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 #4: Baseline Statistics of Acute Care Hospital Readmissions by Episode Type for Select MS-DRGs and Chronic Conditions

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Working Paper #4: Baseline Statistics of Acute Care Hospital Readmissions by Episode Type for Select MS-DRGs and Chronic Conditions

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

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Wednesday, July 18, 2012 — *Final Report*

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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 fourth working paper in a series of focused reports on several 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, especially as they relate to the provision of care in the home.

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 supplies (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 from an admission to home health from the community (community-referred admission as opposed to one following discharge from a facility-based setting). Payments presented for non-post-acute care community-based episodes include the initial home health admission.

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

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

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

Prior Admission: Any hospitalization during the 60-day pre-acute care episode preceding the index acute care hospitalization.

Admission: Any hospitalization during the nine-month non-post-acute care community-based episode.

Key Concepts and Terms

Select Key Terms

Admission	Acute care hospital admission during the nine-month non-post-acute care community-based episode
Antecedent Setting	The care setting immediately preceding an acute care hospital admission, readmission, or prior admission
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

Prior Admission	Acute care hospital admission during the 60-day pre-acute care episode preceding the index acute care hospitalization
Readmission	Acute care hospital admission following discharge from the index acute care hospital admission within the 60-day post-acute care episode
SNF	Skilled Nursing Facility; refers to First Setting
STACH	Short Term Acute Care Hospital; refers to First Setting and indicates patient was readmitted to the hospital before receiving care from another setting

Introduction

The overall purpose of the *Clinically Appropriate and Cost-Effective Placement (CACEP)* project is to determine how the Medicare home health benefit can better meet beneficiary needs and improve the quality and efficiency of care provided within the U.S. health care system. To do this, we are investigating the role of home health in specifically-defined "episodes" of care, which include all of the care received by a Medicare beneficiary during a fixed period of time. We study three types of Medicare patient episodes, defined as follows:

- 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

To date, we have produced three working papers. In Working Papers #1 and #2, we explored the frequency of and expenditures associated with each of our three types of Medicare patient episodes. In Working Paper #3 we presented information on "patient pathways" – the sequence of care settings through which a beneficiary transitions during an episode. In this fourth and final working paper, we examine the frequency of hospital admissions and readmissions in our three types of patient episodes and their impact on Medicare expenditures and patient pathway complexity.

The Importance of Hospital Readmissions

Hospital readmissions have garnered substantial attention from policymakers over the last several years as an opportunity to increase the quality of care provided to beneficiaries and decrease unnecessary health care costs and utilization. Nearly one-fifth (19.6 percent) of all Medicare fee-for-service beneficiaries are readmitted within 30 days of discharge from the hospital.[3] The Medicare Payment Advisory Commission (MedPAC) estimates

[3] Jencks SF, Williams MV, Coleman EA. (2009). Rehospitalizations among patients in the Medicare fee-for-service program. *New England Journal of Medicine* 360(14): 1418-1428.

that 13 percent of readmissions are potentially preventable at an annual cost of $12 billion to the Medicare program.[4]

The Centers for Medicare & Medicaid Services (CMS) currently requires participating hospitals to report on 30-day all cause risk-standardized readmission rates for acute myocardial infarction (AMI), heart failure, and pneumonia in order to receive an annual payment update. The Patient Protection and Affordable Care Act (Affordable Care Act) transforms this program from a "pay for reporting" to a "pay for performance" program by establishing a financial incentive to reduce readmission rates for these conditions.

Under the Affordable Care Act provision, CMS will calculate the average hospital readmission rates for AMI, heart failure, and pneumonia using Medicare claims data, and will impose a penalty on hospitals the following year of up to two percent of annual Medicare payments for "excessive" readmission rates. This financial penalty, which will become effective as of October 1, 2012, has become a major concern for hospitals and has received substantial attention in the media.

Readmissions are correlated with more "sequence stops" in a patient pathway during an episode of care. Clinical interventions offer an approach to reduce readmissions from the delivery system perspective rather than by payment incentives alone. For example, one study found that patients with heart failure that receive an outpatient follow-up visit within seven days of hospital discharge have a lower risk of readmission within 30 days.[5] Another study found that physician follow-up visits within 90 days of discharge from an acute care hospital to the community are protective against hospital readmissions and are associated with substantially lower annual health expenditures.[6] These examples suggest that improved coordination of care between physicians and other care providers can improve quality and reduce health care costs within a patient pathway.

Ambulatory care sensitive conditions (ACSC), which are conditions that, if properly managed with primary and outpatient care, should not lead to complications requiring a hospital admission, are one way of distinguishing between avoidable and unavoidable hospitalizations. Medicare hospitalization rates for several ACSCs rose between 1992 and 2000 due to the increasing average age, growing prevalence of multiple co-morbidities, and falling income of Medicare beneficiaries, suggesting that a targeted approach to reducing hospitalizations is necessary based on beneficiary demographics

[4] Medicare Payment Advisory Commission (2007, June). Report to the Congress: Promoting greater efficiency in Medicare [Table 5-2]. (Washington, DC: MedPAC).

[5] Hernandez AF, Greiner MA, Fonarow GC, Hammill BC, Heidenreich PA, Yancy CW, Peterson ED, Curtis LH. (2010). Relationship between early physician follow-up and 30-day readmission among Medicare beneficiaries hospitalized for heart failure. *Journal of the American Medical Association* 303(17):1716-1722.

[6] Lin CY, Barnato AE, Degenholtz HB. (2011). Physician follow-up visits after acute care hospitalization for elderly Medicare beneficiaries discharged to noninstitutional settings. *Journal of the American Geriatric Society* 59(10):1947-1954.

and other considerations.[7] Improved care coordination and primary care will be an important component of reducing hospital admissions for ACSCs, much like for hospital readmissions.

Hospital Admissions and Readmissions in Patient Pathways

Information on hospital admissions and readmissions within an episode of care could be useful in designing policies to target hospital readmissions and other related issues. This framework would provide a better understanding of the types of care used before, during, and after the hospitalization and how trends in utilization differ across patient profiles within episodes.

For example, we observe that geographic variation in hospital readmissions per 1,000 fee-for-service Medicare beneficiaries in post-acute episodes is directionally related to the number of episodes (or hospital admissions) per 1,000 fee-for-service Medicare beneficiaries. Our analyses are consistent with recent research on geographic variation in hospital readmissions, which found that hospital admission rates explain a large proportion of this variation and suggests that policies to reduce hospital admissions may have a larger impact on readmissions than other approaches.[8]

Using our three episode definitions, we can better understand the role of hospital admissions and readmissions in driving Medicare expenditures for episodes of care. In post-acute care episodes, a hospital admission occurring after the index acute care hospitalization is a hospital readmission. This readmission can be attributed to the first setting to which the patient was discharged from the index acute care hospitalization (the first setting) or the care setting immediately preceding the readmission (the antecedent setting). While a patient may have a hospital readmission any time during a "SNF first setting episode," the care setting from which they were readmitted to the hospital could have been an inpatient rehabilitation facility (IRF), home health agency (HHA), or other care setting. The "first setting" definition of hospital readmissions links any readmission within an episode of care to the episode's first setting, while the "antecedent" setting definition of hospital readmissions links each readmission to the care setting immediately prior to the readmission. These different definitions produce very different results in our analyses.

Unlike in post-acute care episodes (which by definition begin with an index acute care hospitalization), hospital admissions are treated differently in pre-acute care episodes and non-post-acute care community-based episodes. In pre-acute care episodes, a hospital

[7] McCall NT, Brody E, Mobley L, Subramanian S. (2004). Investigation of increasing rates of hospitalization for ambulatory care sensitive conditions among Medicare fee-for-service beneficiaries. Submitted to the Centers for Medicare & Medicaid Services by RTI International. (Washington, DC: RTI International).

[8] Epstein AM, Jha AK, Orav EJ. (2011). The relationship between hospital admission rates and rehospitalizations. *New England Journal of Medicine* 365(24): 2287-2295.

admission (other than the index acute care hospitalization) that occurs during the episode is identified as a "prior hospital admission." In non-post-acute care community-based episodes, since the episode begins with an index home health admission, any hospital admission that occurs during the episode is identified as a "hospital admission" and not differentiated between admissions and readmissions.

In the remainder of this report, we re-introduce the methodology for developing our three episode types, as well as present descriptive statistics on the frequency and Medicare episode payments associated with hospital admissions and readmissions. These descriptive statistics present the distribution of Medicare payments within a context of patients' chronic conditions (and in the case of post-acute care episodes, a patient's index acute care hospitalization MS-DRG). We also analyze the impact of hospital admissions and readmissions on patient pathways, such as the number of readmissions within an episode, the position of the readmission within the episode (by first setting and antecedent setting), and how beneficiary demographic and clinical characteristics influence the likelihood of experiencing a hospital admission or readmission. The final chapter presents descriptive statistics on geographic variation in hospital admissions and readmissions and Medicare expenditures by episode type at both the episode level and the population level.

Upcoming Study Analyses

The analysis of hospital admissions and readmissions presented in this report will be used to inform our future analyses, in which we will model changes across care settings based on the current Medicare home health benefit. These analyses will include a number of simulations that model changes in how home health care is provided to Medicare beneficiaries at different stages of patient care, such as models to simulate:

- Clinically appropriate placement of patients into post-acute care following an index acute care hospitalization at the national or regional level;
- The potential to reduce aggregate facility-based care payments through bundled payment incentives;
- The potential Medicare savings that could be realized by reducing acute care hospital readmissions and emergency room visits; and
- The provision of additional home and ambulatory-based care during pre-acute care episodes for both homebound and non-homebound patients in order to avoid the index acute care hospitalization.

The results of our analyses will be presented in an upcoming final report for the CACEP Project.

Methods in Brief

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

Datasets

These analyses are based on all Part A and Part B claims from a five percent sample of Medicare beneficiaries from 2007 to 2009, including: inpatient and outpatient hospitals, LTCHs, SNFs, IRFs, HHAs, hospice, and physician and outpatient therapy visits.[9] Medicare payments from these claims are presented as Medicare paid amounts and exclude beneficiary copayments, deductibles, and payments from other third parties.[10] These data were requested from the CMS Chronic Condition Warehouse (CCW),[11] which is a database that flags each patient claim with the clinical conditions for which the patient has been historically treated. The CCW data contains flags for 21 common conditions, including, but not limited to, diabetes, congestive heart failure, osteoporosis, various cancers, depression, and stroke.

Episode Definitions

Patient "episodes" were created to capture all health care utilization following (or preceding) key points in the patient's care. In this study, 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," and an outpatient "visit"). The concept of an episode begins to change the way care is viewed (e.g., breaks down the payment silos profiled above).

[9] Durable medical equipment, orthotics, prosthetics, and supplies (DMEPOS) claims are excluded from analyses.

[10] Episode payments do not explicitly include Part D drugs but prescription drug services are included under SNF, IRF, and LTCH PPS payments.

