be defined with a single diagnosis or a set of related diagnoses. A series of path-breaking RAND studies[4,5,6,7] examine the creation and measurement of episodes, referring to a "medical problem" as the basis of grouping episode expenses. Thus, services that the investigators determined to be related to the same problem are grouped into a single episode.

Determining the time interval between the end of one episode and the start of another also raises a number of methodological challenges. Defining the time between episodes requires a definition of the episode's beginning and end. Typically, when using administrative data, a treatment episode begins with the first claim containing the diagnosis of a condition and ends when the condition is no longer being treated. It is possible to define an episode's start as the first patient/provider encounter accompanied by the diagnosis of a specific condition.

[4] Ball JK, Roskamp J. (1986). General methods for diagnosis – and service-specific analyses. *Medical Care* 24: S7-S17.

[5] Keeler EB, Rolph JE. (1988). The demand for episodes of treatment in the Health Insurance Experiment. *Journal of Health Economics* 7:337-367.

[6] Newhouse JP and the Insurance Experiment Group. (1993). Free for All: Lessons from the Rand Health Insurance Experiment. Cambridge, MA: Harvard University Press.

[7] Wells KB, Keeler EB, Manning WG Jr. (1990). Patterns of outpatient mental health care over time: Some implications for estimates of demand and for benefit design. *Health Services Research* 24:773-790.

Another way to define the start of the episode is the point at which a specific treatment protocol is initiated or a particular diagnosis is received.[8] The episode's end may reflect exhaustion of benefits, rather than the successful completion of treatment. The length of the interval between episodes depends upon the medical condition and the course of treatment is often determined by clinical consensus.

An alternative is to consider the severity of acute conditions to define different intervals between episodes.[9] From a payment perspective, one could also consider a "reasonable" timeframe in order to include follow-up visits as part of the same episode.[10] For example, a gap of 20 days between treatment events for the same diagnosis may represent a single treatment episode, while a longer gap of 35 days between the two events may signal the beginning of a new treatment episode. Criteria for deciding upon the appropriate gap to indicate separate payment episodes are somewhat arbitrary.

Bundled Payment Episodes

Over the last several years, policymakers and others have considered enhanced incentives for better care coordination and efficiency in Medicare using a "bundled" payment. Under a bundled payment, a single payment would be made for the bundle or for the "episode" of care. A single entity (such as an Accountable Care Organization) would then be at risk for the care that patients receive over the entire episode. Several bundled payment/episode definitions for Medicare have been recently put forth by Office of Management and Budget (OMB), Senate Finance Committee, Congressional Budget Office (CBO), and the Medicare Payment Advisory Commission (MedPAC).

Each of the various payment concepts recommends providing a single bundled Medicare payment for hospital and post-acute care services, although the proposals differ in the particular post-acute care services that are included and the number of days or services that are included. These proposals also vary in how the end point of an episode is defined (for example, any claim initiated within 30 days might be a variable length episode versus 30 calendar days after discharge, which would be a fixed length episode).

Under Section 3023 of the Patient Protection and Affordable Care Act (Affordable Care Act), which establishes a national pilot program on payment bundling, Medicare would make a single payment to cover inpatient services in an acute care hospital, as well as post-acute care, physician, and outpatient services required during the 30 day period after being discharged from an inpatient hospital. However, the ultimate definition is up to the Secretary's discretion. The Centers for Medicare & Medicaid Services (CMS), through

[8] Hornbrook MC, Hurtado AV, Johnson RE. (1985). Health care episodes: Definition, measurement, and use. *Medical Care Review* 42: 163-218.

[9] Salkever DS, Skinner EA, Steinwachs DM, Katz H. (1982). Episode-based efficiency comparisons for physicians and nurse practitioners. *Medical Care* 20:143-153.

[10] Cave DG. (1995). Profiling physician practice patterns using diagnostic episode clusters. *Medical Care* 33:463-486.

the Center for Medicare & Medicaid Innovations (CMMI) is currently requesting applications for providers to participate in the Bundled Payments for Care Improvement initiative.[11]

Over the years, this research framework for an "episode of care" has been used for multiple purposes, such as:

- To evaluate the quality and efficiency of care provision,[12]
- To evaluate charges associated with different healthcare delivery settings,[13] and
- To study the effect of cost-sharing on patient behavior.[14]

Episodes in the Study

The CACEP project investigates patterns of care under three distinct "episode" types. The final report will present simulations conducted in which patients are shifted into the most clinically appropriate and cost-effective setting based on their clinical and functional status. The simulations will include all care settings and investigate the placement of patients into skilled nursing facilities, inpatient rehabilitation facilities, and home health from higher-intensity care settings. Placement of patients into home health care is simulated according to the requirements of the current Medicare home health benefit. The three episode types and primary study questions included in this project are:

- ***Episode Type 1: Use of home health as a post-acute care provider*** – triggered by an acute care hospitalization, how is home health used as a post-acute care provider?
- ***Episode Type 2: Use of home health as a pre-acute care provider*** – what patterns of care preceded the acute care hospitalization that triggers Episode Type 1? How can the hospitalization potentially be avoided through the use of home health?
- ***Episode Type 3: Use of home health as a non-post-acute community-based care provider –*** triggered by a home health admission that originates from the community, how can home health care be used to keep patients out of facility-based care?

[11] Under the initiative, CMS is requesting applications for four bundling models: 1) retrospective bundle of the acute care hospitalization only; 2) retrospective bundle of the acute care hospitalization and subsequent post-acute care for at least 30 or 90 days after hospital discharge; 3) retrospective bundle of the post-acute care services following a hospital discharge (but not including the hospital stay); and 4) prospective bundled payment of the acute care hospitalization, rehospitalization, and related physician visits.

[12] Kessler LG, Steinwachs DM, Hankin JR. (1982). Episodes of psychiatric care and medical utilization. *Medical Care* 20:1209-1219.

[13] Garnick DW, Luft HS, Gardner LB, Morrison EM, Barrett M, O'Neil A, Harvey B. (1990). Services and charges by PPO physicians for PPO and indemnity patients: An episode of care comparison. *Medical Care* 28: 894-906.

[14] Keeler EB, Rolph JE. (1988). The demand for episodes of treatment in the Health Insurance Experiment. *Journal of Health Economics* 7:337-367.

Introduction

Upcoming Study Analyses

An understanding of the three types of episodes constructed in this study is important to identifying the analyses that can be performed. Based on Medicare claims and post-acute care assessment data, we examine how patient placement is currently handled in various settings, and identify potential changes that can be made to ensure clinical appropriateness and maximize efficiency in the delivery of care.

In the remainder of this report, we present the methodology for developing our three episode types, as well as their baseline descriptive statistics. These descriptive statistics present the distribution of episodes and Medicare episode payments by care settings and by patients' chronic conditions.

Methods

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, long-term care hospitals, skilled nursing facilities, inpatient rehabilitation facilities, home health agencies, hospice, and physician visits. These data were requested from the CMS Chronic Condition Warehouse (CCW),[15] which 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. As CMS develops future payment systems, it will use comparable systems of data.

We have also received patient assessment data for home health agencies (Outcome and Assessment Information Set – OASIS), skilled nursing facilities (Minimum Data Set – MDS), and inpatient rehabilitation facilities (Patient Assessment Instrument – IRF-PAI). These datasets will be incorporated into the claims data in order to perform the analyses presented in the final report.[16]

Episode Definition

Patient "episodes" were created to capture all health care utilization following (or preceding) key points in the patient's care. An "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," or outpatient "visit").

We created three episode types – each of which will be used to both determine how home health care is currently being used in patient care, and to simulate how home health care might be used to improve efficiency in the Medicare program.

[15] Data were provided by CMS under Data Use Agreement number #21007.

[16] Part D data were also received under the Data Use Agreement but were not incorporated into the working paper series.

Methods

The purpose of this working paper is to explain each of the episode definitions, and to provide baseline descriptive statistics on the patient characteristics, utilization of health care, and Medicare payments pertaining to each episode type.

OVERVIEW OF EPISODE DEFINITIONS:

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, which serves as a "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 (hospital or home health) stay. Episode Type 2 tracks all care **preceding** the index acute care hospital stay, as well as the index stay.[17] 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 the total 60-day episode payments.

1. **HOME HEALTH AS A POST-ACUTE CARE PROVIDER:** Initiated by an index acute care hospital stay, this episode type captures all Medicare Part A and Part B post-acute care (facility- and non-facility-based care) that patients receive following a hospital discharge. This episode type was constructed to include all care within 60 days following index acute care hospital discharge.[18] These episodes are clinically defined by the index acute care hospitalization MS-DRG. That is, in order to compare episodes with similar levels of clinical complexity, we calculated descriptive statistics at the acute care hospital MS-DRG-level.[19]

[17] The pre-acute and post-acute care episodes both include the Medicare payments for the index acute care hospitalization; therefore, the payments for these two episode types are not additive.

[18] Post-acute care episodes were also developed to capture care for 30 days and 180 days following the acute care hospital discharge. These results were analyzed for appropriateness, but not reported in this working paper series.

[19] The post-acute care episodes included in the study resemble Model 2 of CMS' Bundled Payments for Care Improvements initiative.

In order to track different patient pathways[20] across episodes within MS-DRGs, an episode is identified by the first setting following the index acute care hospitalization. For example, if a patient is discharged from the acute care hospital, and directly admitted to home health, that episode is referred to as a "home health" (HHA) first setting episode. This nomenclature does not mean, however, that the episode only includes care from the first setting; episodes often include care from several different care settings during the 60 days.

Exhibit A.1 contains the first care settings used to operationally define episodes in our analyses:

Exhibit A.1: Description of First Settings that Characterize 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; 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
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

In this working paper, the Medicare payment data presented for the post-acute care episodes include both the Medicare payment for care during the index acute care hospitalization (including physician visits during the hospitalization), as well as payment for all subsequent post-acute care during the fixed-length episode. Future working papers will further break episodes into payment components (e.g., all post-acute care payments after the initial index acute care hospitalization).

2. **HOME HEALTH AS A PRE-ACUTE CARE PROVIDER:** This episode type encompasses the care that was provided prior to the index acute care hospitalization in Episode Type 1, as well as the index acute care hospital stay. While this episode type is triggered by the same index acute care hospitalization as Episode 1, it looks back to care provided prior to the hospitalization. This episode type was constructed to

[20] Patient pathways refer to the sequence of care settings a patient enters within an episode. Working Paper #3 will investigate the different patient pathways across episode types.

include all care within 60 days preceding acute care hospital admission.[21] Rather than using the index acute care hospitalization MS-DRG, these episodes are clinically defined by the patient's "primary" chronic condition. To assign each patient a unique primary chronic condition designation, we used community risk scores based on the Medicare Advantage hierarchical condition categories (HCC). We discuss more about clinically defining these patient episodes in the next section of this paper.

In this working paper, the Medicare 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. Therefore, the Medicare payments for Episode Types 1 and 2 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. Future working papers will further break episodes into payment components (e.g., all payments for care prior to the index acute care hospitalization).

3. **HOME HEALTH AS A NON-POST-ACUTE CARE COMMUNITY-BASED PROVIDER:** This episode type differs from the others, as it is the only episode type that is triggered by an admission to home health from the community. This episode aims to capture the care and Medicare payments that patients incur following discharge from home health. This episode type was constructed to include all care provided within nine months following discharge from the patient's first home health episode (60-day home health episode). According to MedPAC, the average home health patient had 2.0 home health episodes in 2009.[22] Therefore, we extended the length of this episode type relative to the other 60-day episodes in order to capture any remaining home health episodes, as well as the care patients receive once they are no longer receiving home health. Similar to the clinical definition of Episode Type 2 that is based on primary chronic conditions derived from HCCs, these patient episodes are clinically defined by the patient's primary chronic condition using the CCW categories assigned by CMS.

   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.

[21] Pre-acute care episodes were also developed to capture care for 30 days and 180 days prior to the acute care hospital admission. These results were analyzed for appropriateness, but not reported in this working paper series.

[22] Medicare Payment Advisory Commission. (2011). Chapter 8: HHA services. In *Report to Congress, Medicare Payment Policy*. Washington, DC: MedPAC.

DETERMINING "PRIMARY CHRONIC CONDITIONS" AND PATIENT SEVERITY

For the purpose of attributing health care utilization and payments to unique patient episodes, it is important to categorize each patient with a single mutually exclusive "primary chronic condition." Primary chronic conditions were determined by mapping each chronic condition identified in the CCW[23] data onto one of the HCCs.[24] We present a crosswalk of CCW flags to HCCs in Appendix A. HCCs were ranked from highest to lowest risk according to the HCC community risk score. The presence of three select disease combinations was ranked as the highest risk. For example, patients with both congestive heart failure (CHF) and chronic obstructive pulmonary disease (COPD) (identified as CHF*COPD patients) were ranked with a higher severity score than patients having a single condition. The other two interacted conditions include diabetes and CHF (DIABETES*CHF), and CHF and renal failure (CHF*RENAL).

For patients who do not have these three disease interaction categories, a patient's 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 most severe manifestation among related diseases, based on the community risk score.[25] Therefore, in order create a mutually exclusive primary chronic condition for each patient, patients are not included in all of their chronic condition categories.

The HCC community risk score is based on the presence of a diagnosed condition, absent other comorbidities. For example, COPD has a risk score of 0.388, diabetes has a risk score of 0.124, and depression has a risk score of 0.318. A patient with all of these conditions is assigned a primary chronic condition of COPD, which has the highest risk-score. This patient episode will not be included in the diabetes or depression analyses.

[23] CCW flags are determined by CMS through a series of algorithms that investigate patient diagnoses on claims within the last year. Each chronic condition has its own algorithm.

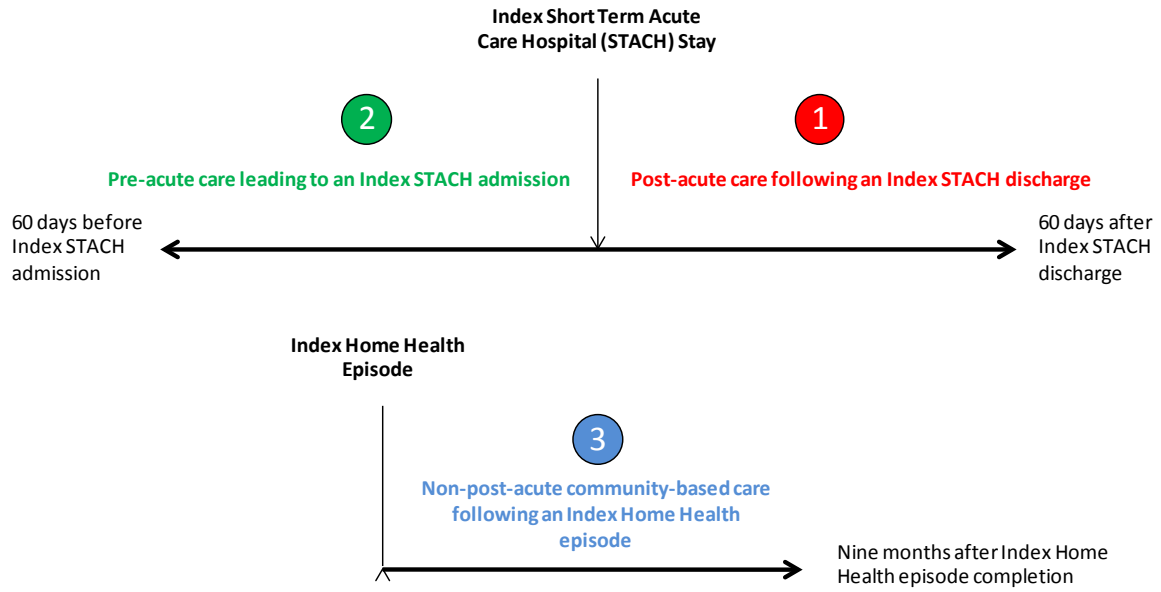
[24] HCCs are used in the Medicare Advantage program to adjust capitated payments for health expenditure risk of their enrollees. The HCC model controls for patient demographics as well as clinical comorbidities present within the last year of Medicare claims.

[25] The severity of a patient's diseases is determined using the community factors of the HCC model (as opposed to the institutionalized factors). The risk scores for the community model, which are presented in the 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 (dated February 19, 2010).

RELATIONSHIP BETWEEN EPISODE TYPES

Exhibit A.2 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).

Exhibit A.2: Relationship between Episode Types



Using the descriptive analyses for varying fixed-length episodes as a guide (data not presented in this report series), we determined that a 60-day episode for the pre- and post-acute care episodes was the most appropriate. It was important that the episode length captured a substantial amount of care related to the index stay, while limiting health care utilization that was unrelated to this stay. Within the non-post-acute care community-based episode, however, the episode length was selected to ensure that care was captured for a significant amount of time following any additional home health admissions.

In this working paper, we present descriptive statistics for the post-acute and pre-acute care episodes for a fixed-length of 60 days surrounding the index acute care hospitalization. Descriptive statistics for the non-post-acute care community-based episode are presented for nine months following discharge from the first community initiated home health episode.

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 with less than 11 individuals are suppressed, per our data use agreement with CMS.

Summary of Findings

This working paper presents a longitudinal look at Medicare administrative claims data in three different episode configurations that have not previously been provided to the public. As provisions of the Affordable Care Act are being designed and implemented, an understanding of how patients currently receive care within different care settings is critical. In the short term, we hope this working paper and the working paper series informs providers and third parties of different ways Medicare can benefit from clinically appropriate and cost-effective placement of its beneficiaries.

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. These episodes show numerous possibilities for clinically-appropriate use of home health care that moderates the use of more expensive facility-based care after patients leave the acute care hospital.

- About 55 percent of Medicare fee-for-service expenditures are captured within the index acute care hospitalizations and the 60 days of subsequent care.

Distribution of Care Settings

- Over one-half (54.0 percent) of episodes result in discharge to the "Community" from the index acute care hospitalization, meaning that the patient returns home without being admitted to a formal care setting (e.g., inpatient-based or home health). Another 16.3 percent of episodes are discharged directly to a SNF as the first setting, and 12.4 percent of episodes are discharged to an HHA as the first setting.

- The average Medicare episode payment varies significantly by first setting, ranging from $14,081 for Community first setting episodes to $86,334 for LTCH first setting episodes. The average Medicare episode payment across all first settings is $18,965, only slightly lower than the average Medicare episode payment for HHA first setting episodes ($19,920).

- Other than Medicare payments to the acute care hospital and to physicians, the largest proportion of Medicare episode payments are allocated to the first setting the patient enters following discharge from the index acute care hospitalization. For example, home health represents the largest proportion of Medicare episode payments within HHA first setting episodes (12.9 percent).

MS-DRGs

- The top 20 percent of MS-DRGs (n=148), ranked by total Medicare episode payments, comprise 77.5 percent of all episodes. There is slight variation in the proportion of these top MS-DRGs represented by first setting, ranging from 73.6 percent for No Care first setting episodes to 83.5 percent for Other IP first setting episodes. For HHA first setting episodes, the top 20 MS-DRGs represent 78.3 percent of all episodes.

Patient Demographics

- Females are more likely to be admitted to formal care settings as a first setting (i.e., inpatient care and home health) than are males.

- The distribution of ethnicity varies by first setting. For example, African Americans are over-represented in LTCH and ER first setting episodes (17.1 percent and 16.5 percent of first setting episodes, respectively) and are under-represented in SNF first setting episodes (representing only 7.9 percent of all SNF first setting episodes).

- The average Medicare episode payment for HHA first setting episodes varies by ethnicity, and ranges from $19,581 for Caucasians to $24,873 for Asians (excluding Unknown ethnicity).

Pre-Acute Care Episodes

Pre-acute care episodes are clinically defined by the patient's primary chronic condition. Primary chronic conditions are hierarchically ordered using Medicare Advantage payment weights for HCCs (see Methods). These episodes show the relative mix of services and Medicare episode payments provided to patients prior to the index acute care hospitalization.

- About 38 percent of Medicare fee-for-service expenditures are captured within the index acute care hospitalization and the 60 days of prior care. (Note that the post-acute and pre-acute care episodes both include Medicare payments for the index acute care hospitalization, and, therefore, are not additive).

Distribution of Care Settings

- Formal post-acute care settings (home health, SNFs, IRFs, and LTCHs) only represent 2.3 percent of total Medicare episode payments in pre-acute care episodes.

- More than 70 percent of all Medicare episode payments allocated to home health care occur in episodes with a primary chronic condition of CHF*COPD[26] (39.8 percent), DIABETES*CHF[27] (17.4 percent), and Osteoporosis (13.4 percent).

Chronic Conditions

- On average, patients with pre-acute care episodes have 5.1 chronic conditions. The most prevalent chronic conditions include: ischemic heart disease (65.4 percent of episodes), heart failure (50.6 percent), diabetes (43.9 percent), and chronic kidney disease (41.7 percent). Given the clinical complexity of the patients represented in our episodes, it is difficult to determine which chronic condition(s) are responsible for the index acute care hospitalization.

- CHF*COPD is the most prevalent primary chronic condition, represented by 24.9 percent of all pre-acute care episodes.

- Within primary chronic conditions, there is a correlation between the number of chronic conditions per episode and the average Medicare episode payment – as the number of chronic conditions increases, so does the average Medicare episode payment. However, across all primary chronic conditions, the average number of chronic conditions is not related to overall average Medicare episode payments. For example, the average colorectal cancer episode has relatively few comorbid chronic conditions (2.9 compared to the overall average of 5.1) but a relatively high average Medicare episode payment ($17,876 compared to the overall average payment of $13,277).

Non-Post-Acute Care Community-Based Episodes

Non-post-acute care community-based episodes are also 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.

- While non-post-acute care community-based episodes capture nine months of care, they only represent approximately 12 percent of Medicare fee-for-service

[26] Primary chronic condition of CHF*COPD is the interaction of congestive heart failure (CHF) and chronic obstructive pulmonary disease (COPD).

[27] Primary chronic condition of DIABETES*CHF is the interaction of diabetes and CHF.

expenditures, compared to the approximately 55 percent of Medicare fee-for-service expenditures captured in the 60-day post-acute care episodes. This suggests that index acute care hospitalizations and the first 60 days of subsequent care is a large driver of Medicare fee-for-service payments.

Distribution of Care Settings

- Medicare payments are more evenly distributed across care settings in non-post-acute care community-based episodes than in either post-acute or pre-acute care episodes.
    - Only 44.1 percent of Medicare episode payments are associated with hospital admissions (index or other) or physician services. This compares to 91.8 percent of all Medicare episode payments that were associated with these services in the pre-acute care episodes, and 76.5 percent of all Medicare episodes payments in the post-acute care episodes.
    - Home health care represents 28.9 percent of Medicare episode payments in non-post-acute care community-based episodes, compared to just 3.2 percent in the post-acute care episodes and 0.4 percent in pre-acute care episodes.

Chronic Conditions

- The proportion of total Medicare episode payments allocated to home health varies by primary chronic condition and ranges from 17.5 percent for lung cancer to 58.3 percent for diabetes. The high proportion of Medicare episode payments allocated to home health for lower-severity primary chronic conditions suggests that patients are able to remain stable in their homes without being admitted to expensive facility-based care settings.
- On average, patients in non-post-acute care community-based episodes have 5.6 chronic conditions, slightly higher than the patients represented in the pre-acute care episodes (5.1). Almost one-half of episodes contain diabetes (47.3 percent), which often presents with ischemic heart disease (74.5 percent of episodes with diabetes), heart failure (63.2 percent), rheumatoid arthritis/osteoarthritis (56.9 percent), and chronic kidney disease (47.9 percent).
- Home health episode payments are relatively consistent within primary chronic conditions categories regardless of the number of chronic conditions. However, as the number of chronic conditions contained in the primary chronic condition episode decreases, home health represents a larger proportion of the overall episode payment. This suggests that home health may serve as the primary care setting for episodes with less complex conditions, such as diabetes and glaucoma.

Benchmarking

We conducted calibration tests to ensure that the number of episodes and proportion of Medicare episode payments they represent approximated known benchmarks from similar analyses. For this purpose only, we present 30-day fixed-length post-acute care episodes (a variation of Episode Type 1). We extrapolated them to the universe of Medicare beneficiaries, in order to determine the extent to which our episode construction approximated an earlier analysis conducted by RTI International.[28]

Across all three years of data (2007-2009), our working dataset contains more than 26 million post-acute care episodes.[29] Episodes are allocated to a year based on the date of discharge from the index acute care hospitalization. In 2007 and 2008, there are approximately 9 million patient episodes in each year. These episodes represent approximately 45 percent of all Medicare fee-for-service expenditures in those years (Exhibit B.1). That is, the care provided to a patient during an index acute care hospitalization and the subsequent 30 days across all care settings represents slightly less than one-half of all Medicare fee-for-service payments.

We only considered completed episodes in our study, so there are fewer episodes in 2009. Therefore, the last patient episode included in our analysis would be a patient discharge from the hospital on November 30, 2009. As a result, the estimated 41.2 percent of Medicare payments that these episodes represent is likely underestimated. Thus, the number of episodes for 2009 is not a complete count.

[28] As noted in the methods, we developed 60-day fixed-length episodes for our descriptive statistics. The 30-day fixed-length episodes were created only for the benchmarking analyses.

[29] Descriptive statistics were calculated on three years of data to eliminate sample size constrictions.

Exhibit B.1: Total Number of Episodes and Medicare Episode Paid for 30-Day Fixed-Length Post-Acute Episodes Over Three Years (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	9,013,440	$134,201,066,580	$299,900,000,000	44.7%
2008	9,173,740	$143,888,333,620	$308,300,000,000	46.7%
2009	8,066,760	$133,956,518,820	$325,400,000,000	41.2%
Total	**26,253,940**	**$412,045,919,020**	**n/a**	**n/a**

Source: Dobson | DaVanzo analysis of research-identifiable 5% SAF for all sites of service, 2007-2009.
[a] Episode payments exclude beneficiary copayments.
[b] Congressional Budget Office, March Baselines for Medicare, 2008-2010.
Note: All episodes have been extrapolated to reflect the universe of Medicare beneficiaries.

RTI International created similar patient episodes using 2006 data.[30] Despite the difference in the number of episodes and years of data included in the studies, as shown in Exhibit B.2, the two analyses have a similar distribution of episodes by the first post-acute care setting following discharge from the index acute care hospitalization (as presented by the "percent of episode" columns). Of the patients that enter facility- or home-based care settings following the index acute care hospitalization, approximately one-half of the patient episodes are admitted to a SNF and 38 percent are admitted to home health. This compares to approximately 45 percent of episodes admitted to a SNF and 41 percent admitted to home heath in RTI International's analysis. The remaining 11 percent of patient episodes in our analysis are admitted to IRFs or LTCHs, compared to 13 percent of RTI's patient episodes.

The reason for the slight discrepancy in the distribution of first post-acute care settings following discharge from the index acute care hospitalization between the RTI International and Dobson | DaVanzo analyses may be the length of the "clean period" needed before the index acute care hospitalization. The RTI International analysis requires a 60-day "clean period" with no facility-based care or home health prior to the index acute care hospitalization, while our analysis only requires a 15-day "clean period" of no facility-based care or home health. We chose to use a 15-day "clean period" rather than a 60-day period to maximize the number of episodes in our analyses, while limiting the number of hospital readmissions that could be identified as "index" stays.

[30] Gage B, Morley M, Spain P, Ingber M. (2009). Examining post acute care relationships in an integrated hospital system: Final report. Prepared for the Assistant Secretary of Planning and Evaluation, U.S. Department of Health and Human Services. (Waltham, MA: RTI International).

Exhibit B.2: Comparison of Distribution of 30-Day Fixed-Length Post-Acute Episodes Defined by First Setting between RTI (2006) and Dobson | DaVanzo (2007-2009)

	RTI Episode PAC Distribution[a]		Dobson | DaVanzo Episode PAC Distribution	
First Setting	Number of Episodes	Percent of Episodes	Number of Episodes	Percent of Episodes
HHA	40,865	41.2%	3,227,220	38.4%
SNF	44,929	45.3%	4,269,420	50.9%
IRF	11,240	11.3%	731,840	8.7%
LTCH	2,235	2.3%	165,320	2.0%
Total	**99,269**	**100%**	**8,393,800**	**100%**

Source: Dobson | DaVanzo analysis of research-identifiable 5% SAF for all sites of service, 2007-2009.
[a] Gage B, Morley M, Spain P, Ingber M. (2009). Examining post acute care relationships in an integrated hospital system: Final report. Prepared for the Assistant Secretary of Planning and Evaluation, U.S. Department of Health and Human Services. (Waltham, MA: RTI International).

In the following three chapters, we present descriptive statistics for each of the three episodes types we developed for the study:

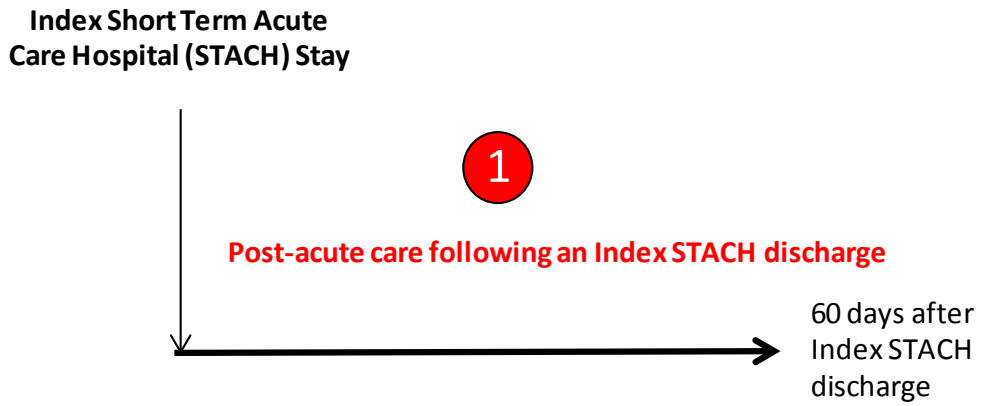
- Episode Type 1: 60-day fixed-length episodes for home health as a post-acute care provider
- Episode Type 2: 60-day fixed-length episodes for home health as a pre-acute care provider
- Episode Type 3: Nine-month fixed-length episodes for home health as a non-post-acute care community-based provider

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

Brief Review of Episode Definition

Initiated by an index acute care hospital stay, Episode Type 1 captures all post-acute care (facility- and non-facility-based) that patients receive following a short-term acute care hospital (STACH) 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



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 post-acute setting; episodes often contain care from several different care 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
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 expenditure data presented for the 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.

Episode Type 1: Post-Acute Episodes

Across all three years (2007-2009), there are 25,560,960 total post-acute care episodes and a total of $484.8 billion in Medicare payments. In 2007 and 2008, the nine million post-acute care episodes each represent about 55 percent of total Medicare fee-for-service spending in those years. There are fewer episodes in 2009, due to data run-off. That is, 60-day fixed-length episodes could not be created for index acute care hospital discharges occurring after October 31, 2009 (i.e., episodes that begin in November and December of 2009). Therefore, the completed post-acute care episodes in our working dataset for 2009 represent only 45.6 percent of total Medicare expenditures. Exhibit 1.3 shows the total number of Type 1 episodes and Medicare payments for Type 1 episodes by year.

Exhibit 1.3: Total 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	9,013,440	$162,160,379,400	$299,900,000,000	54.1%
2008	9,173,740	$174,351,401,340	$308,300,000,000	56.6%
2009	7,373,780	$148,247,979,400	$325,400,000,000	45.6%
Total	**25,560,960**	**$484,759,760,140**	**n/a**	**n/a**

Source: Dobson | DaVanzo analysis of research-identifiable 5% SAF for all sites of service, 2007-2009.
[a] Episode payments exclude beneficiary co-payments.
[b] Congressional Budget Office, March Baselines for Medicare, 2008-2010.
Note: All episodes have been extrapolated to reflect the universe of Medicare beneficiaries.

Descriptive Statistics by First Setting

Exhibit 1.4A shows the distribution of episodes and Medicare payments by first setting. More than one-half of the post-acute care episodes (54.0 percent) include community discharges from the index acute care hospitalization, which were followed by physician or outpatient visits prior to any other care ("Community" first setting). These episodes represent 40.1 percent of total Medicare episode payments.

Approximately 16 percent (16.3 percent) of patients in post-acute care episodes are admitted to a SNF following the index acute care hospital discharge, and represent 24.4 percent of Medicare episode payments. HHA episodes are the next largest post-acute first setting, representing 12.4 percent of episodes and 13.0 percent of Medicare episode payments. Almost 6 percent (5.8 percent) of episodes are discharged directly to the community and received no facility- or non-facility-based care during the episode (No Care).

While only 2.7 percent of all episodes have a hospital readmission prior to receiving post-acute care from any other setting (STACH first setting), readmissions can occur following discharge from any other first setting. The proportion of STACH first setting episodes

appears to be low because many patients typically have a physician or outpatient visit prior to their rehospitalization, therefore are categorized as a first setting of Community.[31]

The average Medicare episode payment varies across first settings: LTCH first setting episodes have the highest average payment ($86,334), while Community first setting episodes have the lowest average payment ($14,081) (including No Care episodes). Medicare payments for episodes characterized as HHA first setting ($19,920) are the lowest of all formal post-acute care settings (HHA, SNF, IRF, LTCH), and are only slightly higher than the overall average ($18,965). Note that Medicare episode payments in Episode Type 1 include the index acute care hospitalization.

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

First Setting	Episodes	Percent of Total Episodes	Medicare Episode Paid[a]	Percent Paid	Average Medicare Episode Paid
HHA	3,173,680	12.4%	$63,220,845,940	13.0%	$19,920
SNF	4,157,400	16.3%	$118,252,828,220	24.4%	$28,444
IRF	713,040	2.8%	$30,489,702,460	6.3%	$42,760
LTCH	163,160	0.6%	$14,086,230,680	2.9%	$86,334
STACH	692,880	2.7%	$19,945,282,960	4.1%	$28,786
Community	13,807,040	54.0%	$194,410,248,800	40.1%	$14,081
ER	766,460	3.0%	$12,057,363,720	2.5%	$15,731
Hospice	506,560	2.0%	$8,643,495,900	1.8%	$17,063
Other IP	104,560	0.4%	$2,387,316,780	0.5%	$22,832
No Care[b]	1,476,180	5.8%	$21,266,444,660	4.4%	$14,406
Total	**25,560,960**	**100.0%**	**$484,759,760,120**	**100.0%**	**$18,965**

Source: Dobson | DaVanzo analysis of research-identifiable 5% SAF for all sites of service, 2007-2009.
[a] Episode payments exclude beneficiary co-payments.
[b] Episodes include deaths during index admission.
Note: All episodes have been extrapolated to reflect the universe of Medicare beneficiaries.

Exhibit 1.4B shows the distribution of episodes and Medicare payments only for the formal first post-acute care settings. Approximately one-third of all patients in post-acute care episodes are admitted a formal setting following the index acute care hospital discharge. Of these patients, 38.7 percent of episodes are discharged to HHA as a first setting, and represent 27.8 percent of Medicare episode payments. SNF first setting episodes represent approximately one-half of these episodes (50.7 percent) and Medicare episode payments (52.3 percent). IRF first setting episodes represent 8.7 percent of formal first setting episodes but represent 13.6 percent of Medicare episode payments. LTCH first setting episodes remain a small proportion of all first setting episodes and represent 2.0 percent of episodes but 6.3 percent of Medicare episode payments.

[31] We will further investigate the role of readmissions across first setting episodes in Working Paper #4.

Episode Type 1: Post-Acute Episodes

HHA first setting episodes have the lowest average Medicare episode payment of all formal first settings ($20,345 compared to the overall average of $28,294). The average Medicare episode payment for SNF first setting episodes approximates that overall average ($29,218), while IRF and LTCH first setting episodes are significantly higher than the overall average Medicare episode payment for these settings ($44,193 and $89,869, respectively).

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

First Setting	Episodes	Percent of Total Episodes	Medicare Episode Paid[a]	Percent Paid	Average Medicare Episode Paid
HHA	3,005,900	38.7%	$61,155	27.8%	$20,345
SNF	3,938,080	50.7%	$115,064	52.3%	$29,218
IRF	675,840	8.7%	$29,867	13.6%	$44,193
LTCH	154,480	2.0%	$13,883	6.3%	$89,869
Total	**7,774,300**	**100%**	**$219,969**	**100.0%**	**$28,294**

Source: Dobson | DaVanzo analysis of research-identifiable 5% SAF for all sites of service, 2007-2009.
[a] Episode payments exclude beneficiary co-payments.
Note: All episodes have been extrapolated to reflect the universe of Medicare beneficiaries.

Top MS-DRGs by First Setting

The top 20 percent of MS-DRGs (n=148) ranked by total Medicare episode payments, represent 77.5 percent of all episodes, and 77.2 percent of total Medicare episode payments (Exhibit 1.5; total row). These top MS-DRGs represent between 73.6 percent (No Care) and 83.5 percent (Other IP) of Type 1 episodes initiated within each first setting. This finding suggests that the majority of top 148 MS-DRGs are treated across all first settings.

The top 20 percent of overall MS-DRGs by total Medicare episode payments represent 78.3 percent of episodes and 76.5 percent of Medicare episode payments among HHA first setting episodes. Some settings, however, represent a disproportionate number of episodes, relative to the Medicare episode payments. For example, the top 20 percent of MS-DRGs by total Medicare episode payments represent 77.7 percent of LTCH first setting episodes, but 82.6 percent of LTCH first setting Medicare episode payments.

Exhibit 1.5: Percent of Episodes and Medicare Episode Paid by First Setting Represented by Top 20 Percent of MS-DRGs by Medicare Episode Paid (N=148) for 60-Day Fixed-Length Post-Acute Episodes (2007-2009)

First Setting	Episodes in Top 20 Percent of MS-DRGs	Percent of Episodes	Medicare Episode Paid[a]	Percent Medicare Episode Paid
HHA	2,486,480	78.3%	$48,380,133,920	76.5%
SNF	3,372,480	81.1%	$94,427,071,300	79.9%
IRF	582,880	81.7%	$24,013,207,200	78.8%
LTCH	126,760	77.7%	$11,639,615,680	82.6%
STACH	538,660	77.7%	$15,275,902,500	76.6%
Community	10,578,880	76.6%	$146,737,214,720	75.5%
ER	569,520	74.3%	$9,019,097,880	74.8%
Hospice	384,960	76.0%	$6,488,756,860	75.1%
Other IP	87,340	83.5%	$1,939,706,320	81.3%
No Care[b]	1,086,180	73.6%	$16,403,205,280	77.1%
Total	**19,814,140**	**77.5%**	**$374,323,911,800**	**77.2%**

Source: Dobson | DaVanzo analysis of research-identifiable 5% SAF for all sites of service, 2007-2009.
[a] Episode payments exclude beneficiary co-payments.
[b] Episodes include deaths during index admission.
Note: All episodes have been extrapolated to reflect the universe of Medicare beneficiaries.

Episode Type 1: Post-Acute Episodes

The proportion of episodes and Medicare payments by top MS-DRGs are relatively similar when analyzing the setting-specific top 20 percent of MS-DRGs by total episode payments (Exhibit 1.6). The top 20 percent of MS-DRGs within each first setting range from 68 to 147 MS-DRGs.

The setting-specific top 20 percent of MS-DRGs range from 71.6 percent to 85.0 percent of episodes across first settings. The top 20 percent of MS-DRGs for HHA first setting episodes (n=144) represent 78.2 percent of HHA first setting episodes, and 77.3 percent of Medicare episode payments. The proportion of episodes and Medicare episode payments are similar to those calculated based on the overall top 20 percent of MS-DRGs (Exhibit 1.5). LTCH first setting episodes represent a disproportionate amount of Medicare episode payments (78.7 percent of episodes represent 84.8 percent of Medicare episode payments). This suggests that the top MS-DRGs among LTCH first setting episodes are of proportionately higher intensity and expense than the remaining MS-DRGs in this first setting.

Exhibit 1.6: Percent of Episodes and Medicare Episode Paid by First Setting Represented by Setting-Specific Top 20 Percent of MS-DRGs by Medicare Episode Paid for 60-Day Fixed-Length Post-Acute Episodes (2007-2009)

First Setting	Number of Episodes	Number of MS-DRGs in Top 20 Percent	Episodes in Top 20 Percent of MS-DRGs	Percent of Episodes	Medicare Episode Paid[a]	Medicare Episode Paid for Top 20 Percent of MS-DRGs	Percent Medicare Episode Paid
HHA	3,173,680	144	2,480,640	78.2%	$63,220,845,780	$48,843,458,140	77.3%
SNF	4,157,400	141	3,448,440	82.9%	$118,252,828,300	$96,756,202,920	81.8%
IRF	713,040	120	605,960	85.0%	$30,489,702,480	$25,908,151,060	85.0%
LTCH	163,160	100	128,360	78.7%	$14,086,230,560	$11,939,610,180	84.8%
STACH	692,880	138	495,840	71.6%	$19,945,282,880	$14,110,857,860	70.7%
Community	13,807,040	147	10,876,440	78.8%	$194,410,248,680	$148,764,524,500	76.5%
ER	766,460	139	593,960	77.5%	$12,057,363,700	$9,148,520,660	75.9%
Hospice	506,560	111	418,420	82.6%	$8,643,496,060	$7,096,027,240	82.1%
Other IP	104,560	68	88,560	84.7%	$2,387,316,900	$1,926,349,460	80.7%
No Care[b]	1,476,180	143	1,142,200	77.4%	$21,266,444,620	$17,752,469,560	83.5%
Total	**25,560,960**	**148**	**19,814,140**	**77.5%**	**$484,759,759,960**	**$374,323,911,800**	**77.2%**

Source: Dobson | DaVanzo analysis of research-identifiable 5% SAF for all sites of service, 2007-2009.
[a] Episode payments exclude beneficiary co-payments.
[b] Episodes include deaths during index admission.
Note: All episodes have been extrapolated to reflect the universe of Medicare beneficiaries.

Top MS-DRGs Across First Settings

Exhibit 1.7 shows the number of episodes and Medicare episode payments for the top 10 MS-DRGs ranked by total episode payments. The top 10 MS-DRGs represent 17.5 percent of episodes and 18.8 percent of Medicare episode payments. The top surgical MS-DRG in terms of Medicare episode payments – 470: major joint replacement or reattachment of lower extremity w/o MCC – represents 4.7 percent of total episodes and 5.5 percent of Medicare episode payments. The top medical MS-DRG – 871: Septicemia or severe sepsis w MCC – represents 1.7 percent of total episodes and 2.1 percent of Medicare episode payments. The average Medicare episode payment varies significantly by MS-DRG. While the overall average episode payment for the top 10 MS-DRGs is $20,394, average episode payments range from $9,656 to $178,353.