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

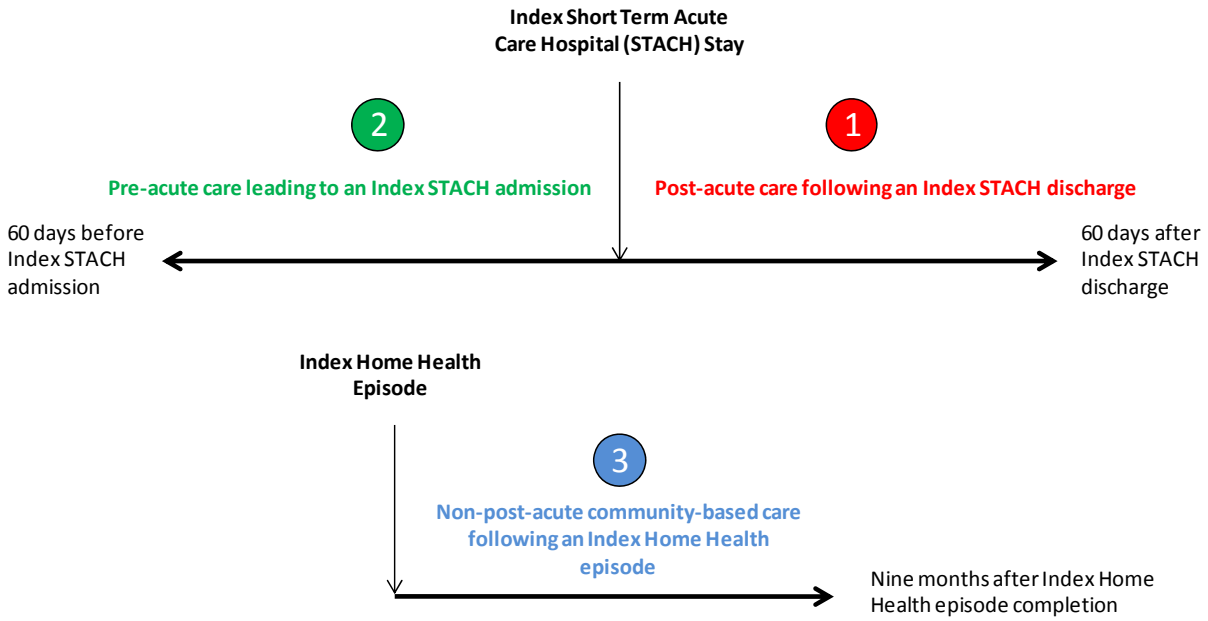
As noted above, three episode definitions were developed to capture the following uses of home health care:

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

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

Exhibit A.1: Relationship between Episode Types



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

Summary of Findings

Post-Acute Care Episodes

Post-acute care episodes are clinically defined in this series of working papers by the index acute care hospitalization MS-DRG and include all care received within 60 days following discharge from the index acute care hospital.

Prevalence of Readmissions

- More than three-quarters (77.6 percent) of post-acute episodes do not contain a readmission, while another 17.4 percent contain one readmission. The remaining five percent of episodes contain two or more readmissions per episode.

- Across all first settings, episodes that contain a readmission have average Medicare episode payments that are more than twice that of episodes that do not ($33,926 compared to $15,335, a ratio of 2.21). Community first setting episodes have the highest ratio of average Medicare episode payments for episodes with a readmission to those without a readmission (2.73), while LTCH first setting episodes have the lowest ratio (1.28).

- As the number of readmissions contained within an episode increases, the average Medicare episode payment increases proportionately. For example, episodes with no readmissions have an average Medicare episode payment of $15,335, while episodes with one readmission have an average Medicare episode payment of $30,762, and $42,752 for episodes with two readmissions.

MS-DRGs

- There is considerable variation in the proportion of episodes containing a readmission by MS-DRG, and by surgical and medical episode designation.

    - Within the top 20 MS-DRGs (ranked by total Medicare episode payments), the percent of episodes containing a readmission ranges from

9.5 percent for MS-DRG 470 (major joint replacement w/o MCC) to 35.0 percent for MS-DRG 291 (heart failure and shock with MCC).

- The percent of episodes containing a readmission for surgical index acute care hospital MS-DRGs range from 9.5 percent (MS-DRG 470) to 24.4 percent (MS-DRG 329 – major small and large bowel procedures), while the percent of episodes with a readmission for medical MS-DRGs range from 16.9 percent (MS-DRG 312 – syncope & collapse) to 35.0 percent for (MS-DRG 291 – heart failure and shock with MCC). Therefore, for the top 20 MS-DRGs analyzed, medical MS-DRGs generally have a higher proportion of readmissions than surgical MS-DRGs.

- Regardless of first setting, 62.0 percent of readmissions originate directly in the Community (antecedent setting), while 13.7 percent come from HHA, and 12.8 percent come from SNFs.

  - However, 12.5 percent of episodes that contain home health care have home health as the antecedent setting. This compares to 16.9 percent of episodes with Community care, 14.2 percent of episodes with SNF care, and 9.0 percent and 8.3 percent of episodes with LTCH and IRF care, respectively.

Chronic Conditions

- As the number of chronic conditions increases within an episode, the percent of episodes that contain a readmission increases. For example, 12.9 percent of episodes with no chronic conditions contain a readmission, while 65.0 percent of episodes with 15 chronic conditions contain a readmission. This suggests that readmissions are partially attributable to the complexity of patients with multiple chronic conditions.

Patient Demographic Characteristics

- Readmissions are concentrated within specific patient demographic characteristics. Episodes for females, those who reside in rural areas, and those who are 85 years and older all have comparable rates of readmissions (about one in five episodes contain a readmission), while episodes for dual eligibles, non-whites, and those who live alone have comparable (but higher) rates (more than one-quarter of episodes contain a readmission).

Summary of Findings

Pre-Acute Care Episodes

Pre-acute care episodes are clinically defined by the patient's primary chronic condition, which is hierarchically ordered using Medicare Advantage community-risk score for comparable hierarchical condition categories (HCCs). These episodes show the relative mix of services and Medicare episode payments provided to patients prior to the index acute care hospitalization. Due to the required 15-day clean period without facility-based or home health care prior to the index acute care hospitalization, any prior hospitalization in the pre-acute care episodes must have occurred prior to this clean period.

Prevalence of Prior Admissions

- Almost 90 percent (89.4 percent) of episodes do not contain a prior admission, while 9.1 percent contain one prior admission, and 1.5 percent contains two or more prior admissions.

- Across all primary chronic conditions, episodes that contain an admission prior to the index acute care hospitalization have average Medicare episode payments that are double those of episodes that do not ($44,972 compared to $25,494, ratio of 2.13).

- Similar to the post-acute care episodes, as the number of prior admissions contained within an episode increases, the average Medicare episode payment increases proportionately. For example, episodes with no prior admissions have an average Medicare episode payment of $11,972, while the average Medicare episode payment for episodes with one readmission is $23,842 (ratio of 1.99), and is $33,470 for episodes with two prior admissions (ratio of 2.80).

Chronic Conditions

- As the severity of the primary chronic conditions decreases, the relative difference in the average Medicare episode payment for episodes containing and not containing prior admissions increases markedly. For example, for diabetes, glaucoma, and cataract primary chronic condition episodes (which are relatively low in severity), episodes with a prior admission have an average Medicare episode payment almost three times the average Medicare payment for episodes that do not include a prior admission. This is likely due to the lower payments for ambulatory care provided in episodes without a prior admission compared to payments for facility-based care for the prior admission. However, for higher severity conditions, such as CHF*COPD and DIABETES*CHF, episodes with a prior admission have an average Medicare episode payment about two times higher than those without prior admissions.

Patient Demographic Characteristics

- The presence of prior admissions does appear to be concentrated within specific patient demographic characteristics. Episodes for patients who died during the index acute care hospitalization, are dual eligible, or are non-white have a higher than average proportion of episodes that contain a prior admission (about 14 percent compared to the overall average of 10.6 percent). Episodes for patients aged 85 years and older have a lower than average proportion of episodes containing a prior admission (7.8 percent compared to 10.6 percent).

Non-Post-Acute Care Community-Based Episodes

Non-post-acute care community-based episodes are clinically defined by the patient's primary chronic condition. These episodes are initiated with a home health admission from the community and include care for nine months following the first home health episode discharge. These episodes generally reflect the services that are provided to community-dwelling patients by home health agencies to coordinate care.

Prevalence of Hospital Admissions

- More than one-half (56.8 percent) of episodes do not contain a hospital admission, while about one-quarter contain one admission, 10.5 percent contain two admissions, and 8.1 percent contain three or more within the nine-month episode.

- Across all primary chronic conditions, episodes that contain a hospital admission have average Medicare episode payments that are about four times higher than episodes that do not ($41,933 compared to $11,162, ratio of 3.76). The difference in the average Medicare episode payment suggests that episodes that do not contain an acute care hospitalization may predominately rely on ambulatory-based or home health care, rather than facility-based care (which is associated with higher average Medicare payments), during the nine-month episode.

- The average Medicare episode payment almost doubles with each additional hospital admission contained within an episode. For example, episodes with no hospital admissions have an average Medicare episode payment of $11,162, while episodes with one admission have an average Medicare episode payment of $28,377. The average Medicare episode payment for episodes with two hospital admissions is $46,394, and is $77,203 for episodes with three or more admissions.

Chronic Conditions

- As the number of chronic conditions increases within an episode, the percent of episodes that contain an admission also increases. For example, 13.0 percent of

episodes with no chronic conditions contain an admission, while 78.7 percent of episodes with fifteen chronic conditions contain an admission. This again suggests that readmissions are partially attributable to the complexity of patients with multiple chronic conditions, and that the majority of episodes with many chronic conditions contain hospital admissions within the nine-month period.

- As severity of primary chronic condition decreases, the relative change in average Medicare episode payments for episodes with hospital admissions increases markedly. Episodes defined by a low-severity primary chronic conditions that contain a hospital admission have an average Medicare episode payment almost five times higher than episodes without an admission, compared to about 3.5 times higher for higher severity primary chronic condition episodes. This finding suggests that if low severity patients were kept out of the hospital with appropriate management of their chronic conditions, Medicare could realize significant savings per avoided admission.

Patient Demographic Characteristics

- Similar to the pre-acute care episodes, the presence of hospital admissions does appear to be concentrated within specific patient demographic characteristics. The percent of episodes that contain an admission for patients who are female, lives alone, reside in a rural area, or are over age 85 is similar to the overall average of 43.2 percent, while episodes for those who are non-white have a lower than average percent of episodes that contain an admission (38.7 percent). Also, almost two-thirds (63.5 percent) of episodes for patients who died during the episode contain a hospital admission.

Regional Variation

Regional variation in the prevalence of hospital admissions and readmission, as well as average Medicare episode payments, was investigated across all three episode types.

Post-acute Care

- Regions with higher rates of index acute care hospital days of care per 1,000 fee-for-service beneficiaries tend to have a disproportionate amount of readmission days of care per 1,000 fee-for-service beneficiaries.

- The average Medicare payment for episodes that contain a readmission is approximately two times the average Medicare payment for episodes that do not contain a readmission, which is consistent within each region and overall across regions.

- The rate of readmission episodes per 1,000 fee-for-service beneficiaries varies by almost two-fold across regions for MS-DRG 470 (major joint replacement w/o

MCC), but the rate of readmissions per 1,000 fee-for-service beneficiaries varies by almost three-fold across regions for MS-DRG 291(heart failure and shock w/o MCC), suggesting that there may be higher regional variation in the frequency of readmission episodes for certain medical MS-DRGs than surgical MS-DRGs. This trend may contribute to why medical MS-DRGs are more prone to readmissions overall.

- At both the MS-DRG level and the overall level across MS-DRGs, the proportion of total post-acute care episodes, frequency of hospital readmissions, and the impact of readmissions on average Medicare episode payments do not appear to have a strong relationship to each other with the exception of Region X (Seattle), which consistently has a relatively low ranking within each category.