Exhibit 1.7: Top 10 MS-DRGs (1.4 Percent of Total MS-DRGs) by Medicare Episode Paid for 60-Day Fixed-Length Post-Acute Episodes (2007-2009)

MS-DRG	Medical/ Surgical Designation	Number of Episodes	Percent of Episodes	Medicare Episode Paid[a]	Percent Medicare Episode Paid	Average Medicare Episode Paid
470: Major joint replacement or reattachment of lower extremity w/o MCC	Surgical	1,190,840	4.7%	$26,502,692,280	5.5%	$22,255
871: Septicemia or severe sepsis w/o MV 96+ hours w MCC	Medical	444,600	1.7%	$10,158,883,840	2.1%	$22,849
291: Heart failure & shock w MCC	Medical	379,540	1.5%	$7,946,931,720	1.6%	$20,938
003: ECMO or trach w MV 96+ hrs or PDX exc face, mouth & neck w maj O.R.	Surgical	41,620	0.2%	$7,423,053,340	1.5%	$178,353
194: Simple pneumonia & pleurisy w CC	Medical	541,380	2.1%	$7,373,456,320	1.5%	$13,620
292: Heart failure & shock w CC	Medical	404,220	1.6%	$6,570,967,180	1.4%	$16,256
481: Hip & femur procedures except major joint w CC	Surgical	204,520	0.8%	$6,507,917,140	1.3%	$31,820
065: Intracranial hemorrhage or cerebral infarction w CC	Medical	264,480	1.0%	$6,301,440,820	1.3%	$23,826
247: Perc cardiovasc proc w drug-eluting stent w/o MCC	Surgical	358,980	1.4%	$6,249,651,540	1.3%	$17,409
392: Esophagitis, gastroent & misc digest disorders w/o MCC	Medical	644,780	2.5%	$6,226,031,620	1.3%	$9,656
Subtotal (Top 10 MS-DRGs)		**4,474,960**	**17.5%**	**$91,261,025,800**	**18.8%**	**$20,394**
Other		21,086,000	82.5%	$393,498,734,160	81.2%	**$18,662**
Total		**25,560,960**	**100.0%**	**$484,759,759,960**	**100.0%**	**$18,965**

Source: Dobson | DaVanzo analysis of research-identifiable 5% SAF for all sites of service, 2007-2009.
[a] Episode payments exclude beneficiary co-payments.
Note: All episodes have been extrapolated to reflect the universe of Medicare beneficiaries.

Episode Type 1: Post-Acute Episodes

Exhibit 1.8 shows the number of episodes and Medicare episode payments for the top 10 MS-DRGs within HHA first setting episodes. Five of the 10 top MS-DRGs in the HHA first setting episodes are also in the top ten overall MS-DRGs (Exhibit 1.7). The top 10 MS-DRGs represent 24.8 percent of the total number of HHA first setting episodes, and 24.5 percent of total Medicare payments for these episodes. The top surgical MS-DRG – 470: major joint replacement or reattachment of lower extremity w/o MCC – is the top surgical MS-DRG within HHA first setting episodes and represents 12.1 percent of total episodes and 10.6 percent of Medicare episode payments. The top medical MS-DRG – 291: heart failure and shock w/ MCC – represents 1.8 percent of both episodes and Medicare episode payments. In both Exhibit 1.7 and 1.8, there is a large difference in the proportion of total episodes and Medicare episode payments between the first and second ranked MS-DRG (by total Medicare episode payments). The overall average Medicare episode payment for the top 10 HHA first setting MS-DRGs is $19,678, while individual MS-DRGs within the top 10 range from $14,171 to $39,685 (which include the index acute care hospital stay).

Exhibit 1.8: Top 10 MS-DRGs (1.4 Percent of Total MS-DRGs) by Medicare Episode Paid for Episodes Defined by HHA First Setting for 60-Day Fixed-Length Post-Acute Episodes (2007-2009)

MS-DRG	Medical/ Surgical Designation	Number of Episodes	Percent of Episodes	Medicare Episode Paid[a]	Percent of Medicare Episode Paid	Average Medicare Episode Paid
470: Major joint replacement or reattachment of lower extremity w/o MCC	Surgical	384,580	12.1%	$6,708,877,280	10.6%	$17,445
291: Heart failure & shock w MCC	Medical	57,480	1.8%	$1,138,972,020	1.8%	$19,815
292: Heart failure & shock w CC	Medical	68,200	2.1%	$1,124,800,940	1.8%	$16,493
234: Coronary bypass w cardiac cath w/o MCC	Surgical	26,920	0.8%	$1,024,408,880	1.6%	$38,054
330: Major small & large bowel procedures w CC	Surgical	35,280	1.1%	$967,160,560	1.5%	$27,414
329: Major small & large bowel procedures w MCC	Surgical	24,280	0.8%	$963,563,400	1.5%	$39,685
871: Septicemia or severe sepsis w/o MV 96+ hours w MCC	Medical	41,920	1.3%	$961,600,660	1.5%	$22,939
194: Simple pneumonia & pleurisy w CC	Medical	66,360	2.1%	$940,356,580	1.5%	$14,171
460: Spinal fusion except cervical w/o MCC	Surgical	30,800	1.0%	$931,285,660	1.5%	$30,237
293: Heart failure & shock w/o CC/MCC	Medical	52,660	1.7%	$754,717,580	1.2%	$14,332
Subtotal (Top 10 MS-DRGs)		**788,480**	**24.8%**	**$15,515,743,560**	**24.5%**	**$19,678**
Other		2,385,200	75.2%	$47,705,102,220	75.5%	**$20,000**
Total		**3,173,680**	**100.0%**	**$63,220,845,780**	**100.0%**	**$19,920**

Source: Dobson | DaVanzo analysis of research-identifiable 5% SAF for all sites of service, 2007-2009.
[a] Episode payments exclude beneficiary co-payments.
Note: All episodes have been extrapolated to reflect the universe of Medicare beneficiaries.

Distribution of Medicare Episode Payments to Providers

The distribution of Medicare episode payments across providers varies by first setting (Exhibit 1.9). Across all episodes and first settings, almost two-thirds (63.0 percent) of the total Medicare episode payment is comprised of the index acute care hospital stay and subsequent readmissions (STACH), ranging from 33 percent to 76 percent across first settings (excluding No Care episodes). Almost 14 percent of Medicare episode payments are allocated to physician visits, which range from 10 percent to 16 percent across first settings. These physician visits occur during the index acute care hospitalizations as well as after index acute care hospital discharge. Of the total Medicare episode payment for HHA first setting episodes, two-thirds (66.7 percent) is allocated to acute care hospitals either for the index stay or for a readmission. Almost 13 percent of total episode payments are allocated to home health agencies, while 14 percent is allocated to physicians. Among SNF first setting episodes, almost 47 percent of Medicare episode payments are allocated to acute care hospitals while 36.6 percent of payments are allocated to SNFs. Within the No Care episodes, 87.8 percent of the Medicare episode payment is for acute care hospital services, while 11.5 percent is for physician services during the hospitalization and 0.6 percent is for outpatient and emergency room visits (0.3 percent each).

Exhibit 1.9: All MS-DRGs – Number and Percent of Episodes and Percent Medicare Episode Paid by First Setting for 60-Day Fixed-Length Post-Acute Episodes (2007-2009)

First Setting	Number of Episodes	% of Episodes	% Paid for STACH[a]	% Paid for HHA	% Paid for SNF[a]	% Paid for IRF[a]	% Paid for LTCH[a]	% Paid for Physician[a]	% Paid for OP[a]	% Paid for ER[a]	% Paid for Hospice[a]	% Paid for Other IP[a]
HHA	3,173,680	12.4%	66.7%	12.9%	2.0%	0.6%	0.4%	14.1%	2.3%	0.5%	0.5%	0.1%
SNF	4,157,400	16.3%	46.7%	2.9%	36.6%	0.4%	0.4%	10.6%	1.2%	0.4%	0.6%	0.2%
IRF	713,040	2.8%	39.4%	4.1%	5.5%	38.8%	0.4%	10.4%	1.0%	0.2%	0.2%	0.1%
LTCH	163,160	0.6%	44.1%	0.6%	2.8%	1.2%	40.2%	10.2%	0.5%	0.1%	0.2%	0.0%
STACH	692,880	2.7%	76.3%	1.4%	4.2%	1.4%	1.0%	12.3%	1.8%	0.7%	0.6%	0.3%
Community	13,807,040	54.0%	72.7%	1.0%	1.8%	1.1%	0.6%	16.3%	5.2%	0.7%	0.4%	0.3%
ER	766,460	3.0%	70.1%	1.4%	2.4%	0.5%	0.5%	15.6%	3.4%	4.5%	0.5%	1.2%
Hospice	506,560	2.0%	61.4%	0.1%	1.2%	0.1%	0.2%	10.7%	0.5%	0.3%	25.4%	0.1%
Other IP	104,560	0.4%	33.5%	1.0%	6.7%	0.3%	0.3%	11.9%	1.4%	0.8%	0.3%	43.8%
No Care[b]	1,476,180	5.8%	87.8%	0.0%	0.0%	0.0%	0.0%	11.5%	0.3%	0.3%	0.0%	0.0%
Overall	**25,560,960**	**100.0%**	**63.0%**	**3.2%**	**10.6%**	**3.2%**	**1.6%**	**13.5%**	**2.9%**	**0.6%**	**0.9%**	**0.4%**

Source: Dobson | DaVanzo analysis of research-identifiable 5% SAF for all sites of service, 2007-2009.
[a] Episode payments exclude beneficiary co-payments.
[b] Episodes include deaths during index admission.
Note: All episodes have been extrapolated to reflect the universe of Medicare beneficiaries.

Episode Type 1: Post-Acute Episodes

Within HHA first setting episodes, the distribution of total Medicare episode payments varies by MS-DRG (Exhibit 1.10). Across the top 10 MS-DRGs for HHA first setting episodes, 67.9 percent of Medicare episode payments are allocated to the index acute care hospitalization and readmissions (STACH). About 14.1 percent of Medicare episode payments are allocated to home health agencies, and 13.5 percent are allocated to physicians. The MS-DRGs in which home health receives its largest proportion of Medicare payments relative to other post-acute settings are MS-DRG 470 (major joint replacement or reattachment of lower extremity) and 194 (simple pneumonia & pleurisy), with 18.0 percent and 16.7 percent of total episode payments, respectively).

Exhibit 1.10: Top 10 MS-DRGs (1.4 Percent of Total MS-DRGs) – Number and Percent of Episodes and Percent Medicare Episode Paid for Episodes Defined by HHA First Setting for 60-Day Fixed-Length Post-Acute Episodes (2007-2009)

MS-DRG	Number of Episodes	% of Episodes	% Paid for STACH[a]	% Paid for HHA	% Paid for SNF[a]	% Paid for IRF[a]	% Paid for LTCH[a]	% Paid for Physician[a]	% Paid for OP[a]	% Paid for ER[a]	% Paid for Hospice[a]	% Paid for Other IP[a]
470: Major joint replacement or reattachment of lower extremity w/o MCC	384,580	12.1%	67.0%	18.0%	0.3%	0.1%	0.1%	12.6%	1.6%	0.2%	0.0%	0.0%
291: Heart failure & shock w MCC	57,480	1.8%	64.2%	12.6%	2.8%	0.7%	0.9%	14.5%	2.8%	0.5%	1.0%	0.0%
292: Heart failure & shock w CC	68,200	2.1%	62.6%	14.6%	3.6%	0.4%	0.7%	14.0%	2.1%	0.7%	1.1%	0.1%
234: Coronary bypass w cardiac cath w/o MCC	26,920	0.8%	79.3%	5.5%	0.3%	0.1%	0.1%	13.4%	0.8%	0.4%	0.0%	0.0%
330: Major small & large bowel procedures w CC	35,280	1.1%	71.3%	8.7%	0.6%	0.4%	0.3%	15.5%	2.6%	0.3%	0.3%	0.0%
329: Major small & large bowel procedures w MCC	24,280	0.8%	77.2%	6.5%	0.8%	0.2%	0.1%	13.3%	1.5%	0.3%	0.1%	0.0%
871: Septicemia or severe sepsis w/o MV 96+ hours w MCC	41,920	1.3%	67.0%	11.8%	2.0%	0.5%	0.7%	14.2%	2.7%	0.5%	0.8%	0.0%
194: Simple pneumonia & pleurisy w CC	66,360	2.1%	59.7%	16.7%	4.0%	0.6%	0.9%	14.3%	2.1%	0.7%	0.9%	0.1%
460: Spinal fusion except cervical w/o MCC	30,800	1.0%	74.4%	8.4%	0.6%	0.3%	0.2%	15.4%	0.5%	0.2%	0.0%	0.0%
293: Heart failure & shock w/o CC/MCC	52,660	1.7%	62.3%	15.5%	4.3%	0.7%	0.2%	13.2%	2.0%	0.8%	0.9%	0.1%
Subtotal (Top 10 MS-DRGs)	**788,480**	**24.8%**	**67.9%**	**14.1%**	**1.3%**	**0.3%**	**0.3%**	**13.5%**	**1.8%**	**0.4%**	**0.3%**	**0.0%**
Other	2,385,200	75.2%	66.3%	12.5%	2.2%	0.7%	0.4%	14.3%	2.4%	0.6%	0.5%	0.1%
Overall	**3,173,680**	**100.0%**	**66.7%**	**12.9%**	**2.0%**	**0.6%**	**0.4%**	**14.1%**	**2.3%**	**0.5%**	**0.5%**	**0.1%**

Source: Dobson | DaVanzo analysis of research-identifiable 5% SAF for all sites of service, 2007-2009.

[a] Episode payments exclude beneficiary co-payments.

Note: All episodes have been extrapolated to reflect the universe of Medicare beneficiaries.

Distribution of Episodes by Patient Characteristics

Exhibit 1.11 shows the distribution of episodes by gender. About 60 percent of all episodes are for female patients, which represent 58.4 percent of total Medicare episode payments. About 40 percent of all episodes are for male patients, which represent 41.6 percent of total Medicare episode payments.

The episode distributions in this study are slightly different than national benchmarks. According to MedPAC, females represented 56 percent of Medicare beneficiaries and 56 percent of Medicare expenditures in 2006.[32] This difference could be attributed to the fact that our analyses are only capturing health care utilization and expenditures following an index acute care hospitalization, as opposed to all care.

Exhibit 1.11: Number and Percent of Episodes and Medicare Episode Paid by Gender for 60-Day Fixed-Length Post-Acute Episodes (2007-2009)

Gender	Number of Episodes	Percent of Episodes	Medicare Episode Paid[a]	Percent of Medicare Episode Paid	Average Medicare Episode Paid
Female	15,446,660	60.4%	$283,260,165,880	58.4%	$18,338
Male	10,114,300	39.6%	$201,499,594,240	41.6%	$19,922
Total	**25,560,960**	**100.0%**	**$484,759,760,120**	**100.0%**	**$18,965**

Source: Dobson | DaVanzo analysis of research-identifiable 5% SAF for all sites of service, 2007-2009.
[a] Episode payments exclude beneficiary co-payments.
Note: All episodes have been extrapolated to reflect the universe of Medicare beneficiaries.

We found gender differences in Medicare episode payments for HHA first setting patients (Exhibit 1.12). Females represent 64.1 percent of HHA first setting episodes, and 59.7 percent of Medicare episode payments for HHA first setting episodes. Males account for 35.9 percent of episodes but 40.3 percent of Medicare episode payments.

Exhibit 1.12: Number and Percent of Episodes and Medicare Episode Paid by Gender for Episodes Defined by HHA First Setting for 60-Day Fixed-Length Post-Acute Episodes (2007-2009)

Gender	Number of Episodes	Percent of Episodes	Medicare Episode Paid[a]	Percent of Episode Paid	Average Medicare Episode Paid
Female	2,034,440	64.1%	$37,728,872,560	59.7%	$18,545
Male	1,139,240	35.9%	$25,491,973,380	40.3%	$22,376
Total	**3,173,680**	**100.0%**	**$63,220,845,940**	**100.0%**	**$19,920**

Source: Dobson | DaVanzo analysis of research-identifiable 5% SAF for all sites of service, 2007-2009.
[a] Episode payments exclude beneficiary co-payments.
Note: All episodes have been extrapolated to reflect the universe of Medicare beneficiaries.

[32] Medicare Payment Advisory Commission. (2011). Chapter 2: Medicare beneficiary demographics. [Chart 2-5: Characteristics of the Medicare population, 2007]. In *Databook: Health care Spending and the Medicare Program*. (Washington, DC: MedPAC).

Episode Type 1: Post-Acute Episodes

The proportion of total male and female episodes represented in each first setting varies significantly, as well as the proportion of Medicare episode payments they represent. Exhibit 1.13 shows the proportion of episodes and Medicare episode payments by gender and by first setting. Three types of first setting episodes represent more than 81 percent of total episodes for both males and females – STACH, SNF, and HHA. The distribution of episodes and payments within these settings differs significantly by gender. For females, about one-half of all episodes (51.2 percent) return to the community and receive physician and outpatient care following acute care hospital discharge. An additional 19.2 percent have SNF as a first setting, and 13.2 percent enter HHA as the first setting. Males have a higher proportion of episodes that return directly to the community (58.2 percent) and a lower proportion of episodes that enter the SNF as the first setting (11.7 percent). The use of home health is similar among males and females. For both males and females, home health Medicare episode payments are proportionate to the utilization, whereas facility-based settings have higher Medicare episode payments in proportion to first setting utilization.

Exhibit 1.13: Number and Percent of Episodes and Medicare Episode Paid by First Setting by Gender for 60-Day Fixed-Length Post-Acute Episodes (2007-2009)

	Female				Male			
First Setting	Number of Episodes	Percent of Episodes	Medicare Episode Paid[a]	Percent Medicare Episode Paid	Number of Episodes	Percent of Episodes	Medicare Episode Paid[a]	Percent Medicare Episode Paid
HHA	2,034,440	13.2%	$37,728,872,560	13.3%	1,139,240	11.3%	$25,491,973,380	12.7%
SNF	2,969,920	19.2%	$81,721,792,820	28.9%	1,187,480	11.7%	$36,531,035,400	18.1%
IRF	469,560	3.0%	$19,156,126,260	6.8%	243,480	2.4%	$11,333,576,180	5.6%
LTCH	87,860	0.6%	$7,279,066,480	2.6%	75,300	0.7%	$6,807,164,220	3.4%
STACH	373,980	2.4%	$10,288,424,040	3.6%	318,900	3.2%	$9,656,858,920	4.8%
Community	7,916,100	51.2%	$103,265,601,660	36.5%	5,890,940	58.2%	$91,144,647,140	45.2%
ER	420,440	2.7%	$6,234,562,920	2.2%	346,020	3.4%	$5,822,800,800	2.9%
Hospice	319,900	2.1%	$5,336,488,540	1.9%	186,660	1.8%	$3,307,007,360	1.6%
Other IP	58,920	0.4%	$1,321,236,120	0.5%	45,640	0.5%	$1,066,080,660	0.5%
No Care[b]	795,540	5.2%	$10,927,994,500	3.9%	680,640	6.7%	$10,338,450,180	5.1%
Total	**15,446,660**	**100.0%**	**$283,260,165,880**	**100.0%**	**10,114,300**	**100.0%**	**$201,499,594,240**	**100.0%**

Source: Dobson | DaVanzo analysis of research-identifiable 5% SAF for all sites of service, 2007-2009.
[a] Episode payments exclude beneficiary co-payments.
[b] Episodes include deaths during index admission.
Note: All episodes have been extrapolated to reflect the universe of Medicare beneficiaries.

Exhibit 1.14 shows the distribution of episodes by patient ethnicity. Caucasian patients represent the vast majority of patient episodes with 84.4 percent of the episodes and 82.7 percent of the Medicare episode payments. African American patients represent 11.0 percent of episodes, but 12.1 percent of Medicare episode payments. Hispanic patients only represent 1.9 percent of total episodes and 2.2 percent of Medicare episode payments. On average, non-Caucasian patients have a higher average Medicare episode payment than Caucasian patients.

This distribution is somewhat different than the absolute distribution of Medicare enrollees by ethnicity.[33] That is, Caucasian patients comprise 78 percent of Medicare enrollees, African American patients comprise 10 percent, and Hispanic patients comprise 8 percent. Our findings suggest that Caucasian Medicare patients are over-represented in episodes, while Hispanic patients are under-represented.

Exhibit 1.14: Number and Percent of Episodes and Medicare Episode Paid by Ethnicity for 60-Day Fixed-Length Post-Acute Episodes (2007-2009)

Ethnicity	Number of Episodes	Percent of Episodes	Medicare Episode Paid[a]	Percent Medicare Episode Paid	Average Medicare Episode Paid
Asian	273,000	1.1%	$6,459,763,820	1.3%	$23,662
African American	2,799,280	11.0%	$58,482,189,980	12.1%	$20,892
Hispanic	491,400	1.9%	$10,461,196,360	2.2%	$21,289
Native American	151,040	0.6%	$2,822,314,920	0.6%	$18,686
Caucasian	21,578,900	84.4%	$400,741,762,460	82.7%	$18,571
Other	233,740	0.9%	$5,091,781,960	1.1%	$21,784
Unknown	33,600	0.1%	$700,750,640	0.1%	$20,856
Total	**25,560,960**	**100.0%**	**$484,759,760,120**	**100.0%**	**$18,965**

Source: Dobson | DaVanzo analysis of research-identifiable 5% SAF for all sites of service, 2007-2009.
[a] Episode payments exclude beneficiary co-payments.
Note: All episodes have been extrapolated to reflect the universe of Medicare beneficiaries.

[33] Kaiser Family Foundation. State Health Facts, Distribution of Medicare Enrollees by Race/Ethnicity, US (2009).