Pre-acute Care

- As with the post-acute care episodes, the average Medicare payment for an episode with a prior admission is approximately twice as high as without a prior admission, which is consistent within each region and overall across regions.

- The rate of prior admission episodes per 1,000 fee-for-service beneficiaries varies by almost two-fold across regions overall, and varies between two- and three-fold across regions within episodes by primary chronic condition.

- Much like the post-acute episodes, the frequency of prior admissions in pre-acute episodes and the impact of prior admissions on Medicare episode payments do not appear to have a strong relationship to each other. No region is ranked consistently low or high across categories, although Region X (Seattle) tends to have the lowest rankings and Region VII (Kansas City) has some of the highest rankings across categories, both at the overall level and within primary chronic conditions.

Non-Post-Acute Care Community-Based

- The average Medicare payment for episodes that contain a hospital admission is slightly less than four times the average Medicare payment for episodes that do not contain a hospital admission at the overall level across regions, but this ratio varies between three and five times within regions.

- In general, and similar to both the post-acute and pre-acute episodes, the frequency of hospital admissions in non-post-acute care community-based episodes and the impact of hospital admissions on Medicare episode payments do not appear to have a strong relationship to each other, with the exception of Region VI (Dallas).

Summary of Findings

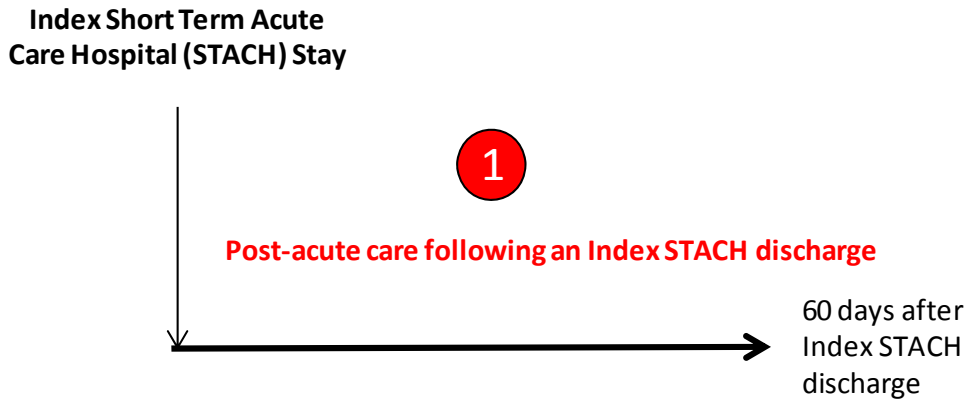
- Region VI (Dallas) has the lowest percent of non-post-acute care community-based episodes with a hospital admission (39.0 percent), but has the highest average Medicare episode payment ($46,439) and the highest number of non-post-acute care community-based episodes with a hospital admission per 1,000 fee-for-service beneficiaries (25). This finding suggests that the increased use of community-based home health may be related to a lower incidence of hospital admissions within episodes. However, Dallas has a higher frequency of hospital admissions per 1,000 Medicare fee-for-service beneficiaries.

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

Brief Review of Episode Definition[12]

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

Exhibit 1.1: Description of Post-Acute Care Episode



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.

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

This nomenclature does not mean, however, that the episode only includes care from the first setting; episodes often contain care from several different settings.

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

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

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

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

Post-acute care episodes represent a significant proportion of Medicare fee-for-service spending. Across all three years (2007-2009), there are 24,239,080 total 60-day post-acute care episodes and a total of $472.8 billion in Medicare payments.[13,14] In 2008, the 9.2 million post-acute care episodes that occurred represent about 55 percent of total Medicare fee-for-service spending in that year.[15]

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

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

[15] Dobson | DaVanzo analysis of research-identifiable 5% SAF for all sites of service, 2007-2009, wage index adjusted by setting and geographic region, and standardized to 2009 dollars, divided by the Congressional Budget Office, March Baselines for Medicare, 2010 (for 2009 Medicare spending).

Episode Type 1: Post-Acute Episodes

Descriptive Statistics by First Setting

Exhibit 1.3 shows the overall distribution of post-acute episodes by first setting. The average Medicare episode payment across all first settings is $19,505. More than one-half (52.7 percent) of all post-acute episodes have a first setting of Community, indicating that a physician or outpatient visit is the first form of care a patient received following discharge from the index acute care hospital. Community first setting episodes represent 39.1 percent of total Medicare episode payments. SNF is the second most frequent first setting, representing 16.2 percent of episodes and 24.3 percent of Medicare episode payments. About 12 percent (12.4 percent) of episodes are HHA first setting episodes, which represent 12.9 percent of episode costs.

Exhibit 1.3: Number of Episodes and Medicare Episode Payment by First Setting for 60-Day Fixed-Length Post-Acute Episodes (2007-2009)

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

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

Exhibit 1.4 shows, for each first setting, the percent of episodes and average Medicare episode payment for episodes that contain a readmission compared to episodes that do not. Across all episodes (those with and without readmissions), the average Medicare episode payment is $19,505, with almost one-quarter of all episodes containing a hospital readmission.

LTCH and ER first setting episodes have the highest proportion of episodes with readmissions (29.2 percent and 28.9 percent, respectively), while hospice first setting episodes have the lowest readmission rate (4.6%) (excluding No Care episodes). Note that STACH first setting episodes contain a readmission by definition, and No Care episodes have no care after discharge from the index STACH. The high proportion of

readmissions in LTCH first setting episodes is likely due to the clinical severity of patients in those settings, and the low readmission rates for Hospice first setting episodes are likely due to patient death. Among the other formal post-acute care settings (HHA, SNF, and IRF), the proportion of episodes that contain a readmission is generally consistent, ranging from 22.7 percent for IRFs to 25.8 percent for SNFs. This does not mean, necessarily, that the readmissions are directly following the first setting. A readmission can occur anywhere along the patient pathway.

Episodes that do not contain a hospital readmission have an average Medicare episode payment of $15,335, while episodes that do contain a hospital readmission average Medicare episode payments of $33,926 (ratio of average Medicare payments for episodes with a readmission to episodes without a readmission of 2.21). Even without the presence of an acute care hospital readmission, the average Medicare episode payment varies by first setting, ranging from $10,768 for Community first setting episodes to $83,121 for LTCH first setting episodes.

The increase in the average Medicare payment per episode by first setting for episodes containing a readmission compared to those not containing a readmission is not uniform. That is, Community first setting episodes not containing a readmission have an average Medicare episode payment of $10,768, while the average Medicare episode payment for Community first setting episodes that include a readmission is almost three times higher ($29,377, ratio of 2.73). This suggests that Community first setting episodes that do not contain a readmission are generally able to remain safely in the community without facility-based care; however, it is possible that some patients may be discharged from the hospital too early, or that the readmission was planned. This early discharge (or planned event) may then result in a readmission. The other community-based first setting episodes, such as ER, OP Therapy, and Hospice, have a similar trend. However, due to the high payments of LTCHs, LTCH first setting episodes without readmissions have an average Medicare payment of $83,121, while episodes with a readmission have an average payment of $106,247 (or ratio of 1.28).

Exhibit 1.4: Percent of Episodes and Average Medicare Episode Payment by First Setting by Readmission Status for 60-Day Fixed-Length Post-Acute Episodes (2007-2009)

	Total			Episode Does Not Contain Readmission		Episode Contains Readmission		Ratio of Average Medicare Episode Payment[b]
First Setting	Percent of Episodes	Average Medicare Episode Payment	Percent of Episodes with Readmission	Percent of Episodes	Average Medicare Episode Payment	Percent of Episodes	Average Medicare Episode Payment	
HHA	12.4%	$20,345	23.3%	12.3%	$16,291	12.9%	$33,694	2.07
SNF	16.2%	$29,218	25.8%	15.5%	$24,628	18.7%	$42,390	1.72
IRF	2.8%	$44,193	22.7%	2.8%	$39,191	2.8%	$61,273	1.56
LTCH	0.6%	$89,869	29.2%	0.6%	$83,121	0.8%	$106,247	1.28
STACH	2.7%	$29,713	100.0%	N/A	N/A	12.1%	$29,713	N/A
Community	52.7%	$14,478	19.9%	54.3%	$10,768	46.8%	$29,377	2.73
ER	3.0%	$16,364	28.9%	2.8%	$11,558	3.9%	$28,203	2.44
OP Therapy	1.4%	$15,233	19.3%	1.5%	$11,890	1.2%	$29,210	2.46
Hospice	2.0%	$17,651	4.6%	2.4%	$16,983	0.4%	$31,380	1.85
Other IP	0.4%	$23,572	21.7%	0.4%	$20,587	0.4%	$34,325	1.67
No Care[a]	5.8%	$14,761	0.0%	7.4%	$14,761	N/A	N/A	N/A
Overall Average	**100.0%**	**$19,505**	**22.4%**	**100.0%**	**$15,335**	**100.0%**	**$33,926**	**2.21**

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

[a] Episodes include deaths during index admission.

[b] Average Medicare Episode Payment for episodes that contain a readmission divided by episodes that do not contain a readmission.

Episode Type 1: Post-Acute Episodes

Exhibit 1.5 shows the percent of episodes and average Medicare episode payment for the top 20 MS-DRGs for the index acute care hospitalization, ranked by total Medicare episode payments, for episodes that contain a readmission compared to episodes that do not. The top 20 MS-DRGs represent 28.9 percent of all post-acute care episodes, of which 21.5 percent contain a hospital readmission. There is considerable variation in the proportion of episodes containing a readmission by MS-DRG. For example, only 9.5 percent of episodes with an index acute care hospitalization of MS-DRG 470 – major joint replacement or reattachment of lower extremity w/o MCC (the top ranked MS-DRG based on total Medicare episode payments) – contain a readmission, while more than one-third (35.0 percent) of episodes for MS-DRG 291 – heart failure and shock w/ MCC – contain a readmission.

Surgical MS-DRGs appear to have a lower proportion of episodes with a readmission (17.6 percent of episodes) compared to medical MS-DRGs (25.6 percent of episodes) (data not shown). However, regardless of MS-DRG for the index acute care hospitalization, 79.4 percent of readmissions are for a medical MS-DRG while 20.6 percent of readmissions are for surgical MS-DRGs.

Exhibit 1.5: Top 20 MS-DRGs (Ranked by Medicare Episode Payment) by Readmission Status for 60-Day Fixed-Length Post-Acute Episodes (2007-2009)

MS-DRG	Med/ Surg	Total					Episode Does Not Contain Readmission		Episode Contains Readmission		Ratio of Average Medicare Episode Payment[a]
		Percent of Episodes	Average Medicare Episode Payment	Percent of Episodes with Readmission	Medical	Surgical	Percent of Episodes	Average Medicare Episode Payment	Percent of Episodes	Average Medicare Episode Payment	
470: Major joint replacement or reattachment of lower extremity w/o MCC	Surgical	4.7%	$22,986	9.5%	70.2%	29.8%	5.4%	$21,319	2.0%	$38,871	1.82
871: Septicemia or severe sepsis w/o MV 96+ hours w MCC	Medical	1.8%	$23,383	23.7%	86.3%	13.7%	1.7%	$18,319	1.9%	$39,662	2.17
291: Heart failure & shock w MCC	Medical	1.5%	$21,572	35.0%	87.5%	12.5%	1.2%	$14,784	2.3%	$34,198	2.31
003: ECMO or trach w MV 96+ hrs or PDX exc face, mouth & neck w maj OR	Surgical	0.2%	$182,116	24.8%	74.5%	25.5%	0.2%	$174,085	0.2%	$206,455	1.19
194: Simple pneumonia & pleurisy w CC	Medical	2.1%	$14,210	22.6%	89.3%	10.7%	2.1%	$10,441	2.1%	$27,129	2.60
481: Hip & femur procedures except major joint w CC	Surgical	0.8%	$32,869	19.1%	77.5%	22.5%	0.8%	$29,980	0.7%	$45,136	1.51
292: Heart failure & shock w CC	Medical	1.6%	$16,744	33.9%	87.6%	12.4%	1.3%	$10,922	2.4%	$28,093	2.57
065: Intracranial hemorrhage or cerebral infarction w CC	Medical	1.0%	$24,522	20.2%	84.4%	15.6%	1.1%	$20,899	0.9%	$38,814	1.86
392: Esophagitis, gastroent & misc digest disorders w/o MCC	Medical	2.5%	$10,016	21.0%	79.2%	20.8%	2.6%	$6,611	2.4%	$22,831	3.45
690: Kidney & urinary tract infections w/o MCC	Medical	1.9%	$13,355	22.5%	85.9%	14.1%	1.9%	$9,963	1.9%	$25,032	2.51
247: Perc cardiovasc proc w drug-eluting stent w/o MCC	Surgical	1.4%	$17,878	16.6%	55.7%	44.3%	1.5%	$15,306	1.0%	$30,758	2.01
641: Nutritional & misc metabolic disorders w/o MCC	Medical	1.7%	$12,461	23.4%	86.5%	13.5%	1.7%	$8,761	1.8%	$24,547	2.80
329: Major small & large bowel procedures w MCC	Surgical	0.4%	$47,808	24.4%	81.0%	19.0%	0.4%	$42,454	0.5%	$64,378	1.52
460: Spinal fusion except cervical w/o MCC	Surgical	0.6%	$33,198	11.1%	62.7%	37.3%	0.7%	$30,917	0.3%	$51,430	1.66
287: Circulatory disorders except AMI, w card cath w/o MCC	Medical	1.3%	$15,604	21.1%	55.1%	44.9%	1.3%	$10,486	1.2%	$34,791	3.32
293: Heart failure & shock w/o CC/MCC	Medical	1.3%	$13,657	30.0%	85.9%	14.1%	1.2%	$8,608	1.8%	$25,445	2.96
683: Renal failure w CC	Medical	1.0%	$18,075	28.7%	84.1%	15.9%	0.9%	$12,928	1.3%	$30,855	2.39
193: Simple pneumonia & pleurisy w MCC	Medical	0.9%	$19,137	26.4%	87.4%	12.6%	0.9%	$13,994	1.1%	$33,474	2.39
312: Syncope & collapse	Medical	1.6%	$10,650	16.9%	79.0%	21.0%	1.8%	$7,850	1.2%	$24,439	3.11
280: Acute myocardial infarction, discharged alive w MCC	Medical	0.6%	$28,135	33.7%	84.2%	15.8%	0.5%	$21,610	0.9%	$40,975	1.90
Subtotal (Top 20 MS-DRGs)		**28.9%**	**$19,530**	**21.5%**	**81.3%**	**18.7%**	**29.2%**	**$15,875**	**27.7%**	**$32,836**	**2.07**
Other		71.1%	$19,495	22.8%	78.6%	21.4%	70.8%	$15,113	72.3%	$34,344	2.27
Overall Average		**100.0%**	**$19,505**	**22.4%**	**79.4%**	**20.6%**	**100.0%**	**$15,335**	**100.0%**	**$33,926**	**2.21**

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

[a] Average Medicare Episode Payment for episodes that contain a readmission divided by episodes that do not contain a readmission.

Episode Type 1: Post-Acute Episodes

Exhibit 1.6 shows the percent of episodes and average Medicare episode payment by primary chronic condition for episodes that contain a readmission compared to episodes that do not. The top seven primary chronic conditions represent 79.7 percent of total post-acute care episodes. As the severity of primary chronic conditions decreases hierarchically, the percent of episodes within the primary chronic condition category decreases as well. One-third of CHF*COPD episodes, and approximately 28 percent of episodes each with DIABETES*CHF, CHF*RENAL, and lung cancer contain a readmission. However, episodes with a primary chronic condition of diabetes, glaucoma, or cataracts have between 6.3 percent and 8.7 percent of episodes containing a readmission. We note that the readmission may not be related to the patient's primary chronic condition and may represent a planned surgery.

The average Medicare episode payment for high-severity primary chronic condition episodes often doubles when the episode contains a readmission, while the increase in payment is often three times higher for lower-severity primary chronic condition episodes. This finding indicates that lower-severity episodes generally rely more on community-based care services than episodes that include a readmission, while higher-severity episodes often contain more facility-based care. Therefore, avoiding readmissions, particularly for beneficiaries with high-severity primary chronic conditions, through use of additional ambulatory-based care and care coordination could result in significant Medicare savings.

Episode Type 1: Post-Acute Episodes

Exhibit 1.6: Percent of Episodes and Medicare Episode Payment by Primary Chronic Condition[a] by Readmission Status for 60-Day Fixed-Length Post-Acute Episodes (2007-2009)

	Total			Episode Does Not Contain Readmission		Episode Contains Readmission		Ratio of Average Medicare Episode Payment[b]
Primary Chronic Conditions	Percent of Episodes	Average Medicare Episode Payment	Percent of Episodes with Readmission	Percent of Episodes	Average Medicare Episode Payment	Percent of Episodes	Average Medicare Episode Payment	
CHF*COPD	25.0%	$22,754	33.3%	21.5%	$16,534	37.2%	$35,206	2.13
DIABETES*CHF	13.4%	$22,842	27.0%	12.6%	$17,357	16.1%	$37,684	2.17
CHF*RENAL	5.6%	$22,863	27.9%	5.2%	$17,720	7.0%	$36,156	2.04
Lung Cancer	2.0%	$21,903	27.7%	1.9%	$17,407	2.5%	$33,650	1.93
Osteoporosis	15.0%	$17,226	15.4%	16.4%	$14,808	10.3%	$30,463	2.06
COPD	7.7%	$16,879	19.4%	8.0%	$13,770	6.7%	$29,796	2.16
Rheumatoid Arthritis/Osteoarthritis	11.0%	$17,118	13.5%	12.3%	$15,023	6.6%	$30,568	2.03
Hip/Pelvic Fracture	0.6%	$25,379	16.9%	0.6%	$22,726	0.4%	$38,397	1.69
Heart Failure	2.6%	$17,923	17.2%	2.8%	$15,127	2.0%	$31,401	2.08
Alzheimer's Disease	1.3%	$16,182	15.3%	1.5%	$13,743	0.9%	$29,648	2.16
Alzheimer's Disease and Related	1.4%	$17,948	18.3%	1.5%	$14,618	1.1%	$32,825	2.25
Stroke / Transient Ischemic Attack	1.7%	$17,862	16.1%	1.9%	$14,603	1.2%	$34,860	2.39
Colorectal Cancer	0.5%	$22,057	22.8%	0.5%	$18,173	0.5%	$35,228	1.94
Depression	3.1%	$14,422	17.8%	3.3%	$11,582	2.5%	$27,500	2.37
Acute Myocardial Infarction	0.4%	$19,331	13.0%	0.5%	$17,277	0.2%	$33,080	1.91
Ischemic Heart Disease	3.4%	$14,827	12.1%	3.8%	$12,697	1.8%	$30,299	2.39
Atrial Fibrillation	0.3%	$13,889	11.6%	0.4%	$11,423	0.2%	$32,674	2.86
Chronic Kidney Disease	1.1%	$18,002	18.7%	1.1%	$14,375	0.9%	$33,783	2.35
Female Breast Cancer	0.1%	$13,666	10.8%	0.2%	$11,971	0.1%	$27,667	2.31
Prostate Cancer	0.2%	$11,158	7.1%	0.2%	$10,161	0.1%	$24,203	2.38
Endometrial Cancer	0.0%	$14,460	17.2%	0.0%	$12,225	0.0%	$25,191	2.06
Diabetes	0.7%	$11,773	8.7%	0.8%	$10,346	0.3%	$26,800	2.59
Glaucoma	0.2%	$11,158	6.3%	0.3%	$10,059	0.1%	$27,434	2.73
Cataract	0.5%	$11,161	7.1%	0.6%	$9,993	0.2%	$26,406	2.64
None	2.0%	$14,037	12.9%	2.2%	$11,514	1.1%	$31,102	2.70
Overall Average	**100.0%**	**$19,505**	**22.4%**	**100.0%**	**$15,335**	**100.0%**	**$33,926**	**2.21**

Source: Dobson | DaVanzo analysis of research-identifiable 5% SAF for all sites of service, 2007-2009, wage index adjusted by setting and geographic region, and standardized to 2009 dollars. Average Medicare Episode Payment includes care from all facility-based and ambulatory care settings and excludes beneficiary co-payments.

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

[b] Average Medicare Episode Payment for episodes that contain a readmission divided by episodes that do not contain a readmission.

Episode Type 1: Post-Acute Episodes

Exhibit 1.7 shows the number and percent of episodes and average Medicare episode payments by the number of readmissions per episode. More than three-quarters (77.6 percent) of episodes do not contain a readmission, and 17.4 percent of episodes contain one readmission during the 60-day fixed length episode. Another four percent of episodes contain two readmissions. Of the episodes that contain at least one readmission, 77.5 percent contain only one readmission, while 18 percent contain two readmissions. As the number of readmissions per episode increases, the average Medicare episode payment increases proportionately as well, from $15,336 for episodes without any readmissions, to $52,868 for episodes containing three or more readmissions. For each additional readmission per episode, there is about a $15,000 increase in the average Medicare episode payment.

Exhibit 1.7: Number of Episodes and Average Medicare Episode Payment by Number of Readmissions within a 60-Day Fixed-Length Post-Acute Episode (2007-2009)

Number of Readmissions	Number of Episodes	Percent of Episodes	Cumulative Percent of Total Readmissions	Percent of Readmitted Episodes	Average Medicare Episode	Percent of Total Medicare Episodes Payment
0	18,802,460	77.6%	0.0%	0.0%	$15,336	61.0%
1	4,211,700	17.4%	17.4%	77.5%	$30,762	27.4%
2	976,620	4.0%	21.4%	18.0%	$42,752	8.8%
3+	248,300	1.0%	22.4%	4.6%	$52,868	2.8%
Total	**24,239,080**	**100.0%**	**22.4%**	**100.0%**	**$19,505**	**100.0%**

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

As shown in Exhibit 1.8, the amount of Medicare episode payments for episodes containing a readmission is disproportionately high. For example, 23.3 percent of HHA first setting episodes contain a readmission, but 38.6 percent of Medicare episode payments for HHA first setting episodes are attributed to these episodes. Thus, the ratio of percent of episode payments for episodes with a readmission to percent of total episodes is 1.66. As the Medicare episode payment decreases by first setting, the ratio of Medicare episode payment to percent of episodes with a readmission increases. This is due to the high cost of a hospitalization, relative to the service mix contained in the first setting episode. LTCH first setting episodes, for example, have high Medicare episode payments regardless of rehospitalization status. Therefore, while 29.2 percent of LTCH first setting episodes contain a readmission, only slightly more than one-third of LTCH first setting Medicare episode payments are attributed to these episodes – a ratio of 1.18. However, community-based care first settings episodes have a considerably higher ratio, such as Community first setting episodes with a ratio of 2.03, and OP Therapy first setting episodes with a ratio of 1.92. The otherwise low reliance on facility-based care within these first setting episodes is a major contributing factor to this ratio.