The distribution of ethnicity among HHA first setting episodes closely mirrors the distribution of episodes across all first settings (Exhibit 1.15). That is, Caucasian patients represent the majority of episodes (85.2 percent), with African American patients representing 10.3 percent of episodes and Hispanic patients representing 2.0 percent of episodes. Among HHA first setting episodes, Asian patients have the highest average Medicare episode payment ($24,873), followed by patients of Other ethnicities ($23,920). Due to the magnitude of the number of episodes, the average Medicare episode payment for Caucasian patients aligns with the overall average of $19,920.

Exhibit 1.15: Number and Percent of Episodes and Medicare Episode Paid by Episodes Defined by HHA First Setting by Ethnicity for 60-Day Fixed-Length Post-Acute Episodes (2007-2009)

Ethnicity	Number of Episodes	Percent of Episodes	Medicare Episode Paid[a]	Percent Medicare Episode Paid	Average Medicare Episode Paid
Asian	37,240	1.2%	$926,264,680	1.5%	$24,873
African American	326,180	10.3%	$6,987,534,660	11.1%	$21,422
Hispanic	64,420	2.0%	$1,412,974,960	2.2%	$21,934
Native American	10,380	0.3%	$218,624,260	0.3%	$21,062
Caucasian	2,705,000	85.2%	$52,965,436,640	83.8%	$19,581
Other	26,640	0.8%	$637,224,180	1.0%	$23,920
Unknown	3,820	0.1%	$72,786,540	0.1%	$19,054
Total	**3,173,680**	**100.0%**	**$63,220,845,940**	**100.0%**	**$19,920**

Source: Dobson | DaVanzo analysis of research-identifiable 5% SAF for all sites of service, 2007-2009.
[a] Episode payments exclude beneficiary co-payments.
Note: All episodes have been extrapolated to reflect the universe of Medicare beneficiaries.

The distribution by ethnicity varies by episode first setting (Exhibit 1.16). African American patients represent 11.0 percent of episodes overall, but represent 17.1 percent of LTCH first setting episodes and 16.5 percent of ER episodes. On the other hand, African American patients represent 7.9 percent of SNF episodes and 8.9 percent of hospice episodes. This finding suggests that African American patients are over-represented in LTCH and ER episodes, but under-represented in SNFs and hospice episodes. Caucasian patients have a similar amount of variation among first settings, in that they represent a lower proportion of LTCH episodes (76.0 percent of episodes) relative to their overall proportion of 84.4 percent of episodes. Caucasian patients are over-represented in SNFs and hospice, where they represent 88.9 percent and 87.3 percent, respectively.

Exhibit 1.16: Number and Percent of Episodes by First Setting by Ethnicity for 60-Day Fixed-Length Post-Acute Episodes (2007-2009)

First Setting	African American Episodes	% of African American	Hispanic Episodes	% of Hispanic	Caucasian Episodes	% of Caucasian	All Other Ethnicity Episodes[a]	% of Other	Total Episodes	% of Total
HHA	326,180	10.3%	64,420	2.0%	2,705,000	85.2%	78,080	2.5%	3,173,680	100.0%
SNF	329,720	7.9%	52,040	1.3%	3,696,140	88.9%	79,500	1.9%	4,157,400	100.0%
IRF	64,220	9.0%	10,340	1.5%	623,040	87.4%	15,440	2.2%	713,040	100.0%
LTCH	27,820	17.1%	5,980	3.7%	124,040	76.0%	5,320	3.3%	163,160	100.0%
STACH	104,600	15.1%	14,500	2.1%	553,300	79.9%	20,480	3.0%	692,880	100.0%
Community	1,561,380	11.3%	283,540	2.1%	11,556,120	83.7%	406,000	2.9%	13,807,040	100.0%
ER	126,640	16.5%	16,580	2.2%	600,500	78.3%	22,740	3.0%	766,460	100.0%
Hospice	45,240	8.9%	8,000	1.6%	442,100	87.3%	11,220	2.2%	506,560	100.0%
Other IP	14,280	13.7%	1,960	1.9%	85,820	82.1%	2,500	2.4%	104,560	100.0%
No Care[b]	199,200	13.5%	34,040	2.3%	1,192,840	80.8%	50,100	3.4%	1,476,180	100.0%
Total	**2,799,280**	**11.0%**	**491,400**	**1.9%**	**21,578,900**	**84.4%**	**691,380**	**2.7%**	**25,560,960**	**100.0%**

Source: Dobson | DaVanzo analysis of research-identifiable 5% SAF for all sites of service, 2007-2009.
[a] Other includes Native American, Other, and Unknown ethnicities.
[b] Episodes include deaths during index admission.
Note: All episodes have been extrapolated to reflect the universe of Medicare beneficiaries.

Similar to how different ethnicities are over- or under-represented in the number of episodes by first setting, the ethnic distribution also differs in Medicare episode payments (Exhibit 1.17). African American patients represent 12.1 percent of Medicare episode payments overall, but are more than 16 percent of payments in LTCH, STACH, and ER episodes. Caucasian patients are under-represented in Medicare episode payments in the same settings.

Exhibit 1.17: Medicare Episode Paid and Percent Medicare Episode Paid by Episode Defined by First Setting by Ethnicity for 60-Day Fixed-Length Post-Acute Episodes (2007-2009)

First Setting	Medicare Episode Paid African American[a]	% of African American	Medicare Episode Paid Hispanic[a]	% of Hispanic	Medicare Episode Paid Caucasian[a]	% of Caucasian	Medicare Episode Paid All Other[a,b]	% of All Other	Total Medicare Episode Paid[a]	% of Total
HHA	$6,987,534,660	11.1%	$1,412,974,960	2.2%	$52,965,436,640	83.8%	$1,854,899,660	2.9%	$63,220,845,940	100.0%
SNF	$10,801,334,360	9.1%	$1,771,976,420	1.5%	$102,915,647,160	87.0%	$2,763,870,280	2.3%	$118,252,828,220	100.0%
IRF	$2,981,657,400	9.8%	$497,737,560	1.6%	$26,249,800,040	86.1%	$760,507,480	2.5%	$30,489,702,460	100.0%
LTCH	$2,355,994,120	16.7%	$521,594,940	3.7%	$10,694,324,540	75.9%	$514,317,080	3.7%	$14,086,230,680	100.0%
STACH	$3,216,726,380	16.1%	$465,654,360	2.3%	$15,592,639,740	78.2%	$670,262,480	3.4%	$19,945,282,960	100.0%
Community	$25,992,060,600	13.4%	$4,746,226,900	2.4%	$156,809,310,700	80.7%	$6,862,650,600	3.5%	$194,410,248,800	100.0%
ER	$2,081,953,560	17.3%	$312,428,840	2.6%	$9,253,870,560	76.7%	$409,110,740	3.4%	$12,057,363,720	100.0%
Hospice	$916,150,900	10.6%	$153,658,340	1.8%	$7,354,490,880	85.1%	$219,195,760	2.5%	$8,643,495,900	100.0%
Other IP	$328,640,520	13.8%	$48,799,260	2.0%	$1,953,236,180	81.8%	$56,640,840	2.4%	$2,387,316,780	100.0%
No Care[c]	$2,820,137,460	13.3%	$530,144,780	2.5%	$16,953,006,040	79.7%	$963,156,400	4.5%	$21,266,444,660	100.0%
Total	**$58,482,189,980**	**12.1%**	**$10,461,196,360**	**2.2%**	**$400,741,762,460**	**82.7%**	**$15,074,611,340**	**3.1%**	**$484,759,760,120**	**100.0%**

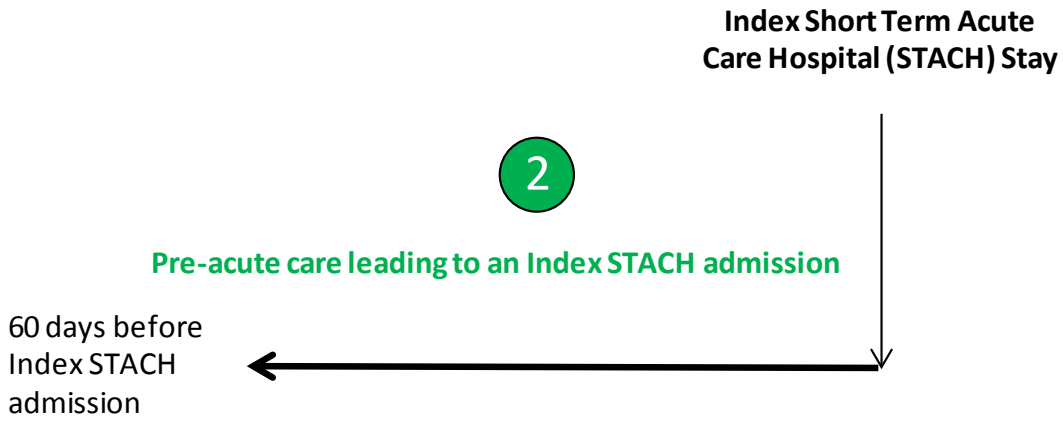
Source: Dobson | DaVanzo analysis of research-identifiable 5% SAF for all sites of service, 2007-2009.
[a] Episode payments exclude beneficiary co-payments.
[b] Other includes Native American, Other, and Unknown ethnicities.
[c] Episodes include deaths during index admission.
Note: All episodes have been extrapolated to reflect the universe of Medicare beneficiaries.

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

Brief Review of Episode Definition

Initiated by an index acute care hospital stay, the Type 2 episode captures all pre-acute care (facility- and non-facility-based) 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 (STACH) admission, as well as the index admission (Exhibit 2.1). This episode type will be used to understand the type of care that precedes the index acute care hospitalization that was examined in Episode Type 1.

Exhibit 2.1: Description of Pre-Acute Care Episode



Episode Type 2: Pre-Acute Episodes

Type 2 episodes are clinically defined by the patients' 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 congestive heart failure (CHF) and chronic obstructive pulmonary disease (COPD) were ranked with a higher severity index score than single conditions (CHF*COPD). Other interacted conditions include diabetes and CHF (DIABETES*CHF), and CHF and renal failure (CHF*RENAL).

For patients who do not have these three disease interaction categories, a patient's 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 not represented in all categories of their chronic conditions.

The Medicare 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.

Across all three years, there are 25,664,840 total Type 2 episodes with a total of $340.7 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 can start on January 15, 2007 (with a 15 day clean period), but that episode will not have accompanying pre-acute care since the claims are not available in our database for 2006. 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 (32.3 percent) is somewhat underestimated. In 2008 and 2009, the pre-acute care episodes represent about 38 percent of total Medicare fee-for-service spending. Medicare expenditures for pre-acute care episodes are not additive with post-acute care expenditures as both episode types include the index acute care hospitalization.

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

Episode Type 2: Pre-Acute Episodes

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

Year	Episodes	Medicare Episode Paid[a]	Total Medicare Fee-for-Service Expenditures[b]	Percent of Total Medicare Fee-for-Service Expenditures
2007	7,691,760	$96,989,946,100	$299,900,000,000	32.3%
2008	9,173,740	$120,619,949,060	$308,300,000,000	39.1%
2009	8,799,340	$123,129,916,960	$325,400,000,000	37.8%
Total	**25,664,840**	**$340,739,812,120**	**n/a**	**n/a**

Source: Dobson | DaVanzo analysis of research-identifiable 5% SAF for all sites of service, 2007-2009.
[a] Episode payments exclude beneficiary co-payments.
[b] Congressional Budget Office, March Baselines for Medicare, 2008-2010.
Note: All episodes have been extrapolated to reflect the universe of Medicare beneficiaries.

Distribution of Episodes by Chronic Conditions

Exhibit 2.3 shows the distribution of episodes by chronic conditions prior to determining the "primary chronic condition" based on the chronic condition hierarchy that will be used to identify the patient in the analyses. This distribution indicates that the patients represented in these episodes must often have several conditions that will determine their health care utilization. Over 65 percent of episodes involve patients with ischemic heart disease, and 50.6 percent of episodes involve patients with heart failure. Another 43.9 percent of episodes involve patients with diabetes, and 41.8 percent each have rheumatoid arthritis or chronic kidney disease. Only 2.2 percent of all pre-acute care episodes involve patients who do not have any chronic conditions. These findings indicate the difficulty of using chronic conditions to define patient episodes, as it is very difficult to identify which particular chronic conditions are responsible for an episode of care.

Episode Type 2: Pre-Acute Episodes

Exhibit 2.3: Total Number of Episodes (N=25,664,840) and Percent of Episodes by Chronic Condition (Not Mutually Exclusive) for 60-Day Fixed-Length Pre-Acute Episodes (2007-2009)

Chronic Condition	Number of Episodes	Percent of Episodes
Lung Cancer	985,660	3.8%
Osteoporosis	7,032,180	27.4%
Chronic Obstructive Pulmonary Disease	9,533,700	37.1%
Rheumatoid Arthritis/Osteoarthritis	10,736,080	41.8%
Hip/Pelvic Fracture	1,550,920	6.0%
Heart Failure	12,991,740	50.6%
Alzheimer's Disease	3,086,800	12.0%
Alzheimer's Disease and Related Disorders or Senile	6,693,820	26.1%
Stroke/Transient Ischemic Attack	5,019,920	19.6%
Colorectal Cancer	785,380	3.1%
Depression	9,255,860	36.1%
Acute Myocardial Infarction	1,989,960	7.8%
Ischemic Heart Disease	16,791,520	65.4%
Atrial Fibrillation	6,368,080	24.8%
Chronic Kidney Disease	10,705,520	41.7%
Female Breast Cancer	910,660	3.5%
Prostate Cancer	1,127,260	4.4%
Endometrial Cancer	122,400	0.5%
Diabetes	11,255,660	43.9%
Glaucoma	3,779,580	14.7%
Cataract	9,776,900	38.1%
None	554,400	2.2%

Source: Dobson | DaVanzo analysis of research-identifiable 5% SAF for all sites of service, 2007-2009.
Note: All episodes have been extrapolated to reflect the universe of Medicare beneficiaries.

Episode Type 2: Pre-Acute Episodes

For illustrative purposes, Exhibit 2.4 shows the distribution of chronic conditions for episodes with diabetes. That is, of the 11.3 million pre-acute care episodes for patients with diabetes, this exhibit shows the other chronic conditions with which these patients presented. More than three-quarters of episodes with diabetes also have ischemic heart disease, while almost two-thirds of episodes also have heart failure. Chronic kidney disease is also very common, and represented by over one-half of diabetes episodes. Since these conditions require different health care treatments, the care these patients receive in the 60 days prior to an acute care hospitalization is very complex and likely aims to serve multiple purposes.

Exhibit 2.4: Total Number of Episodes with Diabetes (N=11,255,660) by Chronic Condition (Not Mutually Exclusive) for 60-Day Fixed-Length Pre-Acute Episodes (2007-2009)

Chronic Condition	Episodes with Diabetes	Percent of Episodes
Lung Cancer	383,340	3.4%
Osteoporosis	2,727,180	24.2%
Chronic Obstructive Pulmonary Disease	4,691,660	41.7%
Rheumatoid Arthritis/Osteoarthritis	4,774,640	42.4%
Hip/Pelvic Fracture	589,340	5.2%
Heart Failure	7,018,480	62.4%
Alzheimer's Disease	1,352,780	12.0%
Alzheimer's Disease and Related Disorders or Senile	3,085,800	27.4%
Stroke/Transient Ischemic Attack	2,534,560	22.5%
Colorectal Cancer	337,380	3.0%
Depression	4,364,000	38.8%
Acute Myocardial Infarction	1,105,540	9.8%
Ischemic Heart Disease	8,541,820	75.9%
Atrial Fibrillation	3,020,180	26.8%
Chronic Kidney Disease	6,102,440	54.2%
Female Breast Cancer	373,960	3.3%
Prostate Cancer	481,180	4.3%
Endometrial Cancer	52,960	0.5%
Glaucoma	1,796,440	16.0%
Cataract	4,202,400	37.3%

Source: Dobson | DaVanzo analysis of research-identifiable 5% SAF for all sites of service, 2007-2009.
Note: All episodes have been extrapolated to reflect the universe of Medicare beneficiaries.

Episode Type 2: Pre-Acute Episodes

Distribution of Episodes by Primary Chronic Condition

Exhibit 2.5 shows the distribution of episodes and Medicare episode payments after each episode is assigned a primary chronic condition, sorted from highest to lowest community risk score. This mutually exclusive assignment of conditions allows us to conduct analyses by chronic condition without duplicating the number of episodes or Medicare payments. As we noted above, the episode is assigned the most severe of the patient's chronic conditions. For example, an osteoporosis episode will often contain numerous less-severe conditions.

The most prevalent primary chronic condition is the combination of CHF*COPD, representing 24.9 percent of episodes and 27.2 percent of Medicare episode payments. Osteoporosis is the second most prevalent primary chronic condition, with 15.0 percent of episodes and 12.9 percent of Medicare episode payments.

Exhibit 2.6 on the following page shows the distribution of episodes and Medicare home health payments by primary chronic condition. Only 0.4 percent of all Medicare episode payments in pre-acute care episodes are for home health care. Episodes for patients with CHF*COPD represent 39.8 percent of all Medicare pre-acute episode payments for home health care, but home health payments for these episodes only represent 0.6 percent of the total Medicare episode payments for CHF*COPD. In another instance, 17.4 percent of Medicare pre-acute episode payments for home health care are for episodes for patients with DIABETES*CHF, but home health represents only 0.5 percent of these Medicare episode payments.

Episode Type 2: Pre-Acute Episodes

Exhibit 2.5: Number and Percent of Episodes and Medicare Episode Paid 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]	Percent of Medicare Episode Paid
CHF*COPD	6,383,880	24.9%	$92,740,919,760	27.2%
DIABETES*CHF	3,423,120	13.3%	$52,453,431,580	15.4%
CHF*RENAL	1,436,740	5.6%	$21,551,397,020	6.3%
Lung Cancer	516,480	2.0%	$8,459,018,940	2.5%
Osteoporosis	3,858,940	15.0%	$43,898,765,080	12.9%
Chronic Obstructive Pulmonary Disease	1,974,900	7.7%	$23,755,441,640	7.0%
Rheumatoid Arthritis/Osteoarthritis	2,820,200	11.0%	$33,844,012,380	9.9%
Hip/Pelvic Fracture	149,120	0.6%	$2,015,023,040	0.6%
Heart Failure	669,660	2.6%	$8,830,054,440	2.6%
Alzheimer's Disease	340,860	1.3%	$3,278,380,360	1.0%
Alzheimer's Disease and Related Disorders or Senile	361,020	1.4%	$4,069,072,560	1.2%
Stroke/Transient Ischemic Attack	443,100	1.7%	$5,476,375,340	1.6%
Colorectal Cancer	132,200	0.5%	$2,363,225,020	0.7%
Depression	802,560	3.1%	$9,155,598,980	2.7%
Acute Myocardial Infarction	104,440	0.4%	$1,686,434,040	0.5%
Ischemic Heart Disease	862,120	3.4%	$11,008,680,160	3.2%
Atrial Fibrillation	81,500	0.3%	$898,563,000	0.3%
Chronic Kidney Disease	277,320	1.1%	$4,113,128,280	1.2%
Female Breast Cancer	34,940	0.1%	$412,238,440	0.1%
Prostate Cancer	52,040	0.2%	$536,303,980	0.2%
Endometrial Cancer	10,080	0.0%	$128,806,280	0.0%
Diabetes	182,840	0.7%	$1,764,840,880	0.5%
Glaucoma	55,520	0.2%	$530,439,800	0.2%
Cataract	136,860	0.5%	$1,319,898,220	0.4%
None	554,400	2.2%	$6,449,762,900	1.9%
Total	**25,664,840**	**100.0%**	**$340,739,812,120**	**100.0%**

Source: Dobson | DaVanzo analysis of research-identifiable 5% SAF for all sites of service, 2007-2009.
[a] For methodology used to determine primary chronic condition, see Appendix A.
[b] Episode payments exclude beneficiary co-payments.
Note: All episodes have been extrapolated to reflect the universe of Medicare beneficiaries.

Episode Type 2: Pre-Acute Episodes

Exhibit 2.6: Number and Percent of Episodes and Medicare Home Health Paid by Primary Chronic Condition[a] for 60-Day Fixed-Length Pre-Acute Episodes (2007-2009)

Primary Chronic Condition	Number of Episodes	Medicare Episode Paid[b]	Home Health Paid	Percent of Home Health Paid	Percent of Episode Paid to Home Health
CHF*COPD	6,383,880	$92,740,919,760	$585,318,480	39.8%	0.6%
DIABETES*CHF	3,423,120	$52,453,431,580	$255,473,500	17.4%	0.5%
CHF*RENAL	1,436,740	$21,551,397,020	$103,703,520	7.1%	0.5%
Lung Cancer	516,480	$8,459,018,940	$23,580,200	1.6%	0.3%
Osteoporosis	3,858,940	$43,898,765,080	$197,672,140	13.4%	0.5%
Chronic Obstructive Pulmonary Disease	1,974,900	$23,755,441,640	$73,339,980	5.0%	0.3%
Rheumatoid Arthritis/Osteoarthritis	2,820,200	$33,844,012,380	$109,637,620	7.5%	0.3%
Hip/Pelvic Fracture	149,120	$2,015,023,040	$9,224,660	0.6%	0.5%
Heart Failure	669,660	$8,830,054,440	$21,165,100	1.4%	0.2%
Alzheimer's Disease	340,860	$3,278,380,360	$17,156,180	1.2%	0.5%
Alzheimer's Disease and Related Disorders or Senile	361,020	$4,069,072,560	$16,070,780	1.1%	0.4%
Stroke/Transient Ischemic Attack	443,100	$5,476,375,340	$12,262,200	0.8%	0.2%
Colorectal Cancer	132,200	$2,363,225,020	$4,629,960	0.3%	0.2%
Depression	802,560	$9,155,598,980	$14,019,020	1.0%	0.2%
Acute Myocardial Infarction	104,440	$1,686,434,040	$828,920	0.1%	0.0%
Ischemic Heart Disease	862,120	$11,008,680,160	$10,460,860	0.7%	0.1%
Atrial Fibrillation	81,500	$898,563,000	$550,580	0.0%	0.1%
Chronic Kidney Disease	277,320	$4,113,128,280	$4,826,120	0.3%	0.1%
Female Breast Cancer	34,940	$412,238,440	$610,360	0.0%	0.1%
Prostate Cancer	52,040	$536,303,980	$405,100	0.0%	0.1%
Endometrial Cancer	10,080	$128,806,280	$63,800	0.0%	0.0%
Diabetes	182,840	$1,764,840,880	$1,614,120	0.1%	0.1%
Glaucoma	55,520	$530,439,800	$463,040	0.0%	0.1%
Cataract	136,860	$1,319,898,220	$549,160	0.0%	0.0%
None	554,400	$6,449,762,900	$7,184,740	0.5%	0.1%
Total	**25,664,840**	**$340,739,812,120**	**$1,470,810,140**	**100.0%**	**0.4%**

Source: Dobson | DaVanzo analysis of research-identifiable 5% SAF for all sites of service, 2007-2009.
[a] For methodology used to determine primary chronic condition, see Appendix A.
[b] Episode payments exclude beneficiary co-payments.
Note: All episodes have been extrapolated to reflect the universe of Medicare beneficiaries.