Exhibit 1.8: Percent of Episodes and Percent of Medicare Episode Payment for Episodes with Readmissions for 60-Day Fixed-Length Post-Acute Episodes (2007-2009)

First Setting	Average Medicare Episode Payment	Percent of Episodes with Readmissions	Percent of Medicare Episode Payment for Episodes with Readmission	Ratio of Percent of Medicare Episode Payment to Proportion of Episodes
HHA	$20,345	23.3%	38.6%	1.66
SNF	$29,218	25.8%	37.5%	1.45
IRF	$44,193	22.7%	31.4%	1.39
LTCH	$89,869	29.2%	34.5%	1.18
STACH	$29,713	100.0%	100.0%	1.00
Community	$14,478	19.9%	40.5%	2.03
ER	$16,364	28.9%	49.8%	1.72
OP Therapy	$15,233	19.3%	37.0%	1.92
Hospice	$17,651	4.6%	8.2%	1.78
Other IP	$23,572	21.7%	31.6%	1.46
No Care[a]	$14,761	0.0%	0.0%	0.00
Overall Average	**$19,505**	**22.4%**	**39.0%**	**1.74**

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

The previous exhibits presented the proportion of episodes containing a readmission by first setting. However, the first setting is not a predictor of the setting from which the patient is readmitted to the hospital. Exhibit 1.9 shows the distribution of readmissions by antecedent setting – that is, the care setting the patient was in immediately prior to the readmission. Across all post-acute care episodes, about 62.0 percent of all readmissions come from the Community, 13.7 percent are readmitted from HHA, and 12.8 percent are readmitted from SNFs. Only 0.4 percent of episodes are readmitted from LTCHs, but this is likely due to the relatively infrequent use of LTCHs compared to other facility-based care settings.

Exhibit 1.9 also presents that percent of episodes that receive care from each setting with that antecedent source. That is, of all episodes that received home health care during the episode, 12.5 percent of these episodes had home health as the antecedent setting. Community episodes have the highest rate of antecedent readmissions (16.5 percent of all episodes that receive care from the Community), followed by SNF (14.2 percent). About 9.0 percent and 8.3 percent of episodes receiving care from an LTCH and IRF, respectively, are readmitted from these settings.

Exhibit 1.9: Distribution of Readmissions (excluding No Care Setting) by Antecedent Setting (Source) for 60-day Fixed-Length Post-Acute Episodes (2007-2009)

Antecedent Setting	Percent of Total Readmissions by Setting	Percent of Episodes Directly Readmitted by Setting
HHA	13.7%	12.5%
SNF	12.8%	14.2%
IRF	1.4%	8.3%
LTCH	0.4%	9.0%
Community	62.0%	16.9%
ER	7.5%	10.8%
OP Therapy	1.4%	4.8%
Hospice	0.5%	2.5%
Other IP	0.3%	6.9%
Overall Average	**100.0%**	**N/A**

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

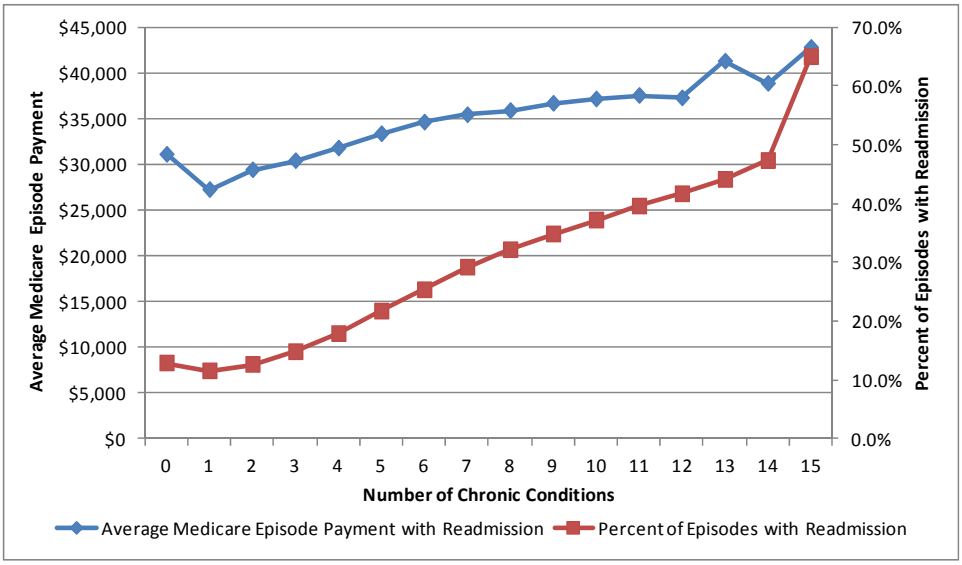
Exhibit 1.10 and Exhibit 1.11 show the number of episodes, the percent of episodes that contain a readmission, and the average Medicare episode payment for episodes containing a readmission by the number of chronic conditions per episode. The percent of episodes containing a readmission increases with the number of chronic conditions per episode. This suggests that readmissions are partially attributable to the complexity of patients with multiple chronic conditions. Approximately 12.9 percent of episodes with no chronic conditions contain a readmission while 65.0 percent of episodes with 15 chronic conditions contain a hospitalization. It is interesting to note that the growth in the proportion of episodes with readmissions increases faster than the growth in the average Medicare episode payment for the readmission episodes.

Exhibit 1.10: Percent of Episodes and Medicare Episode Payment for Episodes with Readmissions by Number of Chronic Conditions for 60-day Fixed-Length Post-Acute Episode (2007-2009)

Number of Chronic Conditions	Percent of Episodes	Percent of Episodes with Readmission	Average Medicare Episode Payment with Readmission
0	2.0%	12.9%	$31,102
1	4.9%	11.5%	$27,251
2	8.8%	12.6%	$29,415
3	12.2%	14.8%	$30,413
4	14.4%	17.9%	$31,793
5	15.0%	21.7%	$33,356
6	13.9%	25.3%	$34,625
7	11.4%	29.2%	$35,435
8	8.0%	32.2%	$35,888
9	4.9%	34.8%	$36,681
10	2.7%	37.2%	$37,156
11	1.2%	39.6%	$37,541
12	0.4%	41.7%	$37,274
13	0.1%	44.1%	$41,290
14	0.0%	47.3%	$38,869
15	0.0%	65.0%	$42,796
Overall Average	**100.0%**	**22.4%**	**$33,926**

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

Exhibit 1.11: Percent of Episodes and Average Medicare Episode Payment for Episodes with Readmissions by Number of Chronic Conditions for 60-day Fixed-Length Post-Acute Episodes (2007-2009)



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

Exhibit 1.12 shows the proportion of episodes that contain a readmission and the average Medicare episode payment by readmission status for select patient demographic characteristics. Overall, the average Medicare episode payment for episodes containing a readmission is more than twice the amount of episodes that do not contain a readmission ($33,926 compared to $15,335, ratio of 2.21). More than one-third (33.9 percent) of episodes for patients who die contain a readmission, which indicates that several of these patients may have died in the hospital or shortly thereafter. Approximately 21.6 percent and 21.7 percent of episodes for females and those residing in rural areas contain a readmission, respectively.

Exhibit 1.12: Percent of Episodes with Readmissions and Average Medicare Episode Payment by Demographic Characteristic for 60-day Fixed-Length Post-Acute Episodes (2007-2009)

Demographics	Percent of Episodes with Readmission	Average Medicare Episode Payment for No Readmission	Average Medicare Episode Payment for Episodes with Readmission	Ratio of Average Medicare Episode Payment[a]
Live Alone	27.5%	$18,159	$35,263	1.94
Died during Episode	33.9%	$18,647	$37,670	2.02
Dual Eligible	26.5%	$15,173	$33,441	2.20
Female	21.6%	$15,032	$32,830	2.18
Rural	21.7%	$14,562	$31,897	2.19
85 and Older	22.5%	$15,352	$31,544	2.05
Non-white	26.3%	$15,835	$36,537	2.31
Overall Average	**22.4%**	**$15,335**	**$33,926**	**2.21**

Source: Dobson | DaVanzo analysis of research-identifiable 5% SAF for all sites of service, 2007-2009, wage index adjusted by setting and geographic region, and standardized to 2009 dollars. All episodes have been extrapolated to reflect the universe of Medicare beneficiaries. Average Medicare Episode Payment includes care from all facility-based and ambulatory care settings and excludes beneficiary co-payments.
[a] Average Medicare Episode Payment for episodes that contain a readmission divided by episodes that do not contain a readmission.

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

In the remainder of this chapter we analyze the post-acute care episode payments and frequency of readmissions for select MS-DRGs in more detail. These sections contain descriptive statistics on the percent of episodes containing readmissions by first setting and by the average Medicare episode payments for episodes containing readmissions compared to those not containing readmissions.

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

As presented earlier, MS-DRG 470 represents 4.7 percent of all post-acute episodes (Exhibit 1.5) and 5.5 percent of total episode payments (data not shown). In this section, we further analyze the post-acute episodes with an index acute care hospitalization of MS-DRG 470 to better understand the distribution of episodes containing readmissions across facility- and non-facility-based care settings. The ultimate goal of these analyses is to better understand how the prevalence of readmissions, Medicare episode payment, and patient demographics differ by first setting within this MS-DRG.

Exhibit 1.13 shows the percent of episodes, percent of episodes containing a readmission, and average Medicare episode payment for episodes containing a readmission by first setting for episodes with an index acute care hospitalization of MS-DRG 470. The Medicare episode payment amount reflects the payments for the total episode, including the index acute care hospitalization (and subsequent readmissions), facility, home health, and ambulatory care settings. Across all first setting episodes, 9.5 percent of episodes for MS-DRG 470 contain a readmission. The average Medicare episode payment for these episodes is $38,871 compared to $21,319 for episodes not containing a readmission, (a ratio of 1.82).

Episode Type 1: Post-Acute Episodes

Of the formal post-acute care settings, HHA first setting episodes have the lowest proportion of episodes with readmissions (6.2 percent), compared to 12.2 percent and 12.4 percent for SNF and IRF first setting episodes, respectively. The average Medicare episode payment for first setting episodes that contain a readmission are slightly less than double the average payment for episodes not containing a readmission.

The ratio of average Medicare episode payments for episodes containing, and not containing a rehospitalization varies by first setting. The ratio ranges by first setting from 1.27 for LTCH first setting episodes to 2.14 for Community first setting episodes. Episodes with a facility-based first setting generally have a higher average Medicare episode payment overall, and therefore the incremental increase in average payment due to the readmission is not as significant as episodes with an ambulatory-based first setting.