Episode Type 2: Pre-Acute Episodes

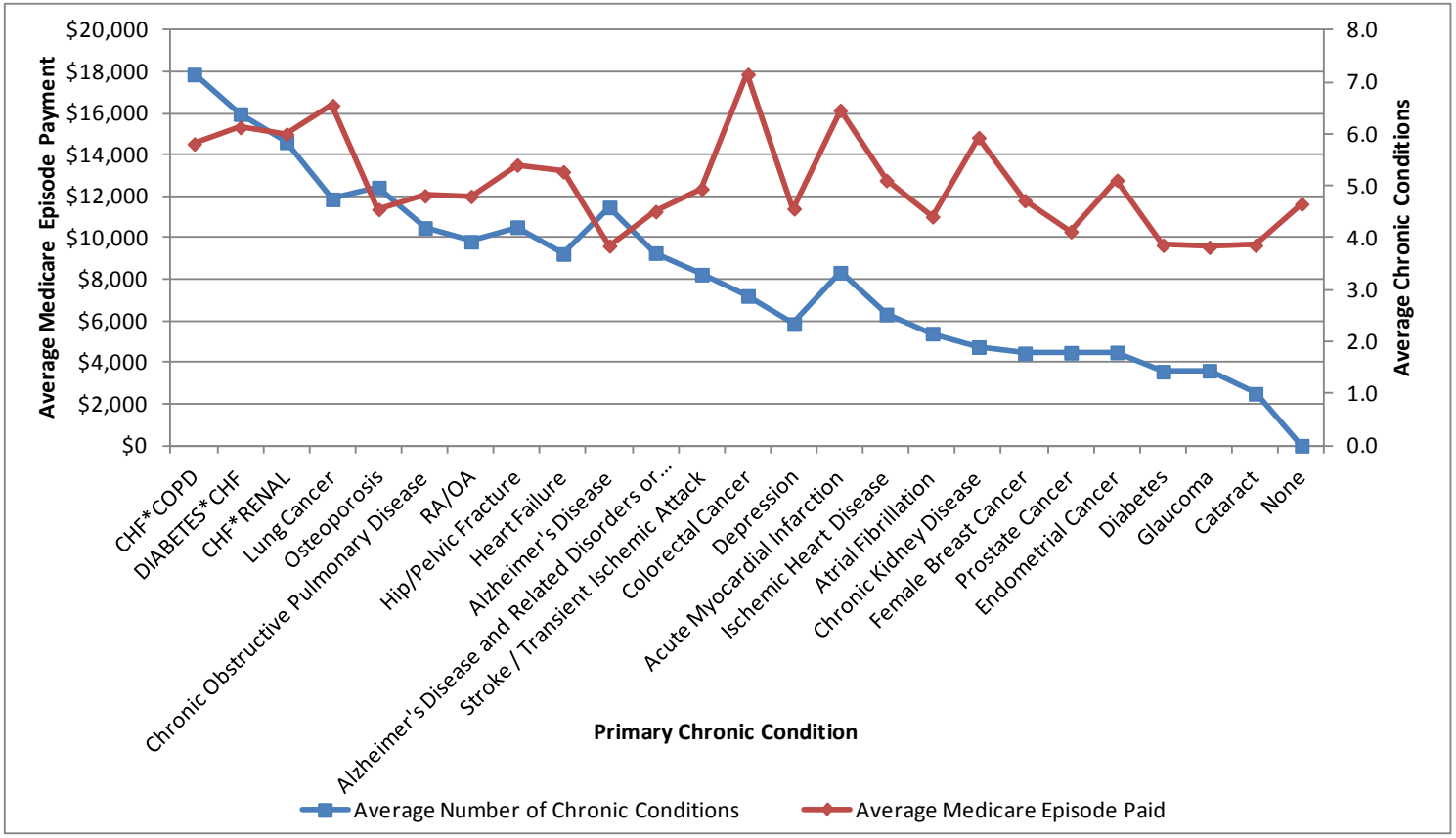
Exhibit 2.7 and 2.8 show the average number of chronic conditions and Medicare episode payment by primary chronic condition. The average pre-acute episode has 5.1 chronic conditions, and Medicare episode payment of $13,277. While CHF*COPD and DIABETES*CHF episodes have the highest number of chronic conditions (7.1 and 6.4, respectively), the average Medicare episode payment for those episode types is only slightly higher than the overall average ($14,527 and $15,323, 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 ($17,876 and $16,147, respectively).

Exhibit 2.7: 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 of Chronic Conditions	Average Medicare Episode Paid[b]
CHF*COPD	7.1	$14,527
DIABETES*CHF	6.4	$15,323
CHF*RENAL	5.8	$15,000
Lung Cancer	4.7	$16,378
Osteoporosis	5.0	$11,376
Chronic Obstructive Pulmonary Disease	4.2	$12,029
Rheumatoid Arthritis/Osteoarthritis	3.9	$12,001
Hip/Pelvic Fracture	4.2	$13,513
Heart Failure	3.7	$13,186
Alzheimer's Disease	4.6	$9,618
Alzheimer's Disease and Related Disorders or Senile	3.7	$11,271
Stroke/Transient Ischemic Attack	3.3	$12,359
Colorectal Cancer	2.9	$17,876
Depression	2.3	$11,408
Acute Myocardial Infarction	3.3	$16,147
Ischemic Heart Disease	2.5	$12,769
Atrial Fibrillation	2.2	$11,025
Chronic Kidney Disease	1.9	$14,832
Female Breast Cancer	1.8	$11,798
Prostate Cancer	1.8	$10,306
Endometrial Cancer	1.8	$12,778
Diabetes	1.4	$9,652
Glaucoma	1.4	$9,554
Cataract	1.0	$9,644
None	0.0	$11,634
Overall	**5.1**	**$13,277**

Source: Dobson | DaVanzo analysis of research-identifiable 5% SAF for all sites of service, 2007-2009.
[a] For methodology used to determine primary chronic condition, see Appendix A.
[b] Episode payments exclude beneficiary co-payments.

Exhibit 2.8: 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.

[a] Episode payments exclude beneficiary co-payments.

[b] For methodology used to determine primary chronic condition, see Appendix A.

Episode Type 2: Pre-Acute Episodes

Exhibit 2.9 shows the distribution of Medicare episode payments, across all primary chronic conditions, by care setting. Almost 92 percent of all Medicare pre-acute episode payments are associated with hospital admissions or physician services. Almost three-quarters (74.5 percent) of all Medicare episode payments are for short term acute care hospitalizations (STACH), which include the index acute care hospitalization, while physician services represent another 17.3 percent. Less than two percent (1.9 percent) of Medicare episode payments are for facility-based care (SNF, IRF, LTCH), while home health only accounts for 0.4 percent of the total payments. In part, this is because SNF, IRF, and LTCHs are primarily used as post-acute care providers.

Exhibit 2.9: Medicare Episode Paid and Percent of Medicare Episode Paid for All Episodes by Care Setting for 60-Day Fixed-Length Pre-Acute Episodes (2007-2009)

Setting	Medicare Episode Paid[a]	Percent Medicare Episode Paid
HHA	$1,470,810,140	0.4%
SNF	$4,036,073,680	1.2%
IRF	$1,578,105,820	0.5%
LTCH	$517,111,460	0.2%
STACH	$253,740,110,600	74.5%
Physician	$58,795,045,920	17.3%
OP	$15,278,782,260	4.5%
ER	$3,345,145,100	1.0%
Hospice	$1,414,853,540	0.4%
Other IP	$563,773,540	0.2%
Total	**$340,739,812,120**	**100.0%**

Source: Dobson | DaVanzo analysis of research-identifiable 5% SAF for all sites of service, 2007-2009.

[a] Episode payments exclude beneficiary co-payments.

Episode Type 2: Pre-Acute Episodes

In the remainder of this chapter, we analyze the CHF*COPD and Osteoporosis pre-acute care episodes in more detail. These sections contain descriptive statistics on the number of chronic conditions within these episodes, the allocation of Medicare episode payments by care setting, distribution of episodes and Medicare payments by region, and the top MS-DRGs for the index acute care hospitalization.

Distribution of CHF*COPD Episodes and Medicare Episode Payments

Exhibit 2.10 shows the distribution of episodes by chronic conditions for episodes with the primary chronic condition of CHF*COPD. In addition to having CHF and COPD, 86.3 percent of episodes involve patients with ischemic heart disease, and 59.1 percent of episodes involve patients with chronic kidney disease. Diabetes is also very prevalent among this population, and represented in 56.3 percent of episodes.

Exhibit 2.10: Total Number of Episodes Defined by CHF*COPD[a] (N=6,383,880) by Chronic Condition (Not Mutually Exclusive) for 60-Day Fixed-Length Pre-Acute Episodes (2007-2009)

Chronic Condition	Number of Episodes	Percent of Episodes
DIABETES*CHF	3,595,360	56.3%
CHF*RENAL	3,771,380	59.1%
Lung Cancer	401,200	6.3%
Osteoporosis	1,843,960	28.9%
Chronic Obstructive Pulmonary Disease	6,383,880	100.0%
Rheumatoid Arthritis/Osteoarthritis	2,882,600	45.2%
Hip/Pelvic Fracture	434,980	6.8%
Heart Failure	6,383,880	100.0%
Alzheimer's Disease	857,600	13.4%
Alzheimer's Disease and Related Disorders or Senile	2,042,420	32.0%
Stroke/Transient Ischemic Attack	1,487,720	23.3%
Colorectal Cancer	179,380	2.8%
Depression	2,759,940	43.2%
Acute Myocardial Infarction	802,120	12.6%
Ischemic Heart Disease	5,509,080	86.3%
Atrial Fibrillation	2,473,920	38.8%
Chronic Kidney Disease	3,771,380	59.1%
Female Breast Cancer	187,620	2.9%
Prostate Cancer	281,020	4.4%
Endometrial Cancer	15,480	0.2%
Diabetes	3,595,360	56.3%
Glaucoma	927,780	14.5%
Cataract	2,417,220	37.9%

Source: Dobson | DaVanzo analysis of research-identifiable 5% SAF for all sites of service, 2007-2009.

[a] For methodology used to determine primary chronic condition, see Appendix A.

Note: All episodes have been extrapolated to reflect the universe of Medicare beneficiaries.

Episode Type 2: Pre-Acute Episodes

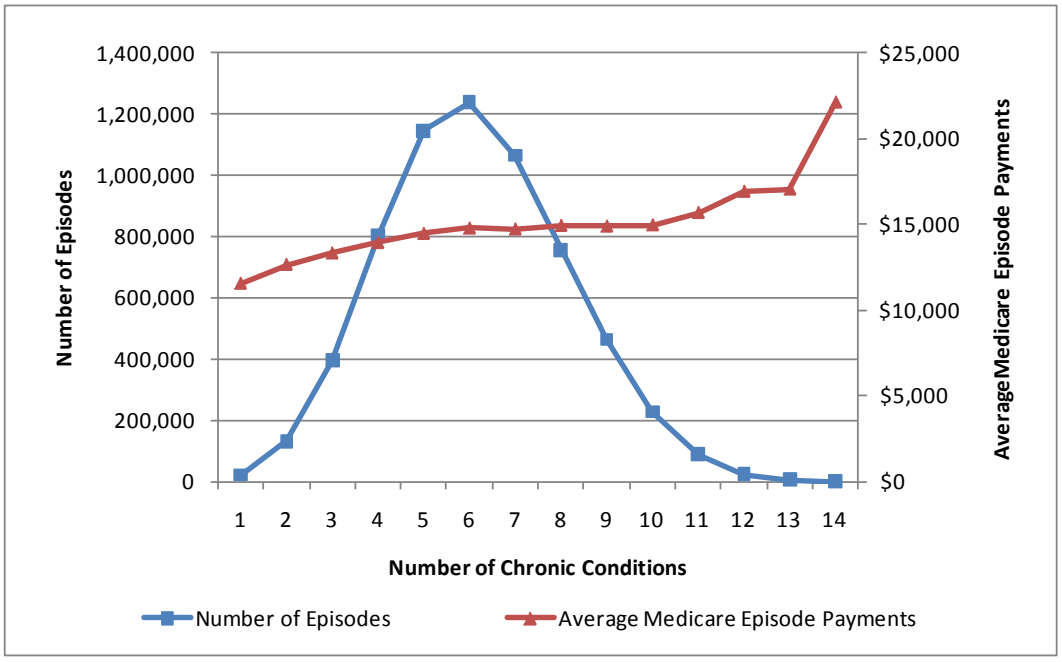
CHF*COPD episodes have an average of 7.1 chronic conditions, and an average Medicare episode payment of $14,527 (Exhibit 2.7). As shown in Exhibit 2.11 and 2.12, the average Medicare episode payment increases with the number of chronic conditions. However, this relationship plateaus between seven and 11 chronic conditions. Once an episode has more than 11 chronic conditions, average Medicare episode payments increase significantly with each additional chronic condition. Less than one percent (0.4 percent) of the total CHF*COPD episodes have no other chronic conditions.

Exhibit 2.11: Number and Percent of Episodes and Medicare Episode Paid for Episodes Defined by CHF*COPD[a] for 60-Day Fixed-Length Pre-Acute Episodes (2007-2009)

Number of Chronic Conditions	Number of Episodes	Percent of Episodes	Medicare Episode Paid[b]	Percent Medicare Episode Paid	Average Medicare Episode Paid
2	22,680	0.4%	$262,217,020	0.3%	$11,562
3	132,440	2.1%	$1,677,108,620	1.8%	$12,663
4	395,360	6.2%	$5,270,670,200	5.7%	$13,331
5	807,080	12.6%	$11,250,773,300	12.1%	$13,940
6	1,147,640	18.0%	$16,610,455,880	17.9%	$14,474
7	1,239,100	19.4%	$18,324,064,220	19.8%	$14,788
8	1,065,860	16.7%	$15,705,401,520	16.9%	$14,735
9	757,540	11.9%	$11,318,484,380	12.2%	$14,941
10	465,480	7.3%	$6,936,472,720	7.5%	$14,902
11	228,940	3.6%	$3,429,066,380	3.7%	$14,978
12	90,040	1.4%	$1,413,539,940	1.5%	$15,699
13	23,820	0.4%	$403,451,440	0.4%	$16,938
14	7,040	0.1%	$120,158,720	0.1%	$17,068
15	860	0.0%	$19,055,420	0.0%	$22,157
Total	**6,383,880**	**100.0%**	**$92,740,919,760**	**100.0%**	**$14,527**

Source: Dobson | DaVanzo analysis of research-identifiable 5% SAF for all sites of service, 2007-2009.
[a] For methodology used to determine primary chronic condition, see Appendix A.
[b] Episode payments exclude beneficiary co-payments.
Note: All episodes have been extrapolated to reflect the universe of Medicare beneficiaries.

Exhibit 2.12: Total Number of Episodes and Medicare Episode Payments[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.
[a] Episode payments exclude beneficiary co-payments.
[b] For methodology used to determine primary chronic condition, see Appendix A.
Note: All episodes have been extrapolated to reflect the universe of Medicare beneficiaries.

Episode Type 2: Pre-Acute Episodes

Over 90 percent of Medicare payments for CHF*COPD episodes are associated with the index acute care hospital admission or prior hospital admission (STACH) and physician visits within the 60 days prior to the index acute care hospitalization (Exhibit 2.13). About five percent (4.7 percent) of Medicare episode payments are associated with outpatient visits. Only 2.3 percent of total Medicare episode payments are associated with facility-based care (SNF, IRF, and LTCH). Home health represents only 0.6 percent of Medicare episode payments, indicating that patients are receiving little home health care prior to their index acute care hospitalizations.

Exhibit 2.13: Medicare Episode Paid and Percent of Medicare Episode Paid for Episodes Defined by CHF*COPD[a] by Setting for 60-Day Fixed-Length Pre-Acute Episodes (2007-2009)

Setting	Medicare Episode Paid[b]	Percent Medicare Episode Paid
HHA	$585,318,480	0.6%
SNF	$1,444,973,360	1.6%
IRF	$396,923,740	0.4%
LTCH	$263,178,020	0.3%
STACH	$68,154,503,040	73.5%
Physician	$15,967,716,120	17.2%
OP	$4,313,159,880	4.7%
ER	$995,979,840	1.1%
Hospice	$484,907,580	0.5%
Other IP	$134,259,700	0.1%
Total	**$92,740,919,760**	**100.0%**

Source: Dobson | DaVanzo analysis of research-identifiable 5% SAF for all sites of service, 2007-2009.
[a] For methodology used to determine primary chronic condition, see Appendix A.
[b] Episode payments exclude beneficiary co-payments.
Note: All episodes have been extrapolated to reflect the universe of Medicare beneficiaries.

Episode Type 2: Pre-Acute Episodes

The number of episodes per 1,000 fee-for-service Medicare beneficiaries and average Medicare payments for CHF*COPD episodes varies by geographic region. Exhibit 2.14 shows the number of episodes, an indexed measure of number of episodes per 1,000 fee-for-service beneficiaries, and average Medicare episode payment for each of the 10 CMS regions.[34] (See Appendix B for a list of states by CMS region.) There appears to be some correlation between the indexed number of CHF*COPD episodes per 1,000 Medicare fee-for-service beneficiaries and the average Medicare episode payment. Region VIII – Denver – has the lowest number of CHF*COPD episodes per 1,000 fee-for-service beneficiaries (0.74), and the lowest average Medicare episode payment ($12,427) of all other regions. Region II – New York, which has the highest number of CHF*COPD episodes per 1,000 beneficiaries (1.17), also has one of the highest average Medicare episode payments ($17,207). However, Region IX – San Francisco – has a below-average number of CHF*COPD episodes per 1,000 fee-for-service beneficiaries (0.86), but one of the highest average Medicare episode payments ($18,023). The average Medicare episode payments have not been standardized for wage differences, which may be a factor in these results.

Exhibit 2.14: Indexed Number of Episodes per 1,000 Fee-for-Service Medicare Beneficiaries and Average Medicare Episode Paid for Episodes Defined by CHF*COPD[a] by CMS Region for 60-Day Fixed-Length Pre-Acute Episodes (2007-2009)

CMS Region[b]	Number of Episodes	Indexed Number of Episodes per 1,000 FFS Beneficiaries	Average Medicare Episode Paid[c]
Region I - Boston	309,560	0.86	$14,703
Region II - New York	650,540	1.17	$17,207
Region III - Philadelphia	730,340	1.09	$14,536
Region IV - Atlanta	1,508,040	1.04	$13,419
Region V - Chicago	1,237,880	1.09	$14,069
Region VI - Dallas	663,100	0.90	$13,734
Region VII - Kansas City	410,500	1.07	$12,653
Region VIII - Denver	157,580	0.74	$12,427
Region IX - San Francisco	560,000	0.86	$18,023
Region X - Seattle	151,320	0.66	$15,227
Unknown	5,020	N/A	$14,344
Total	**6,383,880**	**1.00**	**$14,527**

Source: Dobson | DaVanzo analysis of research-identifiable 5% SAF for all sites of service, 2007-2009.
[a] For methodology used to determine primary chronic condition, see Appendix A.
[b] Beneficiary region is determined by the state in which the beneficiary's hospital referral region (HRR) is located.
[c] Episode payments exclude beneficiary co-payments.
Note: All episodes have been extrapolated to reflect the universe of Medicare beneficiaries.

[34] Medicare payments reflect the wage index of each region. We will adjust the Medicare episode payments to standardize payments regardless of wage in the next working paper.

Episode Type 2: Pre-Acute Episodes

As shown above in Exhibit 2.11, more than 99 percent of CHF*COPD episodes involve patients with additional (more than two) chronic conditions. Exhibit 2.15 identifies the top 10 MS-DRGs (based on total Medicare episode paid) for the index acute care hospitalizations that followed the 60 day pre-acute care episode. While some of these MS-DRGs are directly related to CHF and/or COPD, several index acute care hospitalizations may relate to one of the many other chronic conditions that were identified within the episode. Note that the cost of the index acute care hospitalization is included in the total Medicare episode payment. The top 10 MS-DRGs account for more than one-quarter of all episodes (26.8 percent) and 23.1 percent of Medicare episode payments, and are predominately medical MS-DRGs. MS-DRG 291 – heart failure and shock with MCC – accounts for 3.5 percent of episodes and 3.4 percent of Medicare episode payments.