Exhibit 1.13: Percent of Episodes and Average Medicare Episode Payment by First Setting by Readmission Status for MS-DRG 470 for 60-Day Fixed-Length Post-Acute Episodes (2007-2009)

	Total			Episode Does Not Contain Readmission		Episode Contains Readmission		Ratio
First Setting	Percent of Episodes	Average Medicare Episode Payment	Percent of Episodes with Readmission	Percent of Episodes	Average Medicare Episode Payment	Percent of Episodes	Average Medicare Episode Payment	Average Medicare Episode Payment[b]
HHA	32.4%	$18,068	6.18%	33.6%	$17,254	21.05%	$30,438	1.76
SNF	38.0%	$26,861	12.16%	36.9%	$24,921	48.67%	$40,885	1.64
IRF	11.4%	$33,538	12.43%	11.0%	$31,142	14.89%	$50,410	1.62
LTCH	0.1%	$57,896	27.78%	0.1%	$53,823	0.28%	$68,484	1.27
STACH	0.2%	$30,302	100.00%	0.0%	N/A	2.40%	$30,302	N/A
Community	11.9%	$17,340	7.26%	12.2%	$16,020	9.06%	$34,208	2.14
ER	0.6%	$17,766	10.53%	0.6%	$16,407	0.63%	$29,311	1.79
OP Therapy	4.8%	$15,103	5.63%	5.0%	$14,368	2.83%	$27,410	1.91
Hospice	0.1%	$25,569	10.00%	0.1%	$23,253	0.11%	$46,410	2.00
Other IP	0.0%	$30,574	17.39%	0.0%	$29,175	0.07%	$37,216	1.28
No Care[a]	0.5%	$11,290	0.00%	0.6%	$11,290	0.00%	N/A	N/A
Total	**100.00%**	**$22,986**	**9.50%**	**100.00%**	**$21,319**	**100.00%**	**$38,871**	**1.82**

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

[a] Episodes include deaths during index admission.

[b] Average Medicare Episode Payment for episodes that contain a readmission divided by episodes that do not contain a readmission.

Episode Type 1: Post-Acute Episodes

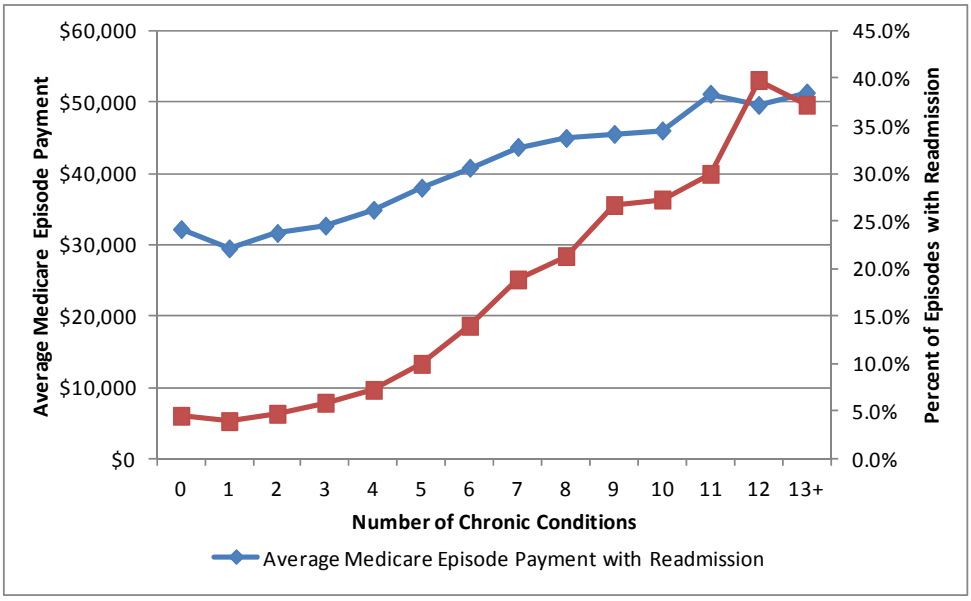
Exhibit 1.14 and Exhibit 1.15 show the number of episodes, percent of episodes that contain a readmission, and the average Medicare episode payment for MS-DRG 470 episodes containing a readmission by the number of chronic conditions per episode. The percent of episodes containing a readmission is relatively consistent for episodes with three or fewer chronic conditions, but generally increases with the number of chronic conditions per episode. As the number of chronic conditions per episode increases beyond four, the percent of episodes containing a readmission increases as well. Consistent with post-acute care episodes overall, the percent of episodes containing a readmission increases faster than the growth in the average Medicare episode payment for readmission episodes, by number of chronic conditions. Approximately 4.5 percent of episodes with no chronic conditions contain a readmission while 37.1 percent of episodes with 13 or more chronic conditions contain a hospitalization. The average Medicare episode payment for episodes containing a readmission ranges from $29,401 for episodes with one chronic condition to $51,229 for episodes with 13 or more chronic conditions.

Exhibit 1.14: Percent of Episodes and Medicare Episode Payment for Episodes with Readmissions by Number of Chronic Conditions for MS-DRG 470 for 60-day Fixed-Length Post-Acute Episodes (2007-2009)

Number of Chronic Condition	Percent of Episodes	Percent of Episodes with Readmission	Average Medicare Episode Payment with Readmission
0	1.0%	4.5%	$32,095
1	6.1%	3.9%	$29,401
2	15.0%	4.7%	$31,560
3	20.1%	5.8%	$32,578
4	18.9%	7.2%	$34,797
5	14.1%	9.9%	$37,895
6	10.4%	13.9%	$40,705
7	6.5%	18.8%	$43,618
8	4.0%	21.2%	$44,869
9	2.2%	26.6%	$45,443
10	1.1%	27.2%	$45,923
11	0.4%	29.9%	$51,067
12	0.1%	39.7%	$49,501
13+	0.1%	37.1%	$51,229
Overall Average	**100.0%**	**9.5%**	**$38,871**

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

Exhibit 1.15: Percent of Episodes and Average Medicare Episode Payment for Episodes with Readmissions by Number of Chronic Conditions for MS-DRG 470 for 60-day Fixed-Length Post-Acute Episodes (2007-2009)



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

Exhibit 1.16 shows the proportion of MS-DRG 470 episodes that contain a readmission and the average Medicare episode payment by readmission status by patient demographic characteristic. Overall, the average Medicare episode payment for episodes containing a readmission is slightly less than twice the amount of episodes that did not contain a readmission ($38,871 compared to $21,319, ratio of 1.82). Nearly one-third (31.0 percent) of episodes for patients who die during the episode contain a readmission. A low proportion of female and rural episodes contain readmissions (9.5 percent and 9.0 percent respectively), while 16.7 percent of episodes for patients 85 years and older contain a readmission.

Exhibit 1.16: Percent of Episodes with Readmission and Average Medicare Episode Payment by Demographic Characteristic for MS-DRG 470 for 60-day Fixed-Length Post-Acute Episodes (2007-2009)

Demographics	Percent of Episodes with Readmission	Average Medicare Episode Payment for No Readmission	Average Medicare Episode Payment for Episodes with Readmission	Ratio of Average Medicare Episode Payment[a]
Live Alone	11.7%	$24,602	$41,790	1.70
Died during Episode	31.0%	$26,897	$46,365	1.72
Dual Eligible	13.1%	$23,866	$41,583	1.74
Female	9.5%	$22,054	$39,725	1.80
Rural	9.0%	$20,260	$37,738	1.86
85 and Older	16.7%	$28,083	$44,221	1.57
Non-white	10.3%	$22,997	$40,699	1.77
Overall Average	**9.5%**	**$21,319**	**$38,871**	**1.82**

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

[a] Average Medicare Episode Payment for episodes that contain a readmission divided by episodes that do not contain a readmission.

MS-DRG 291 – Heart Failure and Shock with MCC

MS-DRG 291 is the second-ranked medical MS-DRG by Medicare episode payments overall and represents 1.5 percent of all episodes (Exhibit 1.5) and 1.6 percent of total episode payments (data not shown). In this section, we further analyze the post-acute episodes with an index acute care hospitalization of MS-DRG 291 to better understand the distribution of episodes containing readmissions across facility- and non-facility-based care settings. The ultimate goal of these analyses is to better understand how the prevalence of readmissions, Medicare episode payment, and patient demographics differ by first setting.

Exhibit 1.17 shows the percent of episodes, percent of episodes containing a readmission, and average Medicare payment for episodes containing a readmission by first setting for episodes with an index acute care hospitalization of MS-DRG 291. The Medicare episode payment amount reflects the payments for the total episode, including the index acute care hospitalization (and subsequent readmissions), facility, home health, and ambulatory care settings. Across all first setting episodes, 35.0 percent of episodes for MS-DRG 291 contain a readmission. The average Medicare episode payment for these episodes is $34,198 compared to $14,784 for episodes not containing a readmission, (ratio of 2.31).

Of the formal post-acute care settings, HHA and SNF first setting episodes have a similar proportion of episodes with readmissions (approximately 37 percent), compared to 45.7

percent for IRFs. Only 29.8 percent of LTCH first setting episodes for MS-DRG 291 (which represents only 0.7 percent of all MS-DRG 291 episodes) contain a readmission. This is the lowest proportion of all first settings, excluding Hospice and No Care episodes. This low proportion is likely due to patient death early in the episode.

The ratio of the average Medicare payment for episodes containing and not containing a rehospitalization varies by first setting. LTCH and IRF first setting episodes have the smallest increase in Medicare payments for episodes that contain a readmission compared to those that do not (i.e., smallest ratio). For IRF episodes, those without a readmission have an average payment of $40,753, while episodes with a readmission have an average payment of $50,986 – a ratio of 1.25. Again, this indicates that for patients with heart failure, even episodes without readmissions have a significant amount of facility-based care and that the additional readmission does not alter the episode payment average significantly. However, ER and Community first setting episodes that do not contain a readmission primarily contain community-based care, and therefore the presence of the readmission greatly impacts the average Medicare episode payment. ER first setting episodes containing a readmission have an average Medicare episode payment of $13,143 compared to $33,264 for episodes with a readmission – a ratio of 2.53. Community first setting episodes containing a readmission have an average Medicare episode payment of $32,176 compared to $12,169 for episodes without a readmission – a ratio of 2.64.

Exhibit 1.17: Percent of Episodes and Average Medicare Episode Payment by First Setting by Readmission Status for MS-DRG 291 for 60-Day Fixed-Length Post-Acute Episodes (2007-2009)

	Total			Episode Does Not Contain Readmission		Episode Contains Readmission		Ratio of Average Medicare Episode Payment[b]
First Setting	Percent of Episodes	Average Medicare Episode Payment	Percent of Episodes with Readmission	Percent of Episodes	Average Medicare Episode Payment	Percent of Episodes	Average Medicare Episode Payment	
HHA	15.2%	$20,211	37.2%	14.7%	$13,652	16.1%	$31,290	2.29
SNF	17.8%	$28,551	37.7%	17.1%	$21,964	19.2%	$39,438	1.80
IRF	1.0%	$45,426	45.7%	0.8%	$40,753	1.3%	$50,986	1.25
LTCH	0.7%	$62,123	29.8%	0.7%	$58,934	0.6%	$69,619	1.18
STACH	3.6%	$35,030	100.0%	0.0%	N/A	10.2%	$35,030	N/A
Community	48.0%	$19,127	34.8%	48.1%	$12,169	47.7%	$32,176	2.64
ER	2.3%	$22,124	44.6%	1.9%	$13,143	2.9%	$33,264	2.53
OP Therapy	1.1%	$20,004	43.4%	0.9%	$12,359	1.3%	$29,980	2.43
Hospice	3.8%	$15,412	5.2%	5.6%	$14,438	0.6%	$33,091	2.29
Other IP	0.1%	$41,459	41.7%	0.1%	$36,102	0.1%	$48,958	1.36
No Care[a]	6.6%	$12,024	0.0%	10.1%	$12,024	0.0%	N/A	N/A
Overall Average	**100.0%**	**$21,572**	**35.0%**	**100.0%**	**$14,784**	**100.0%**	**$34,198**	**2.31**

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

[a] Episodes include deaths during index admission.