Exhibit 2.15: Number and Percent of Episodes and Medicare Episode Paid for Top 10 Index MS-DRGs (Ranked by Medicare Episode Paid) for Episodes Defined by CHF*COPD[a] for 60-Day Fixed-Length Pre-Acute Episodes (2007-2009)

MS-DRG	Medical/ Surgical Designation	Number of Episodes	Percent of Episodes	Medicare Episode Paid[b]	Percent Medicare Episode Paid	Average Medicare Episode Paid
291: Heart failure & shock w MCC	Medical	223,820	3.5%	$3,192,570,820	3.4%	$14,264
871: Septicemia or severe sepsis w/o MV 96+ hours w MCC	Medical	146,280	2.3%	$2,650,923,500	2.9%	$18,122
292: Heart failure & shock w CC	Medical	227,020	3.6%	$2,364,006,320	2.5%	$10,413
003: ECMO or trach w MV 96+ hrs or PDX exc face, mouth & neck w maj O.R.	Surgical	16,020	0.3%	$2,257,680,200	2.4%	$140,929
190: Chronic obstructive pulmonary disease w MCC	Medical	194,220	3.0%	$2,138,266,600	2.3%	$11,010
194: Simple pneumonia & pleurisy w CC	Medical	219,900	3.4%	$2,051,185,680	2.2%	$9,328
191: Chronic obstructive pulmonary disease w CC	Medical	206,360	3.2%	$1,861,307,920	2.0%	$9,020
189: Pulmonary edema & respiratory failure	Medical	134,460	2.1%	$1,724,547,640	1.9%	$12,826
192: Chronic obstructive pulmonary disease w/o CC/MCC	Medical	229,320	3.6%	$1,661,789,900	1.8%	$7,247
193: Simple pneumonia & pleurisy w MCC	Medical	114,360	1.8%	$1,507,025,000	1.6%	$13,178
Subtotal (Top 10 MS-DRGs)		**1,711,760**	**26.8%**	**$21,409,303,580**	**23.1%**	**$12,507**
Other		4,672,120	73.2%	$71,331,616,120	76.9%	$15,268
Total		**6,383,880**	**100.0%**	**$92,740,919,700**	**100.0%**	**$14,527**

Source: Dobson | DaVanzo analysis of research-identifiable 5% SAF for all sites of service, 2007-2009.
[a] For methodology used to determine primary chronic condition, see Appendix A.
[b] Episode payments exclude beneficiary co-payments.
Note: All episodes have been extrapolated to reflect the universe of Medicare beneficiaries.

Distribution of Osteoporosis Episodes and Medicare Episode Payments

Exhibit 2.16 shows the distribution of episodes by additional chronic condition for episodes with the primary chronic condition of osteoporosis. In addition to having osteoporosis, 55.9 percent of episodes involve patients with rheumatoid arthritis/osteoarthritis, while 51.8 percent of episodes involve patients with ischemic heart disease. Another 47.3 percent of episodes involve patients with cataracts, and 38.0 percent are for depression.

Exhibit 2.16: Number and Percent of Episodes Defined by Osteoporosis[a] (N=3,858,940) by Chronic Condition (Not Mutually Exclusive) for 60 Day Fixed-Length Pre-Acute Episodes (2007-2009)

Chronic Condition	Number of Episodes	Percent of Episodes
Chronic Obstructive Pulmonary Disease	853,480	22.1%
Rheumatoid Arthritis/Osteoarthritis	2,158,560	55.9%
Hip/Pelvic Fracture	448,700	11.6%
Heart Failure	576,440	14.9%
Alzheimer's Disease	549,460	14.2%
Alzheimer's Disease and Related Disorders or Senile	1,076,160	27.9%
Stroke/Transient Ischemic Attack	694,460	18.0%
Colorectal Cancer	107,060	2.8%
Depression	1,468,160	38.0%
Acute Myocardial Infarction	135,160	3.5%
Ischemic Heart Disease	1,997,540	51.8%
Atrial Fibrillation	633,260	16.4%
Chronic Kidney Disease	805,000	20.9%
Female Breast Cancer	234,680	6.1%
Prostate Cancer	73,900	1.9%
Endometrial Cancer	25,060	0.6%
Diabetes	970,740	25.2%
Glaucoma	691,800	17.9%
Cataract	1,826,540	47.3%

Source: Dobson | DaVanzo analysis of research-identifiable 5% SAF for all sites of service, 2007-2009.
[a] For methodology used to determine primary chronic condition, see Appendix A.
Note: All episodes have been extrapolated to reflect the universe of Medicare beneficiaries.

Episode Type 2: Pre-Acute Episodes

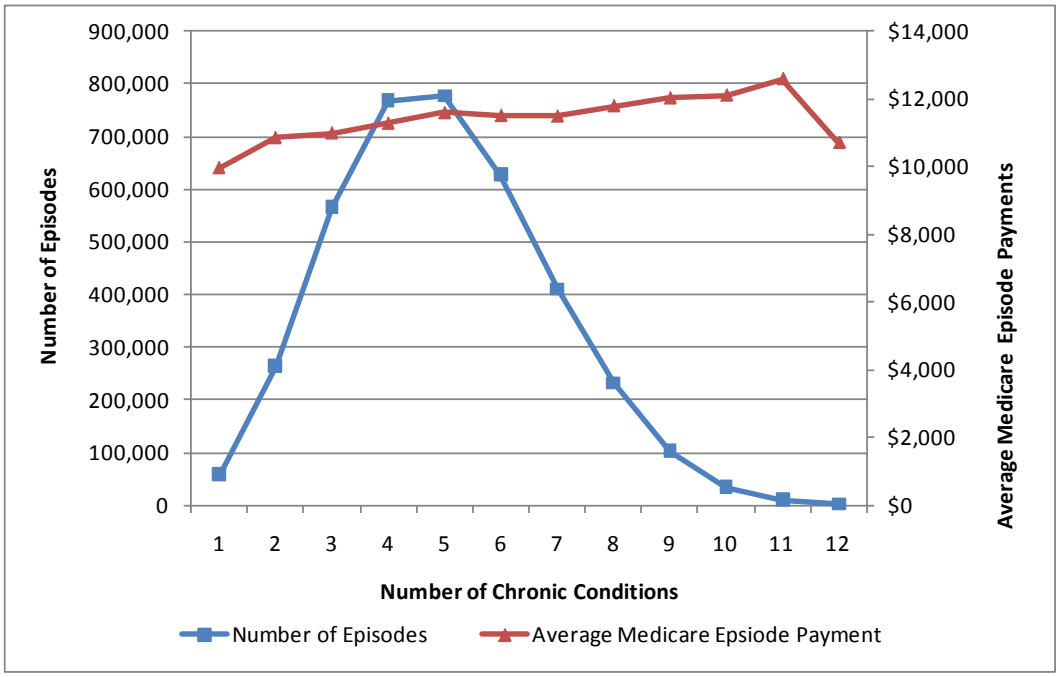
Osteoporosis episodes have an average of 5.0 chronic conditions, and an average Medicare episode payment of $11,376 (Exhibit 2.7). As shown in Exhibit 2.17 and 2.18, the average Medicare episode payment increases as the number of chronic conditions increase. The difference in Medicare payment for episodes with few chronic conditions compared to those with many chronic conditions is far less than the variance in payments for CHF*COPD episodes. More than 80 percent of episodes have between three and seven chronic conditions and have average Medicare episode payments that range between $10,998 and $11,494 per episode. Across all episodes, the average Medicare episode payment ranges from $9,977 for one chronic condition to $12,593 for 11 chronic conditions.

Exhibit 2.17: Number and Percent of Episodes and Medicare Episode Paid for Episodes Defined by Osteoporosis[a] for 60-Day Fixed-Length Pre-Acute Episodes (2007-2009)

Number of Chronic Conditions	Number of Episodes	Percent of Episodes	Medicare Episode Paid[b]	Percent Medicare Episode Paid	Average Medicare Episode Paid
1	58,800	1.5%	$586,621,940	1.3%	$9,977
2	264,340	6.9%	$2,870,399,360	6.5%	$10,859
3	566,360	14.7%	$6,228,809,980	14.2%	$10,998
4	768,040	19.9%	$8,665,437,020	19.7%	$11,283
5	778,060	20.2%	$9,020,162,040	20.5%	$11,593
6	628,080	16.3%	$7,229,124,180	16.5%	$11,510
7	411,100	10.7%	$4,725,017,920	10.8%	$11,494
8	232,000	6.0%	$2,736,781,940	6.2%	$11,796
9	103,640	2.7%	$1,246,502,100	2.8%	$12,027
10	35,040	0.9%	$424,392,700	1.0%	$12,112
11	11,220	0.3%	$141,295,020	0.3%	$12,593
12+	2,260	0.1%	$24,220,860	0.1%	$10,717
Total	**3,858,940**	**100.0%**	**$43,898,765,080**	**100.0%**	**$11,376**

Source: Dobson | DaVanzo analysis of research-identifiable 5% SAF for all sites of service, 2007-2009.
[a] For methodology used to determine primary chronic condition, see Appendix A.
[b] Episode payments exclude beneficiary co-payments.
Note: All episodes have been extrapolated to reflect the universe of Medicare beneficiaries.

Exhibit 2.18: Number of Episodes and Medicare Episode 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.
[a] Episode payments exclude beneficiary co-payments.
[b] For methodology used to determine primary chronic condition, see Appendix A.
Note: All episodes have been extrapolated to reflect the universe of Medicare beneficiaries.

Episode Type 2: Pre-Acute Episodes

Similar to the overall allocation of Medicare pre-acute episode payments by setting, over 90 percent of Medicare payments for osteoporosis episodes are associated with the index acute care hospitalization and hospital readmissions (STACH) and physician visits within the 60 days prior to the index acute care hospitalization (Exhibit 2.19). Only 3.2 percent of Medicare episode payments are associated with outpatient visits. Only 2.2 percent of total Medicare episode payments are associated with facility-based care (SNF, IRF, and LTCH). Home health represents only 0.5 percent of Medicare episode payments, indicating that patients are receiving little home health care prior to their index acute care hospitalizations.

Exhibit 2.19: Medicare Episode Paid and Percent of Medicare Episode Paid for Episodes Defined by Osteoporosis[a] for 60-Day Fixed-Length Pre-Acute Episodes (2007-2009)

Setting	Medicare Episode Paid[b]	Percent Medicare Episode Paid
HHA	$197,672,140	0.5%
SNF	$608,099,700	1.4%
IRF	$310,922,900	0.7%
LTCH	$32,974,540	0.1%
STACH	$32,697,965,100	74.5%
Physician	$8,031,228,380	18.3%
OP	$1,419,049,140	3.2%
ER	$406,993,080	0.9%
Hospice	$133,285,640	0.3%
Other IP	$60,574,460	0.1%
Total	**$43,898,765,080**	**100.0%**

Source: Dobson | DaVanzo analysis of research-identifiable 5% SAF for all sites of service, 2007-2009.

[a] For methodology used to determine primary chronic condition, see Appendix A.

[b] Episode payments exclude beneficiary co-payments.

Episode Type 2: Pre-Acute Episodes

The number of osteoporosis episodes per 1,000 fee-for-service Medicare beneficiaries and average Medicare payments for these episodes varies by geographic region. Exhibit 2.20 shows the number of episodes, an indexed measure of number of episodes per 1,000 fee-for-service beneficiaries, and average Medicare episode payment for each of the 10 CMS regions.[35] Unlike the geographic variation for CHF*COPD, there does not appear to be a correlation between the number of osteoporosis episodes per 1,000 beneficiaries and the average Medicare episode payment for these episodes. Region X – Seattle – has the lowest number of osteoporosis episodes per 1,000 fee-for-service beneficiaries (0.82), but a high average Medicare episode payment ($12,537). The region with the highest number of osteoporosis episodes per 1,000 fee-for-service Medicare beneficiaries (1.13) – Region II – New York – has an average Medicare episode payment above the overall average ($12,600).

Exhibit 2.20: Indexed Number of Episodes per 1,000 Fee-for-Service Medicare Beneficiaries and Average Medicare Episode Paid for Episodes Defined by Osteoporosis[a] by CMS Region for 60-Day Fixed-Length Pre-Acute Episodes (2007-2009)

CMS Region[b]	Number of Episodes	Indexed Number of Episodes per 1,000 FFS Beneficiaries	Average Medicare Episode Paid[c]
Region I - Boston	216,380	1.00	$11,881
Region II - New York	379,700	1.13	$12,600
Region III - Philadelphia	446,800	1.11	$11,223
Region IV - Atlanta	869,100	0.99	$10,635
Region V - Chicago	689,920	1.01	$10,861
Region VI - Dallas	388,340	0.87	$10,954
Region VII - Kansas City	244,160	1.06	$10,203
Region VIII - Denver	130,120	1.01	$10,883
Region IX - San Francisco	377,100	0.96	$13,699
Region X - Seattle	113,320	0.82	$12,537
Unknown	4,000	N/A	$11,506
Total	**3,858,940**	**1.00**	**$11,376**

Source: Dobson | DaVanzo analysis of research-identifiable 5% SAF for all sites of service, 2007-2009.
[a] For methodology used to determine primary chronic condition, see Appendix A.
[b] Beneficiary region is determined by the state in which the beneficiary's hospital referral region (HRR) is located.
[c] Episode payments exclude beneficiary co-payments.
Note: All episodes have been extrapolated to reflect the universe of Medicare beneficiaries.

[35] Medicare payments reflect the wage index of each region. We will adjust the Medicare episode payments to standardize payments regardless of wage in the next working paper.

Episode Type 2: Pre-Acute Episodes

As demonstrated above, some osteoporosis episodes have twelve or more chronic conditions, indicating the clinical complexity of these patients. Exhibit 2.21 identifies the top 10 MS-DRGs (based on total Medicare episode paid) for the index acute care hospitalizations that followed the 60 day pre-acute care episode. While some of these MS-DRGs are directly related to osteoporosis, most of the index acute care hospitalizations relate to one of the many other chronic conditions identified within each episode. Note that the cost of the index acute care hospitalization is not included in the total Medicare episode payment. The top 10 MS-DRGs account for more than one-quarter of all episodes (23.4 percent) and 26.1 percent of Medicare episode payments. As expected, MS-DRG 470 – major joint replacement or reattachment of lower extremity – is the most frequent MS-DRG, and accounts for 8.4 percent of episodes and 10.9 percent of Medicare episode payments. All of the surgical MS-DRGs that directly relate to osteoporosis (as opposed to the other chronic conditions) are more costly than the average Medicare episode payment.

Exhibit 2.21: Number and Percent of Episodes and Medicare Episode Paid for Top 10 Index MS-DRGs (Ranked by Medicare Episode Paid) for Episodes Defined by Osteoporosis[a] for 60-Day Fixed-Length Pre-Acute Episodes (2007-2009)

MS-DRG	Medical/ Surgical Designation	Number of Episodes	Percent of Episodes	Medicare Episode Paid[b]	Percent of Paid	Average Medicare Paid
470: Major joint replacement or reattachment of lower extremity w/o MCC	Surgical	324,900	8.4%	$4,769,192,520	10.9%	$14,679
481: Hip & femur procedures except major joint w CC	Surgical	79,920	2.1%	$1,136,221,340	2.6%	$14,217
460: Spinal fusion except cervical w/o MCC	Surgical	40,580	1.1%	$1,127,484,540	2.6%	$27,784
392: Esophagitis, gastroent & misc digest disorders w/o MCC	Medical	136,980	3.5%	$846,337,260	1.9%	$6,179
871: Septicemia or severe sepsis w/o MV 96+ hours w MCC	Medical	45,100	1.2%	$643,315,300	1.5%	$14,264
330: Major small & large bowel procedures w CC	Surgical	30,380	0.8%	$643,061,000	1.5%	$21,167
247: Perc cardiovasc proc w drug-eluting stent w/o MCC	Surgical	38,760	1.0%	$614,786,440	1.4%	$15,861
690: Kidney & urinary tract infections w/o MCC	Medical	92,000	2.4%	$612,260,500	1.4%	$6,655
194: Simple pneumonia & pleurisy w CC	Medical	69,140	1.8%	$545,032,960	1.2%	$7,883
482: Hip & femur procedures except major joint w/o CC/MCC	Surgical	44,820	1.2%	$538,752,960	1.2%	$12,020
Subtotal (Top 10 MS-DRGs)		**902,580**	**23.4%**	**$11,476,444,820**	**26.1%**	**$12,715**
Other		2,956,360	76.6%	$32,422,320,500	73.9%	$10,967
Total		**3,858,940**	**100.0%**	**$43,898,765,320**	**100.0%**	**$11,376**

Source: Dobson | DaVanzo analysis of research-identifiable 5% SAF for all sites of service, 2007-2009.

[a] For methodology used to determine primary chronic condition, see Appendix A.

[b] Episode payments exclude beneficiary co-payments.

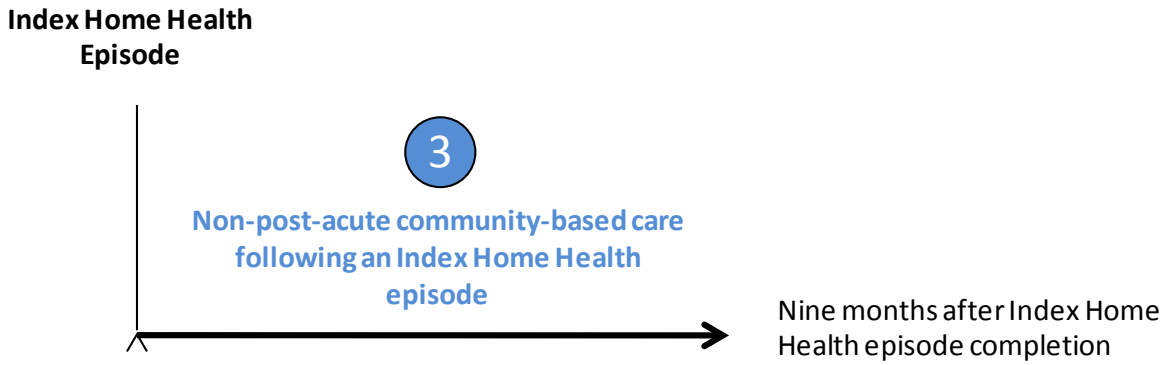
Note: All episodes have been extrapolated to reflect the universe of Medicare beneficiaries.

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

Brief Review of Episode Definition

Episode Type 3 is not anchored by an index acute care hospital stay. This episode type is initiated by a community admission to home health, and captures all care (facility and non-facility based care) 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).

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



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, their 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. Therefore, in order to have a single mutually exclusive primary chronic condition for each patient, patients are not represented in all categories of their chronic conditions.

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 3,458,760 total Type 3 episodes with a total of $83.1 billion in Medicare payments. 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. Therefore, the patient's first home health episode discharge must have occurred by March 31, 2009 to be included in this analysis. Exhibit 3.2 shows the total number of Type 3 episodes and Medicare payments by year.

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	1,550,980	$36,680,080,120	$299,900,000,000	12.2%
2008	1,500,860	$36,147,972,000	$308,300,000,000	11.7%
2009	406,920	$10,305,828,060	$325,400,000,000	3.2%
Total	**3,458,760**	**$83,133,880,180**	**n/a**	**n/a**

Source: Dobson | DaVanzo analysis of research-identifiable 5% SAF for all sites of service, 2007-2009.
[a] Episode payments exclude beneficiary co-payments.
[b] Congressional Budget Office, March Baselines for Medicare, 2008-2010.
Note: All episodes have been extrapolated to reflect the universe of Medicare beneficiaries.

Episode Type 3: Non-Post-Acute Episodes

Distribution of Episodes by Chronic Conditions

Exhibit 3.3 shows the distribution of episodes by chronic conditions prior to identifying the "primary chronic condition" based on the chronic condition hierarchy. This distribution indicates that the patients represented in these episodes often have several conditions that will determine their health care utilization. Similar to the patient chronic conditions in Episode Type 2 (pre-acute care episodes), about 64 percent of episodes involve patients with ischemic heart disease, and 54.5 percent of episodes involve patients with rheumatoid arthritis/osteoarthritis. Heart failure and diabetes are both very prevalent, in that 53.7 percent and 47.3 percent of episodes, respectively, are for patients with these conditions. Only 1.3 percent of all non-post-acute care community-based episodes involve patients that do not have any chronic conditions, slightly lower than the pre- and post-acute care episodes.

Exhibit 3.3: Number and Percent of Episodes (N=3,458,760) by Chronic Condition (Not Mutually Exclusive) for Nine-Month Fixed-Length Non-Post-Acute Care Community-Based Episodes (2007-2009)

Chronic Condition	Number of Episodes	Percent of Episodes
Lung Cancer	88,600	2.5%
Osteoporosis	1,155,580	33.1%
Chronic Obstructive Pulmonary Disease	1,191,300	34.1%
Rheumatoid Arthritis/Osteoarthritis	1,902,020	54.5%
Hip/Pelvic Fracture	214,460	6.1%
Heart Failure	1,873,360	53.7%
Alzheimer's Disease	839,400	24.0%
Alzheimer's Disease and Related Disorders or Senile	1,546,160	44.3%
Stroke/Transient Ischemic Attack	712,400	20.4%
Colorectal Cancer	75,840	2.2%
Depression	1,530,860	43.9%
Acute Myocardial Infarction	156,140	4.5%
Ischemic Heart Disease	2,248,680	64.4%
Atrial Fibrillation	743,600	21.3%
Chronic Kidney Disease	1,306,660	37.4%
Female Breast Cancer	124,240	3.6%
Prostate Cancer	116,680	3.3%
Endometrial Cancer	10,640	0.3%
Diabetes	1,652,400	47.3%
Glaucoma	562,780	16.1%
Cataract	1,150,300	33.0%
None	46,540	1.3%

Source: Dobson | DaVanzo analysis of research-identifiable 5% SAF for all sites of service, 2007-2009.
Note: All episodes have been extrapolated to reflect the universe of Medicare beneficiaries.

Episode Type 3: Non-Post-Acute Episodes

For illustrative purposes, Exhibit 3.4 shows the distribution of chronic conditions for episodes with diabetes. That is, of the 1.7 million non-post-acute care community-based episodes for patients with diabetes, this exhibit shows the other chronic conditions with which these patients presented. About three-quarters of episodes with diabetes also have ischemic heart disease, while almost two-thirds of episodes also have heart failure. Chronic kidney disease is also very common, represented by nearly one-half of diabetes episodes. Although these patients are clinically complex, they were admitted to home health from the community, indicating that they were stable enough to remain at home without facility-based care.

Exhibit 3.4: Number and Percent of Episodes with Diabetes (N=1,652,400) by Chronic Condition (Not Mutually Exclusive) for Nine-Month Fixed-Length Non-Post-Acute Care Community-Based Episodes (2007-2009)

Chronic Condition	Number of Episodes	Percent of Episodes
Lung Cancer	37,160	2.2%
Osteoporosis	491,300	29.7%
Chronic Obstructive Pulmonary Disease	635,840	38.5%
Rheumatoid Arthritis/Osteoarthritis	940,740	56.9%
Hip/Pelvic Fracture	83,900	5.1%
Heart Failure	1,044,080	63.2%
Alzheimer's Disease	354,240	21.4%
Alzheimer's Disease and Related Disorders or Senile	684,840	41.4%
Stroke/Transient Ischemic Attack	375,300	22.7%
Colorectal Cancer	37,080	2.2%
Depression	755,740	45.7%
Acute Myocardial Infarction	94,760	5.7%
Ischemic Heart Disease	1,231,120	74.5%
Atrial Fibrillation	369,080	22.3%
Chronic Kidney Disease	792,000	47.9%
Female Breast Cancer	55,300	3.3%
Prostate Cancer	56,740	3.4%
Endometrial Cancer	5,720	0.3%
Glaucoma	295,680	17.9%
Cataract	564,420	34.2%

Source: Dobson | DaVanzo analysis of research-identifiable 5% SAF for all sites of service, 2007-2009.
Note: All episodes have been extrapolated to reflect the universe of Medicare beneficiaries.

Episode Type 3: Non-Post-Acute Episodes

Distribution of Episodes by Primary Chronic Condition

Exhibit 3.5 shows the distribution of episodes and Medicare episode payments after each episode is assigned a primary chronic condition, sorted from highest to lowest community risk. This mutually exclusive assignment of conditions allows us to conduct analyses by chronic condition without duplicating the number of episodes or Medicare episode payments. As we noted above in the Methods section of this report, the episode is assigned to the most severe chronic condition. For example, an osteoporosis episode may typically contain many of the less severe conditions.

As with Episode Type 2, CHF*COPD is the most prevalent primary chronic condition, representing 24.2 percent of episodes. However, unlike the pre-acute care episode types, CHF*COPD non-post-acute care community-based episodes represent more than one-third (34.5 percent) of all Medicare episode payments. Osteoporosis remains the second most prevalent primary chronic condition, with 18.1 percent of episodes and 14.0 percent of Medicare episode payments.

Exhibit 3.6 shows the distribution of episodes and Medicare home health payments by primary chronic condition. Home health care represents 28.9 percent of all Medicare non-post-acute care community-based episode payments, and ranges from 13.4 percent of colorectal cancer Medicare episode payments to 58.3 percent of diabetes Medicare episode payments. Overall, 28.6 percent of all home health episode payments are for episodes for patients with CHF*COPD, and another 18.2 percent are for patients with DIABETES*CHF episodes. This suggests that for patients with relatively less-complex clinical conditions (i.e., diabetes, glaucoma, or cataracts), home health care is helping to keep patients stable and allows them to remain in their homes. At least one-half of their Medicare episode payments are attributed to home health, which indicates that these patients likely do not have admissions to inpatient care settings such as acute care hospitals or SNFs.

Episode Type 3: Non-Post-Acute Episodes

Exhibit 3.5: Number and Percent 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]	Percent Medicare Episode Paid
CHF*COPD	836,020	24.2%	$28,648,367,840	34.5%
DIABETES*CHF	550,720	15.9%	$16,175,470,140	19.5%
CHF*RENAL	186,500	5.4%	$5,055,938,060	6.1%
Lung Cancer	44,140	1.3%	$1,142,248,280	1.4%
Osteoporosis	627,000	18.1%	$11,652,308,200	14.0%
Chronic Obstructive Pulmonary Disease	212,100	6.1%	$4,405,618,760	5.3%
Rheumatoid Arthritis/Osteoarthritis	435,540	12.6%	$7,341,280,640	8.8%
Hip/Pelvic Fracture	15,600	0.5%	$388,102,980	0.5%
Heart Failure	85,840	2.5%	$1,392,813,220	1.7%
Alzheimer's Disease	104,660	3.0%	$1,680,661,760	2.0%
Alzheimer's Disease and Related Disorders or Senile	71,820	2.1%	$1,193,987,580	1.4%
Stroke/Transient Ischemic Attack	31,580	0.9%	$553,009,020	0.7%
Colorectal Cancer	8,420	0.2%	$250,359,680	0.3%
Depression	70,540	2.0%	$1,172,587,540	1.4%
Acute Myocardial Infarction	1,400	0.0%	$25,564,840	0.0%
Ischemic Heart Disease	57,260	1.7%	$758,102,500	0.9%
Atrial Fibrillation	4,340	0.1%	$67,939,580	0.1%
Chronic Kidney Disease	18,240	0.5%	$308,168,020	0.4%
Female Breast Cancer	4,140	0.1%	$72,368,260	0.1%
Prostate Cancer	2,720	0.1%	$26,263,660	0.0%
Endometrial Cancer	320	0.0%	$5,526,900	0.0%
Diabetes	28,020	0.8%	$239,742,900	0.3%
Glaucoma	5,380	0.2%	$37,565,120	0.0%
Cataract	9,920	0.3%	$79,088,360	0.1%
None	46,540	1.3%	$460,796,340	0.6%
Total	**3,458,760**	**100.0%**	**$83,133,880,180**	**100.0%**

Source: Dobson | DaVanzo analysis of research-identifiable 5% SAF for all sites of service, 2007-2009.

[a] For methodology used to determine primary chronic condition, see Appendix A.

[b] Episode payments exclude beneficiary co-payments.

Note: All episodes have been extrapolated to reflect the universe of Medicare beneficiaries.

Episode Type 3: Non-Post-Acute Episodes

Exhibit 3.6: Number and Percent of Episodes and Medicare Home Health 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	Medicare Episode Paid[b]	Medicare Home Health Paid	Percent Home Health Paid	Percent Medicare Episode Paid to Home Health
CHF*COPD	836,020	$28,648,367,840	$6,891,298,300	28.6%	24.1%
DIABETES*CHF	550,720	$16,175,470,140	$4,373,773,560	18.2%	27.0%
CHF*RENAL	186,500	$5,055,938,060	$1,170,382,880	4.9%	23.1%
Lung Cancer	44,140	$1,142,248,280	$199,629,420	0.8%	17.5%
Osteoporosis	627,000	$11,652,308,200	$4,042,427,740	16.8%	34.7%
Chronic Obstructive Pulmonary Disease	212,100	$4,405,618,760	$1,515,752,020	6.3%	34.4%
Rheumatoid Arthritis/Osteoarthritis	435,540	$7,341,280,640	$2,907,567,840	12.1%	39.6%
Hip/Pelvic Fracture	15,600	$388,102,980	$90,480,900	0.4%	23.3%
Heart Failure	85,840	$1,392,813,220	$464,541,200	1.9%	33.4%
Alzheimer's Disease	104,660	$1,680,661,760	$581,272,060	2.4%	34.6%
Alzheimer's Disease and Related Disorders or Senile	71,820	$1,193,987,580	$411,397,240	1.7%	34.5%
Stroke/Transient Ischemic Attack	31,580	$553,009,020	$186,998,240	0.8%	33.8%
Colorectal Cancer	8,420	$250,359,680	$33,488,460	0.1%	13.4%
Depression	70,540	$1,172,587,540	$379,005,400	1.6%	32.3%
Acute Myocardial Infarction	1,400	$25,564,840	$6,215,040	0.0%	24.3%
Ischemic Heart Disease	57,260	$758,102,500	$261,806,000	1.1%	34.5%
Atrial Fibrillation	4,340	$67,939,580	$19,856,240	0.1%	29.2%
Chronic Kidney Disease	18,240	$308,168,020	$81,861,080	0.3%	26.6%
Female Breast Cancer	4,140	$72,368,260	$11,653,540	0.0%	16.1%
Prostate Cancer	2,720	$26,263,660	$9,285,040	0.0%	35.4%
Endometrial Cancer	320	$5,526,900	$1,269,380	0.0%	23.0%
Diabetes	28,020	$239,742,900	$139,863,720	0.6%	58.3%
Glaucoma	5,380	$37,565,120	$20,561,100	0.1%	54.7%
Cataract	9,920	$79,088,360	$39,999,560	0.2%	50.6%
None	46,540	$460,796,340	$218,631,480	0.9%	47.4%
Total	**3,458,760**	**$83,133,880,180**	**$24,059,017,440**	**100.0%**	**28.9%**

Source: Dobson | DaVanzo analysis of research-identifiable 5% SAF for all sites of service, 2007-2009.

[a] For methodology used to determine primary chronic condition, see Appendix A.

[b] Episode payments exclude beneficiary co-payments.

Note: All episodes have been extrapolated to reflect the universe of Medicare beneficiaries.

Episode Type 3: Non-Post-Acute Episodes

Exhibits 3.7 and 3.8 show the average number of chronic conditions, Medicare episode payment, and home health episode payment by primary chronic condition. The average episode has 5.6 chronic conditions – slightly higher than the patients represented in the pre-acute care episodes. The average Medicare episode payment is $24,036, which consists of an average home health episode payment of $6,956 (including the index first home health episode). CHF*COPD and DIABETES*CHF episodes have the highest number of chronic conditions (7.5 and 6.6, respectively), and a higher than average Medicare payment compared to the overall average ($34,268 and $29,371, respectively), as well as home health episode payment ($8,243 and $7,942, respectively).

As shown in Exhibit 3.8, relative to the average Medicare episode payments, home health episode payments are relatively consistent regardless of the number of chronic conditions in the primary chronic condition category. However, as the number of chronic conditions contained in the primary chronic condition episode decreases, home health represents a larger proportion of the overall episode payment. This suggests that home health is only one aspect of care for more clinically complex primary condition episodes (such as CHF*COPD, DIABETES*CHF, and CHF*RENAL), but may represent the primary care setting for less complex condition episodes, such as diabetes and glaucoma.

Episode Type 3: Non-Post-Acute Episodes

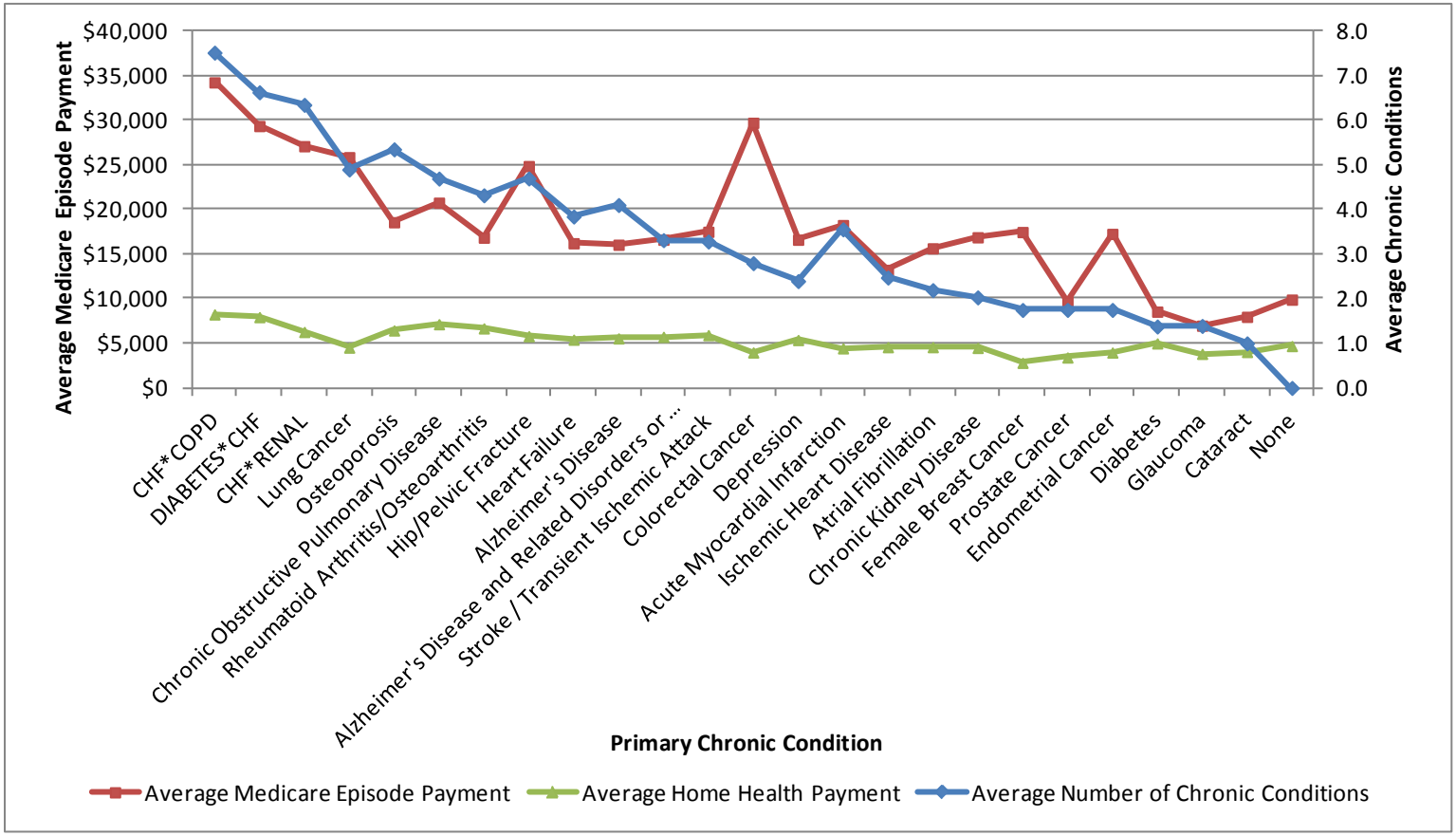
Exhibit 3.7: Average Number of Chronic Conditions and Medicare Episode Paid by Primary Chronic Condition[a] for Nine-Month Fixed-Length Non-Post-Acute Care Community-Based Episodes (2007-2009)

Primary Chronic Condition	Average Number Chronic Conditions	Average Medicare Episode Paid[b]	Average Medicare Home Health Paid
CHF*COPD	7.5	$34,268	$8,243
DIABETES*CHF	6.6	$29,371	$7,942
CHF*RENAL	6.3	$27,110	$6,276
Lung Cancer	4.9	$25,878	$4,523
Osteoporosis	5.4	$18,584	$6,447
Chronic Obstructive Pulmonary Disease	4.7	$20,771	$7,146
Rheumatoid Arthritis/Osteoarthritis	4.3	$16,856	$6,676
Hip/Pelvic Fracture	4.7	$24,878	$5,800
Heart Failure	3.8	$16,226	$5,412
Alzheimer's Disease	4.1	$16,058	$5,554
Alzheimer's Disease and Related Disorders or Senile	3.3	$16,625	$5,728
Stroke/Transient Ischemic Attack	3.3	$17,511	$5,921
Colorectal Cancer	2.8	$29,734	$3,977
Depression	2.4	$16,623	$5,373
Acute Myocardial Infarction	3.6	$18,261	$4,439
Ischemic Heart Disease	2.5	$13,240	$4,572
Atrial Fibrillation	2.2	$15,654	$4,575
Chronic Kidney Disease	2.0	$16,895	$4,488
Female Breast Cancer	1.7	$17,480	$2,815
Prostate Cancer	1.8	$9,656	$3,414
Endometrial Cancer	1.8	$17,272	$3,967
Diabetes	1.4	$8,556	$4,992
Glaucoma	1.4	$6,982	$3,822
Cataract	1.0	$7,973	$4,032
None	0.0	$9,901	$4,698
Overall	**5.6**	**$24,036**	**$6,956**

Source: Dobson | DaVanzo analysis of research-identifiable 5% SAF for all sites of service, 2007-2009.
[a] For methodology used to determine primary chronic condition, see Appendix A.
[b] Episode payments exclude beneficiary co-payments.

Episode Type 3: Non-Post-Acute Episodes

Exhibit 3.8: Average Number of Chronic Conditions and 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.

[a] Episode payments exclude beneficiary co-payments.

[b] For methodology used to determine primary chronic condition, see Appendix A.

Episode Type 3: Non-Post-Acute Episodes

Exhibit 3.9 shows the distribution of Medicare episode payments across all primary chronic conditions by care setting. Unlike the pre-acute care episodes, the care provided in non-post-acute care community-based episodes is more widely distributed across care settings. Whereas almost 92 percent of all Medicare episode payments for pre-acute care episodes were associated with hospital admissions or physician services, only 44.1 percent of Medicare episode payments are associated with those care settings in non-post-acute care community-based episodes. Moreover, home health care represents 28.9 percent of Medicare episode payments, as opposed to 0.4 percent in pre-acute care episodes. SNFs also represent 10.6 percent of Medicare episode payments for non-post-acute care community-based.

Exhibit 3.9: Medicare Episode Paid and Percent of Medicare Episode Paid for All Episodes by Care Setting for Nine-Month Fixed-Length Non-Post-Acute Care Community-Based Episodes (2007-2009)

Setting	Medicare Episode Paid[a]	Percent Medicare Episode Paid
HHA	$24,059,017,460	28.9%
SNF	$8,786,872,660	10.6%
IRF	$1,847,902,200	2.2%
LTCH	$1,707,373,360	2.1%
STACH	$23,239,389,180	28.0%
Physician	$13,376,238,620	16.1%
OP	$5,454,703,860	6.6%
ER	$945,816,260	1.1%
Hospice	$2,992,791,680	3.6%
Other IP	$723,774,880	0.9%
Total	**$83,133,880,180**	**100.0%**

Source: Dobson | DaVanzo analysis of research-identifiable 5% SAF for all sites of service, 2007-2009.

[a] Episode payments exclude beneficiary co-payments.

As we showed in the pre-acute care chapter, we analyze the CHF*COPD and osteoporosis non-post-acute care community-based episodes in greater detail in the remainder of this chapter. These sections contain descriptive statistics on the number of episodes by chronic condition count, the allocation of Medicare episode payments by setting, and Medicare episode payments by region.

Episode Type 3: Non-Post-Acute Episodes

Distribution of CHF*COPD Episodes and Medicare Episode Payments

Exhibit 3.10 shows the distribution of episodes by chronic condition for episodes with the primary chronic condition of CHF*COPD. In addition to having CHF and COPD, 85.3 percent of episodes involve patients with ischemic heart disease, and 61.3 percent of episodes involve patients with rheumatoid arthritis/osteoarthritis. Diabetes, which is also very prevalent among this population, is contained in 59.0 percent of episodes.

Exhibit 3.10: Number and Percent of Episodes Defined by CHF*COPD[a] (N=836,020) by Chronic Condition (Not Mutually Exclusive) for Nine-Month Fixed-Length Non-Post-Acute Care Community-Based Episodes (2007-2009)

Chronic Condition	Number of Episodes	Percent of Episodes
DIABETES*CHF	493,360	59.0%
CHF*RENAL	452,500	54.1%
Lung Cancer	37,100	4.4%
Osteoporosis	292,000	34.9%
Chronic Obstructive Pulmonary Disease	836,020	100.0%
Rheumatoid Arthritis/Osteoarthritis	512,520	61.3%
Hip/Pelvic Fracture	62,400	7.5%
Heart Failure	836,020	100.0%
Alzheimer's Disease	183,820	22.0%
Alzheimer's Disease and Related Disorders or Senile	382,480	45.8%
Stroke/Transient Ischemic Attack	207,360	24.8%
Colorectal Cancer	19,140	2.3%
Depression	431,920	51.7%
Acute Myocardial Infarction	67,100	8.0%
Ischemic Heart Disease	713,280	85.3%
Atrial Fibrillation	280,520	33.6%
Chronic Kidney Disease	452,500	54.1%
Female Breast Cancer	24,200	2.9%
Prostate Cancer	33,080	4.0%
Endometrial Cancer	1,820	0.2%
Diabetes	493,360	59.0%
Glaucoma	136,680	16.3%
Cataract	284,060	34.0%

Source: Dobson | DaVanzo analysis of research-identifiable 5% SAF for all sites of service, 2007-2009.
[a] For methodology used to determine primary chronic condition, see Appendix A.
Note: All episodes have been extrapolated to reflect the universe of Medicare beneficiaries.

Episode Type 3: Non-Post-Acute Episodes

CHF*COPD episodes have an average of 7.5 chronic conditions, and an average Medicare episode payment of $34,268 (Exhibit 3.7). As shown in Exhibit 3.11 and 3.12, the average Medicare episode payment increases significantly with the number of chronic conditions. Episodes for patients with CHF*COPD as the only chronic conditions (0.3 percent of all CHF*COPD episodes) have an average Medicare episode payment of $16,244. This average episode payment increases to $60,512 for patients with 14 or more chronic conditions.