[b] Average Medicare Episode Payment for episodes that contain a readmission divided by episodes that do not contain a readmission.

Episode Type 1: Post-Acute Episodes

Exhibit 1.18 and Exhibit 1.19 show the number of episodes, percent of episodes that contain a readmission, and the average Medicare payment for MS-DRG 291 episodes containing a readmission by the number of chronic conditions per episode. Other than episodes with none or one chronic condition, the percent of episodes containing a readmission increases monotonically with the number of chronic conditions per episode, ranging from 11.4 percent for episodes with two chronic conditions to 53.6 percent for episodes with 13 or more chronic conditions.[16] Despite the number of chronic conditions contained in the episode, the average Medicare payment for episodes containing a readmission is relatively consistent, ranging from $31,121 per episode with four chronic conditions to $36,269 for episodes with 12 chronic conditions. Episodes with 13 or more chronic conditions have a significantly higher average Medicare episode payment of $54,096. The high readmission rate for episodes with no chronic conditions indicated is likely due to the CMS methodology for identifying chronic conditions. If a patient does not have the requisite number of historical Medicare claims with a specified diagnosis code, the patient is not considered to have a chronic condition. Therefore, newly enrolled Medicare patients or those who do not often receive health care services may be captured in this category despite the presence of a condition.

[16] A monotonic increase is when one variable increases (e.g., percent of episodes with readmissions) as a second variable increases (e.g., average Medicare Episode Payment with readmissions) and then keeps the same order.

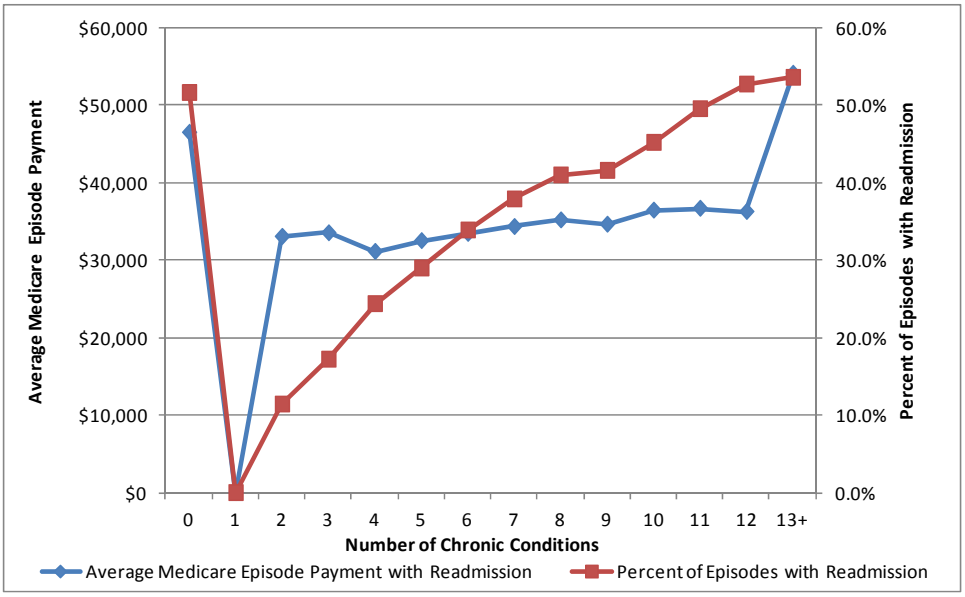
Exhibit 1.18: Percent of Episodes and Medicare Episode Payment for Episodes with Readmissions by Number of Chronic Conditions for MS-DRG 291 for 60-day Fixed-Length Post-Acute Episodes (2007-2009)

Number of Chronic Conditions	Percent of Episodes	Percent of Episodes with Readmission	Average Medicare Episode Payment with Readmission
0	0.3%	51.6%	$46,481
1	0.1%	*	*
2	1.2%	11.4%	$33,053
3	3.7%	17.2%	$33,527
4	9.4%	24.4%	$31,121
5	15.9%	29.0%	$32,507
6	18.9%	33.9%	$33,443
7	18.4%	37.9%	$34,332
8	14.2%	41.0%	$35,184
9	9.3%	41.6%	$34,627
10	5.1%	45.2%	$36,443
11	2.3%	49.5%	$36,676
12	0.8%	52.7%	$36,269
13+	0.3%	53.6%	$54,096
Overall Average	**100.0%**	**35.0%**	**$34,198**

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

*Indicates a cell size of less than 11.

Exhibit 1.19: Percent of Episodes and Average Medicare Episode Payment for Episodes with Readmissions by Number of Chronic Conditions for MS-DRG 291 for 60-day Fixed-Length Post-Acute Episodes (2007-2009)



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

Exhibit 1.20 shows the proportion of MS-DRG 291 episodes that contain a readmission and the average Medicare episode payment by readmission status by patient demographic characteristic. For each of the demographic characteristics identified in this exhibit, the percent of episodes containing a readmission is closely distributed around the overall average of 35.0 percent. This suggests that readmissions for MS-DRG 291 are generally not concentrated within any particular demographic category. Of the non-white population, 40.4 percent of episodes contain a readmission, while approximately 29.4 percent of episodes for patients 85 years or older contain a readmission.

Exhibit 1.20: Percent of Episodes with Readmission and Average Medicare Episode Payment by Demographic Characteristic for MS-DRG 291 for 60-day Fixed-Length Post-Acute Episodes (2007-2009)

Demographic Characteristics	Percent of Episodes with Readmission	Average Medicare Episode Payment for No Readmission	Average Medicare Episode Payment for Episodes with Readmission	Ratio of Average Medicare Episode Payment[a]
Live Alone	39.6%	$16,073	$34,636	2.15
Died during Episode	38.9%	$14,938	$35,213	2.36
Dual Eligible	39.4%	$15,920	$35,106	2.21
Female	34.5%	$14,893	$33,289	2.24
Rural	32.8%	$14,193	$31,716	2.23
85 and Older	29.4%	$14,596	$31,564	2.16
Non-white	40.4%	$15,559	$36,665	2.36
Overall Average	**35.0%**	**$14,784**	**$34,198**	**2.31**

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

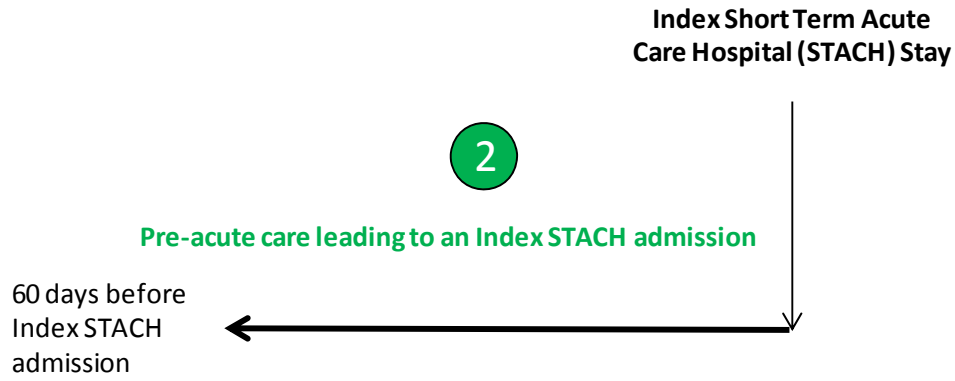
[a] Average Medicare Episode Payment for episodes that contain a readmission divided by episodes that do not contain a readmission.

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

Brief Review of Episode Definition[17]

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

Exhibit 2.1: Description of Pre-Acute Care Episode



Type 2 episodes are clinically defined by the patient's primary chronic condition. A primary chronic condition was determined by mapping each chronic condition identified

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

in the patients' CCW claims data onto one of the HCCs used to determine expected payments in the Medicare Advantage program and then ranked in order of severity. Patients with three select disease interactions were ranked as the highest risk. For example, patients with both CHF and COPD (CHF*COPD) were ranked with a higher severity than the individual conditions. The other two interacted conditions include diabetes and CHF (DIABETES*CHF), and CHF and renal failure (CHF*RENAL).

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

The average Medicare episode payment data presented for the pre-acute care episodes include both payments for the care provided during the fixed-length episode prior to the index acute care hospitalization as well as the index acute care hospitalization itself. The Medicare payments related to the index acute care hospitalization are included in both the Episode Type 1 and Episode Type 2 analyses; therefore the Medicare payments for these episode types cannot be added together to calculate the total care before and after the index acute care hospitalization, as it will double count the payments for the index acute care hospitalization. Beneficiary copayments, deductibles, and payments from other third parties are excluded from all payment amounts.

Across all three years (2007-2009), there are 25,664,640 Type 2 episodes that represent $344.2 billion in Medicare payments.[18,19] In 2008, the pre-acute care episodes represent about 37 percent of total Medicare fee-for-service spending.[20]

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

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

[20] Dobson | DaVanzo analysis of research-identifiable 5% SAF for all sites of service, 2007-2009, wage index adjusted by setting and geographic region, and standardized to 2009 dollars, divided by the Congressional Budget Office, March Baselines for Medicare, 2010 (for 2009 Medicare spending).

Episode Type 2: Pre-Acute Episodes

Distribution of Episodes and Medicare Payments by Primary Chronic Condition

Exhibit 2.2 shows the distribution of episodes and Medicare episode payments by primary chronic condition, sorted from highest to lowest community risk score. The episode is assigned the most severe chronic condition, (e.g., an "osteoporosis episode" will often contain numerous less-severe conditions). This mutually exclusive assignment of conditions allows us to conduct analyses by chronic condition without duplicating the number of episodes or any Medicare payments.

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

Episode Type 2: Pre-Acute Episodes

Exhibit 2.2: Distribution of Episodes and Medicare Episode Payment Defined by Primary Chronic Condition[a] for 60-Day Fixed-Length Pre-Acute Episodes (2007-2009)