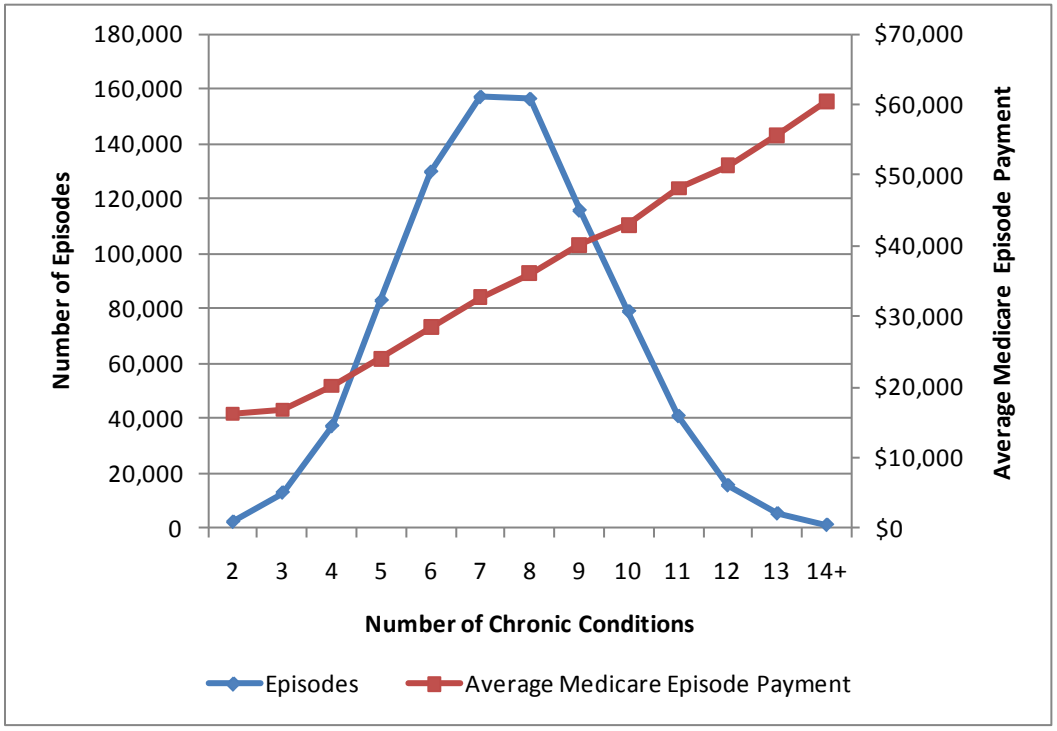
Exhibit 3.11: Number and Percent of Episodes and Medicare Episode Paid for Episode Defined by CHF*COPD[a] for Nine-Month Fixed-Length Non-Post-Acute Care Community-Based Episodes (2007-2009)

Number of Chronic Conditions	Number of Episodes	Percent of Episodes	Medicare Episode Paid[b]	Percent Medicare Episode Paid	Average Medicare Episode Paid[b]
2	2,180	0.3%	$35,411,300	0.1%	$16,244
3	12,840	1.5%	$216,078,180	0.8%	$16,829
4	37,100	4.4%	$747,444,580	2.6%	$20,147
5	82,920	9.9%	$1,991,769,300	7.0%	$24,020
6	129,920	15.5%	$3,703,911,860	12.9%	$28,509
7	157,220	18.8%	$5,145,352,520	18.0%	$32,727
8	156,480	18.7%	$5,650,141,700	19.7%	$36,108
9	115,800	13.9%	$4,649,444,920	16.2%	$40,151
10	78,980	9.4%	$3,392,918,720	11.8%	$42,959
11	40,780	4.9%	$1,963,674,360	6.9%	$48,153
12	15,500	1.9%	$796,287,380	2.8%	$51,373
13	5,240	0.6%	$291,790,100	1.0%	$55,685
14+	1,060	0.1%	$64,142,940	0.2%	$60,512
Total	**836,020**	**100.0%**	**$28,648,367,840**	**100.0%**	**$34,268**

Source: Dobson | DaVanzo analysis of research-identifiable 5% SAF for all sites of service, 2007-2009.
[a] For methodology used to determine primary chronic condition, see Appendix A.
[b] Episode payments exclude beneficiary co-payments.
Note: All episodes have been extrapolated to reflect the universe of Medicare beneficiaries.

Episode Type 3: Non-Post-Acute Episodes

Exhibit 3.12: 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.
[a] Episode payments exclude beneficiary co-payments.
[b] For methodology used to determine primary chronic condition, see Appendix A.
Note: All episodes have been extrapolated to reflect the universe of Medicare beneficiaries.

Episode Type 3: Non-Post-Acute Episodes

About one-third (33.9 percent) of Medicare episode payments for CHF*COPD episodes are associated with acute care hospital admissions (STACH). Another 15.8 percent are associated with physician visits (Exhibit 3.13). Home health represents about one-quarter of Medicare episode payments and SNFs represent 10.9 percent. This finding suggests that following a home heath admission, select patients with CHF*COPD are hospitalized and, unable to return home, are discharged to a SNF. IRFs and LTCHs are responsible for a combined 5.5 percent of Medicare episode payments. Outpatient hospital continues to be a minor part of patient care for CHF*COPD episodes and represents 5.8 percent of Medicare episode payments (compared to 4.7 percent in pre-acute care episodes).

Exhibit 3.13: Medicare Episode Paid and Percent of Medicare Episode Paid for Episodes Defined by CHF*COPD[a] by Care Setting for Nine-Month Fixed-Length Non-Post-Acute Care Community-Based Episodes (2007-2009)

Setting	Medicare Episode Paid[b]	Percent Medicare Episode Paid
HHA	$6,891,298,300	24.1%
SNF	$3,119,539,840	10.9%
IRF	$649,703,260	2.3%
LTCH	$914,568,280	3.2%
STACH	$9,710,717,940	33.9%
Physician	$4,521,303,680	15.8%
OP	$1,648,592,000	5.8%
ER	$323,077,800	1.1%
Hospice	$671,691,700	2.3%
Other IP	$197,875,040	0.7%
Total	**$28,648,367,840**	**100.0%**

Source: Dobson | DaVanzo analysis of research-identifiable 5% SAF for all sites of service, 2007-2009.

[a] For methodology used to determine primary chronic condition, see Appendix A.

[b] Episode payments exclude beneficiary co-payments.

Episode Type 3: Non-Post-Acute Episodes

The number of CHF*COPD episodes per 1,000 fee-for-service Medicare beneficiaries and average Medicare episode payments for these episodes varies substantially by geographic region. Exhibit 3.14 shows the number of episodes, an indexed measure of number of episodes per 1,000 fee-for-service beneficiaries, and average Medicare episode payment for each of the 10 CMS regions.[36] The number of CHF*COPD episodes per 1,000 fee-for-service beneficiaries among the non-post-acute community-based episodes varies more significantly than among the pre-acute episodes. Region X – Seattle – has the lowest number of CHF*COPD episodes per 1,000 fee-for-service Medicare beneficiaries (0.45) and Region VI – Dallas – has the highest (1.64). This does not appear to be related to the average Medicare episode payment, as both of these regions have lower Medicare episodes payments than the overall average ($27,298 and $33,518, respectively, compared to the overall average of $34,268). The regions with the highest average Medicare episode payments have lower than average number of CHF*COPD episodes per 1,000 Medicare beneficiaries (Region IX – San Francisco - $39,893, and Region II – New York – $38,160).

Exhibit 3.14: Indexed Number of Episodes per 1,000 Fee-for-Service Medicare Beneficiaries and Average Medicare Episode Paid for Episodes Defined by CHF*COPD[a] by CMS Region for Nine-Month Fixed-Length Non-Post-Acute Care Community-Based Episodes (2007-2009)

CMS Region[b]	Number of Episodes	Indexed Number of Episodes per 1,000 FFS Beneficiaries	Average Medicare Episode Paid[c]
Region I - Boston	39,000	0.83	$36,018
Region II - New York	47,600	0.65	$38,160
Region III - Philadelphia	59,360	0.68	$33,555
Region IV - Atlanta	244,760	1.29	$33,784
Region V - Chicago	163,700	1.10	$33,977
Region VI - Dallas	158,760	1.64	$33,518
Region VII - Kansas City	29,300	0.59	$29,628
Region VIII - Denver	13,180	0.47	$29,110
Region IX - San Francisco	65,960	0.77	$39,893
Region X - Seattle	13,520	0.45	$27,298
Unknown	880	N/A	$35,040
Total	**836,020**	**1.00**	**$34,268**

Source: Dobson | DaVanzo analysis of research-identifiable 5% SAF for all sites of service, 2007-2009.
[a] For methodology used to determine primary chronic condition, see Appendix A.
[b] Beneficiary region is determined by the state in which the beneficiary's hospital referral region (HRR) is located.
[c] Episode payments exclude beneficiary co-payments.
Note: All episodes have been extrapolated to reflect the universe of Medicare beneficiaries.

[36] Medicare payments reflect the wage index of each region. We will adjust the Medicare episode payments to standardize payments regardless of wage in the next working paper.

Episode Type 3: Non-Post-Acute Episodes

Distribution of Osteoporosis Episodes and Medicare Episode Payments

Exhibit 3.15 shows the distribution of episodes by chronic conditions for those with the primary chronic condition of osteoporosis. In addition to having osteoporosis, in 65.7 percent of episodes patients have rheumatoid arthritis/osteoarthritis, while in 52.4 percent of episodes patients have ischemic heart disease. Another 48.0 percent of episodes are for patients with Alzheimer's disease, and 47.7 percent are for depression.

Exhibit 3.15: Number and Percent of Episodes Defined by Osteoporosis[a] (N=627,000) by Chronic Condition (Not Mutually Exclusive) for Nine-Month Fixed-Length Non-Post-Acute Care Community-Based Episodes (2007-2009)

Chronic Condition	Number of Episodes	Percent of Episodes
Chronic Obstructive Pulmonary Disease	119,120	19.0%
Rheumatoid Arthritis/Osteoarthritis	411,760	65.7%
Hip/Pelvic Fracture	62,000	9.9%
Heart Failure	113,240	18.1%
Alzheimer's Disease	177,080	28.2%
Alzheimer's Disease and Related Disorders or Senile	300,860	48.0%
Stroke/Transient Ischemic Attack	112,260	17.9%
Colorectal Cancer	10,460	1.7%
Depression	299,280	47.7%
Acute Myocardial Infarction	11,480	1.8%
Ischemic Heart Disease	328,800	52.4%
Atrial Fibrillation	87,320	13.9%
Chronic Kidney Disease	110,760	17.7%
Female Breast Cancer	33,820	5.4%
Prostate Cancer	9,960	1.6%
Endometrial Cancer	2,120	0.3%
Diabetes	173,780	27.7%
Glaucoma	115,040	18.3%
Cataract	249,460	39.8%

Source: Dobson | DaVanzo analysis of research-identifiable 5% SAF for all sites of service, 2007-2009.
[a] For methodology used to determine primary chronic condition, see Appendix A.
Note: All episodes have been extrapolated to reflect the universe of Medicare beneficiaries.

Episode Type 3: Non-Post-Acute Episodes

Osteoporosis episodes have an average of 5.4 chronic conditions, and an average Medicare episode payment of $18,584 (Exhibit 3.7). As shown in Exhibits 3.16 and 3.17, the average Medicare episode payment increases significantly as the number of chronic conditions increases. Episodes for patients with osteoporosis as the only chronic condition (1.1 percent of all osteoporosis episodes) have an average Medicare episode payment of $8,994. This average episode payment increases to $37,229 for patients with 12 chronic conditions.

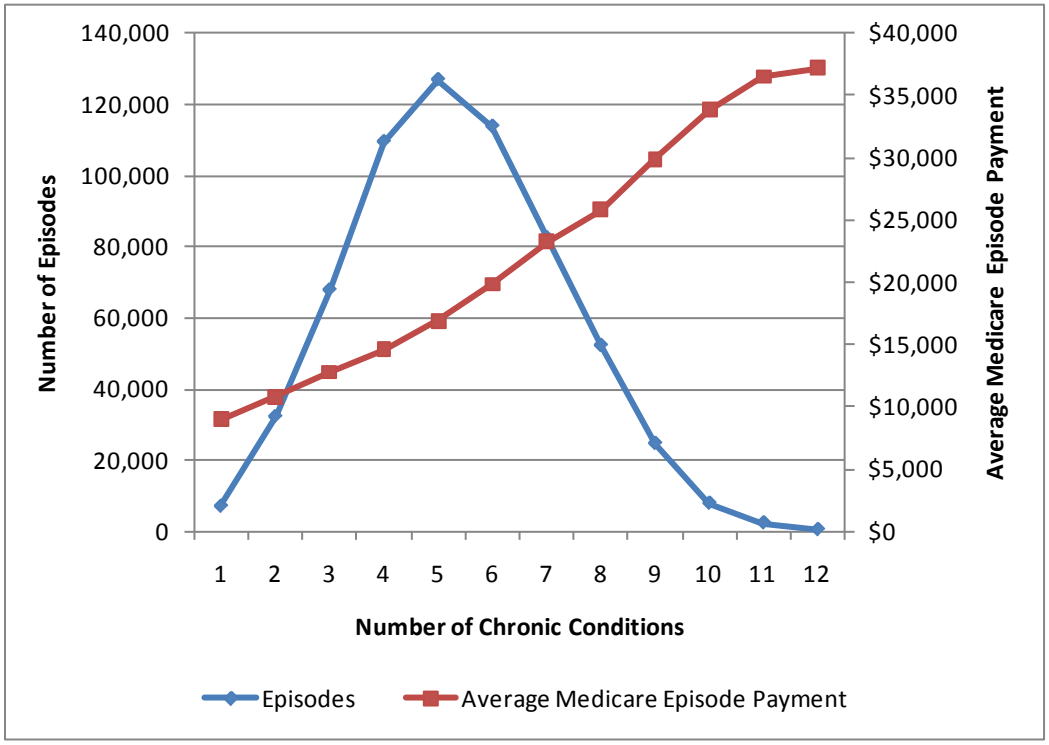
Exhibit 3.16: Number and Percent of Episodes and Medicare Episode Paid for Episodes Defined by Osteoporosis[a] for Nine-Month Fixed-Length Non-Post-Acute Care Community-Based Episodes (2007-2009)

Number of Chronic Conditions	Number of Episodes	Percent of Episodes	Medicare Episode Paid[b]	Percent Medicare Episode Paid	Average Medicare Episode Paid
1	6,980	1.1%	$62,776,480	0.5%	$8,994
2	32,160	5.1%	$348,154,000	3.0%	$10,826
3	67,780	10.8%	$867,284,420	7.4%	$12,796
4	109,460	17.5%	$1,600,078,660	13.7%	$14,618
5	126,920	20.2%	$2,146,488,440	18.4%	$16,912
6	113,800	18.1%	$2,259,629,520	19.4%	$19,856
7	82,460	13.2%	$1,917,709,620	16.5%	$23,256
8	52,200	8.3%	$1,347,430,380	11.6%	$25,813
9	24,660	3.9%	$736,942,880	6.3%	$29,884
10	7,840	1.3%	$265,450,220	2.3%	$33,858
11	2,320	0.4%	$84,727,440	0.7%	$36,520
12	420	0.1%	$15,636,140	0.1%	$37,229
Total	**627,000**	**100.0%**	**$11,652,308,200**	**100.0%**	**$18,584**

Source: Dobson | DaVanzo analysis of research-identifiable 5% SAF for all sites of service, 2007-2009.
[a] For methodology used to determine primary chronic condition, see Appendix A.
[b] Episode payments exclude beneficiary co-payments.
Note: All episodes have been extrapolated to reflect the universe of Medicare beneficiaries.

Episode Type 3: Non-Post-Acute Episodes

Exhibit 3.17: Number of Episodes and 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.
[a] Episode payments exclude beneficiary co-payments.
[b] For methodology used to determine primary chronic condition, see Appendix A.
Note: All episodes have been extrapolated to reflect the universe of Medicare beneficiaries.

Episode Type 3: Non-Post-Acute Episodes

About 35 percent (34.7 percent) of Medicare payments for osteoporosis episodes are associated with hospital admissions (STACH). Another 17.1 percent are associated with physician visits (Exhibit 3.18). Home health represents more than one-third of Medicare episode payments for patients with osteoporosis, and SNFs represent 12.3 percent. Similar to non-post-acute care community-based episodes for patients with CHF*COPD, this finding suggests that following a home heath admission, select patients with osteoporosis are subsequently admitted to the acute care hospital and then admitted to a SNF. IRFs and LTCHs are responsible for a combined 3.5 percent of Medicare episode payments, suggesting that some patients with osteoporosis are too clinically-complex to remain at home and may require facility-based care.

Exhibit 3.18: Medicare Episode Paid and Percent of Medicare Episode Paid for Episodes Defined by Osteoporosis[a] by Care Setting for Nine-Month Fixed-Length Non-Post-Acute Care Community-Based Episodes (2007-2009)

Setting	Medicare Episode Paid[b]	Percent Medicare Episode Paid
HHA	$4,042,427,740	34.7%
SNF	$1,429,235,760	12.3%
IRF	$318,783,680	2.7%
LTCH	$98,622,360	0.8%
STACH	$2,359,917,840	20.3%
Physician	$1,988,627,880	17.1%
OP	$676,647,140	5.8%
ER	$147,161,980	1.3%
Hospice	$461,498,720	4.0%
Other IP	$129,385,100	1.1%
Total	**$11,652,308,200**	**100.0%**

Source: Dobson | DaVanzo analysis of research-identifiable 5% SAF for all sites of service, 2007-2009.

[a] For methodology used to determine primary chronic condition, see Appendix A.

[b] Episode payments exclude beneficiary co-payments.

Episode Type 3: Non-Post-Acute Episodes

While the number of osteoporosis episodes per 1,000 fee-for-service Medicare beneficiaries varied significantly across geographic region, the average Medicare episode payments for these episodes remained relatively consistent. Exhibit 3.19 shows the number of episodes, an indexed measure of number of episodes per 1,000 fee-for-service beneficiaries, and average Medicare episode payment for each of the 10 CMS regions.[37] The number of osteoporosis episodes per 1,000 fee-for-service beneficiaries among the non-post-acute community-based episodes varies significantly. Region VII – Kansas City – has the lowest number of osteoporosis episodes per 1,000 fee-for-service Medicare beneficiaries (0.55) and Region VI – Dallas – continues to have the highest (1.65). Similar to the CHF*COPD episodes, this does not appear to be related to the average Medicare episode payment, as both Region VII – Kansas City and Region VI – Dallas have average Medicare episode payments slightly below the overall average of $18,584 ($17,034 and $18,466, respectively).

Exhibit 3.19: Indexed Number of Episodes per 1,000 Fee-for-Service Medicare Beneficiaries and Average Medicare Episode Paid for Episodes Defined by Osteoporosis[a] by CMS Region for Nine-Month Fixed-Length Non-Post-Acute Care Community-Based Episodes (2007-2009)

CMS Region[b]	Number of Episodes	Indexed Number of Episodes per 1,000 FFS Beneficiaries	Average Medicare Episode Paid[c]
Region I - Boston	38,580	1.09	$18,725
Region II - New York	39,320	0.72	$17,378
Region III - Philadelphia	45,320	0.69	$17,535
Region IV - Atlanta	185,140	1.30	$19,318
Region V - Chicago	91,320	0.82	$18,500
Region VI - Dallas	120,280	1.65	$18,466
Region VII - Kansas City	20,580	0.55	$17,034
Region VIII - Denver	14,940	0.71	$18,451
Region IX - San Francisco	54,980	0.86	$19,465
Region X - Seattle	16,040	0.71	$16,222
Unknown	500	N/A	$16,434
Total	**627,000**	**1.00**	**$18,584**

Source: Dobson | DaVanzo analysis of research-identifiable 5% SAF for all sites of service, 2007-2009.
[a] For methodology used to determine primary chronic condition, see Appendix A.
[b] Beneficiary region is determined by the state in which the beneficiary's hospital referral region (HRR) is located.
[c] Episode payments exclude beneficiary co-payments.
Note: All episodes have been extrapolated to reflect the universe of Medicare beneficiaries.

[37] Medicare payments reflect the wage index of each region. We will adjust the Medicare episode payments to standardize payments regardless of wage in the next working paper.

Conclusion

While the data contained in this report are preliminary, they are highly informative. Each episode type is very different in the relationship of providers that comprise it. As expected, post-acute care episodes (Episode Type 1) show high Medicare payments for post-acute care settings. That is, the majority of care is provided in facility-based care settings or home health, as opposed to ambulatory care settings. The pre-acute episodes (Episode Type 2), on the other hand, show very little Medicare episode payments for home health or facility-based care settings (excluding acute care hospitals). Prior to the start of a "treatment episode" (the index acute care hospitalization), patients rely on ambulatory care (physicians) until the point at which they are admitted to the hospital. In the non-post-acute care community-based episodes (Episode Type 3), however, there is a significant reliance on home heath following discharge from the index home health episode, and a significantly lower proportion of payments for acute care hospitals or other facility-based settings.

These preliminary findings regarding the three episode types would suggest that prior to admission into formal care settings – facility-based care or home health – patients typically rely on their physicians (or home health for Episode Type 3) to keep them clinically stable. However, once a patient is admitted to a facility, such as an acute care hospital, they are generally more likely to remain in facility-based care. This finding has significant implications for Medicare episode payments. We will explore the reasons for these notable differences, including the differences by chronic condition, in future reports.

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