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

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

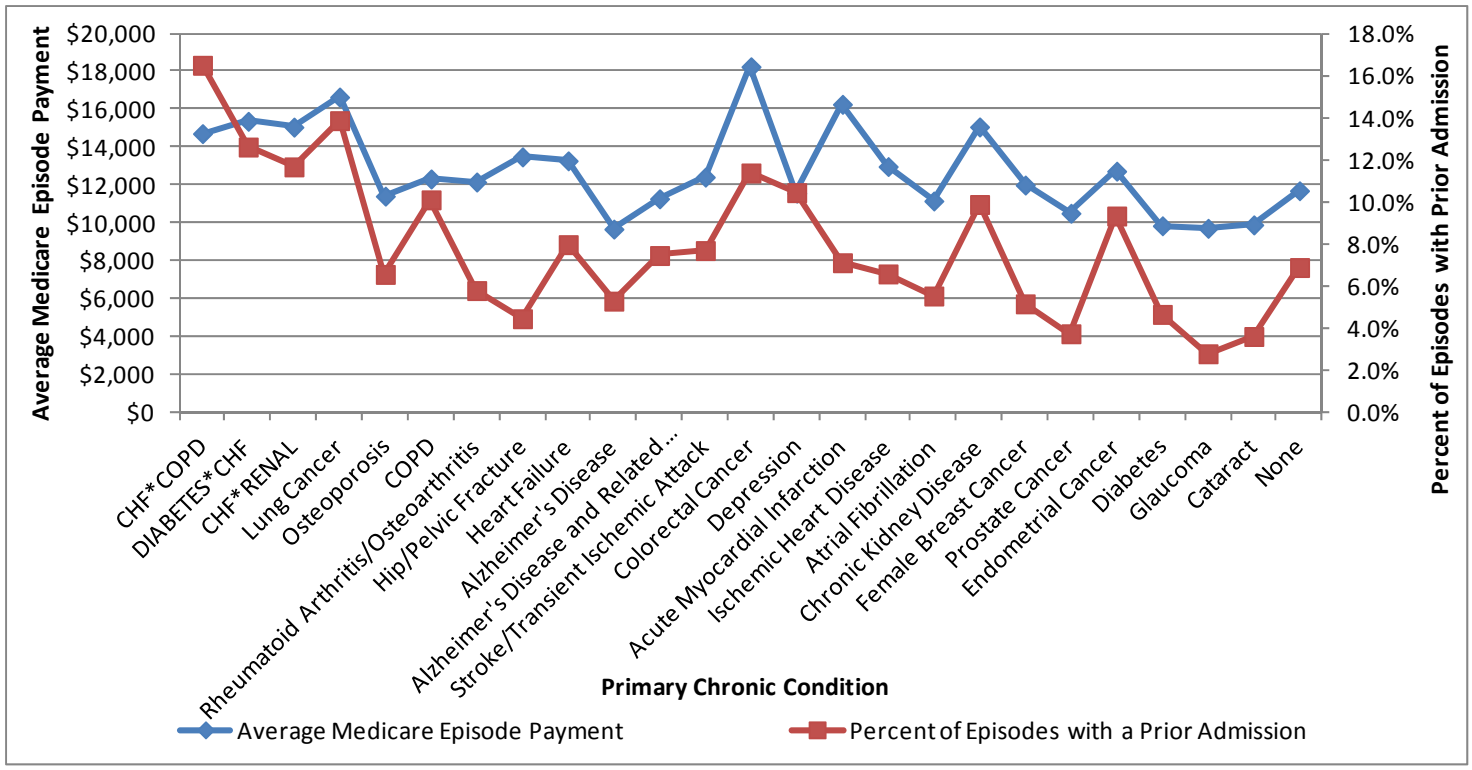
[a] For methodology used to determine primary chronic condition, see Working Paper #1.

Exhibit 2.3 shows the overall average Medicare episode payment and the percent of episodes that contain a prior hospital admission by primary chronic condition. As the primary chronic conditions decrease in severity, the percent of episodes that contain a prior hospital admission generally decrease slightly, but not in a consistent pattern. Episodes with a primary chronic condition of CHF*COPD have the highest proportion of

episodes containing a prior admission (16.5 percent), while episodes with a primary chronic condition of glaucoma have the lowest proportion (2.8 percent). Episodes with a primary chronic condition of any of the various cancer types, acute myocardial infarction, and chronic kidney disease have prior admission rates that appear to differ from their placement in the hierarchy suggests. Also, episodes for patients with no chronic conditions have a relatively high proportion of episodes with prior admissions.

Exhibit 2.4 shows the percent of episodes and average Medicare episode payment by primary chronic condition for episodes that contain a prior admission compared to episodes that do not. Across all primary chronic conditions, episodes with a prior admission have an average Medicare episode payment more than twice that of the episodes without a prior admission ($25,494 compared to $11,972, ratio of 2.13). Episodes with a primary chronic condition of colorectal cancer have the smallest relative difference in average Medicare episode payment between episodes that contain and do not contain a prior admission ($30,090 compared to $16,729, a ratio of 1.80). Episodes with a primary chronic condition of lung cancer and hip/pelvic fractures also have a ratio of less than 2.0. As the severity of the primary chronic condition decreases, the relative difference in the average Medicare episode payment for episodes containing, and not containing prior admissions increases markedly. For example, for diabetes, glaucoma, and cataract primary chronic condition episodes, episodes with a prior admission have an average Medicare episode payment of almost three times the average payment for episodes not including a prior admission, compared to average payments about two times higher for higher-severity primary chronic conditions. This is likely due to the lower payments for ambulatory care provided in episodes without a prior admission compared to the facility-based care payments for the prior admission.

Exhibit 2.3: Average Medicare Episode Payment and Percent of Episodes Containing Prior Admission by Primary Chronic Conditions[a] for 60-day Fixed-Length Pre-Acute Episodes (2007-2009)



Source: Dobson | DaVanzo analysis of research-identifiable 5% SAF for all sites of service, 2007-2009, wage index adjusted by setting and geographic region, and standardized to 2009 dollars. Average Medicare Episode Payment includes care from all facility-based and ambulatory care settings and excludes beneficiary co-payments.

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

Exhibit 2.4: Percent of Episodes, Average Medicare Episode Payment by Prior Admission Status by Primary Chronic Condition[a] for 60-day Fixed-Length Pre-Acute Episodes (2007-2009)

	Total			Episode Does Not Contain Prior Admission		Episode Contains Prior Admission		Ratio of Average Medicare Episode Payment[b]
Primary Chronic Condition	Percent of Episodes	Average Medicare Episode Payment	Percent of Episodes with Prior Admission	Percent of Episodes	Average Medicare Episode Payment	Percent of Episodes	Average Medicare Episode Payment	
CHF*COPD	24.9%	$14,717	16.5%	23.2%	$12,571	38.6%	$25,578	2.03
DIABETES*CHF	13.3%	$15,367	12.6%	13.0%	$13,470	15.8%	$28,509	2.12
CHF*RENAL	5.6%	$15,060	11.7%	5.5%	$13,419	6.1%	$27,493	2.05
Lung Cancer	2.0%	$16,649	13.9%	1.9%	$14,767	2.6%	$28,339	1.92
Osteoporosis	15.0%	$11,414	6.6%	15.7%	$10,668	9.3%	$22,056	2.07
COPD	7.7%	$12,322	10.1%	7.7%	$11,155	7.3%	$22,716	2.04
Rheumatoid Arthritis/Osteoarthritis	11.0%	$12,160	5.8%	11.6%	$11,486	6.0%	$23,150	2.02
Hip/Pelvic Fracture	0.6%	$13,488	4.4%	0.6%	$12,918	0.2%	$25,767	1.99
Heart Failure	2.6%	$13,279	8.0%	2.7%	$12,229	2.0%	$25,406	2.08
Alzheimer's Disease	1.3%	$9,672	5.3%	1.4%	$9,068	0.7%	$20,514	2.26
Alzheimer's Disease and Related	1.4%	$11,274	7.5%	1.5%	$10,287	1.0%	$23,529	2.29
Stroke / Transient Ischemic Attack	1.7%	$12,419	7.7%	1.8%	$11,246	1.2%	$26,516	2.36
Colorectal Cancer	0.5%	$18,249	11.4%	0.5%	$16,729	0.6%	$30,090	1.80
Depression	3.1%	$11,571	10.4%	3.1%	$10,323	3.1%	$22,284	2.16
Acute Myocardial Infarction	0.4%	$16,264	7.1%	0.4%	$15,198	0.3%	$30,203	1.99
Ischemic Heart Disease	3.4%	$12,978	6.6%	3.5%	$12,034	2.1%	$26,405	2.19
Atrial Fibrillation	0.3%	$11,156	5.5%	0.3%	$10,299	0.2%	$25,823	2.51
Chronic Kidney Disease	1.1%	$15,070	9.9%	1.1%	$13,478	1.0%	$29,597	2.20
Female Breast Cancer	0.1%	$11,999	5.2%	0.1%	$11,228	0.1%	$26,191	2.33
Prostate Cancer	0.2%	$10,509	3.7%	0.2%	$10,080	0.1%	$21,574	2.14
Endometrial Cancer	0.0%	$12,734	9.3%	0.0%	$11,598	0.0%	$23,775	2.05
Diabetes	0.7%	$9,849	4.6%	0.8%	$9,218	0.3%	$22,785	2.47
Glaucoma	0.2%	$9,713	2.8%	0.2%	$9,285	0.1%	$24,732	2.66
Cataract	0.5%	$9,894	3.6%	0.6%	$9,358	0.2%	$24,267	2.59
None	2.2%	$11,698	6.9%	2.3%	$10,629	1.4%	$26,180	2.46
Overall Average	**100.0%**	**$13,411**	**10.6%**	**100.0%**	**$11,972**	**100.0%**	**$25,494**	**2.13**

Source: Dobson | DaVanzo analysis of research-identifiable 5% SAF for all sites of service, 2007-2009, wage index adjusted by setting and geographic region, and standardized to 2009 dollars. Average Medicare Episode Payment includes care from all facility-based and ambulatory care settings and excludes beneficiary co-payments. [a] For methodology used to determine primary chronic condition, see Working Paper #1. [b] Average Medicare Episode Payment for episodes that contain a readmission divided by episodes that do not contain a readmission.

Episode Type 2: Pre-Acute Episodes

As shown in Exhibit 2.5, the percent of episodes containing an admission prior to the index acute care hospitalization is disproportionate to the amount of Medicare episode payments they represent. For example, 16.5 percent of CHF*COPD episodes contain a prior admission, but 28.7 percent of Medicare episode payments are attributed to these episodes. Therefore, the ratio of percent of episode payments to percent of episodes is 1.74. As the severity of the primary chronic condition decreases, the percent of episodes containing a prior admission and the Medicare episode payment for these episodes decreases, increasing the ratio of percent of episode payments to percent of episodes. This ratio is driven by the high cost of a hospitalization, relative to the service mix contained in the episodes by primary chronic condition. Episodes with a primary chronic condition of colorectal cancer have the lowest ratio of Medicare episode payment to proportion of episodes (1.65), as 11.4 percent of episodes represent 18.8 percent of Medicare episode payments. This is likely due to the high cost of cancer regimens that are included in the episode payment. Glaucoma primary chronic condition episodes have the highest ratio (2.55), as 2.8 percent of episodes represent 7.1 percent of Medicare episode payments.

Episode Type 2: Pre-Acute Episodes

Exhibit 2.5: Percent of Episodes and Percent of Medicare Episode Payment for Episodes Containing a Prior Admission by Primary Chronic Conditions[a] for 60-day Fixed-Length Pre-Acute Episodes (2007-2009)

Primary Chronic Condition	Percent of Episodes with Prior Admission	Percent of Medicare Payment for Episodes with Prior Admission	Ratio of Medicare Episode Payment to Proportion of Episodes[b]
CHF*COPD	16.5%	28.7%	1.74
DIABETES*CHF	12.6%	23.4%	1.86
CHF*RENAL	11.7%	21.3%	1.83
Lung Cancer	13.9%	23.6%	1.70
Osteoporosis	6.6%	12.7%	1.93
COPD	10.1%	18.6%	1.84
Rheumatoid Arthritis/Osteoarthritis	5.8%	11.0%	1.90
Hip/Pelvic Fracture	4.4%	8.5%	1.91
Heart Failure	8.0%	15.2%	1.91
Alzheimer's Disease	5.3%	11.2%	2.12
Alzheimer's Disease and Related Disorders	7.5%	15.6%	2.09
Stroke/Transient Ischemic Attack	7.7%	16.4%	2.14
Colorectal Cancer	11.4%	18.8%	1.65
Depression	10.4%	20.1%	1.93
Acute Myocardial Infarction	7.1%	13.2%	1.86
Ischemic Heart Disease	6.6%	13.4%	2.03
Atrial Fibrillation	5.5%	12.8%	2.31
Chronic Kidney Disease	9.9%	19.4%	1.96
Female Breast Cancer	5.2%	11.2%	2.18
Prostate Cancer	3.7%	7.7%	2.05
Endometrial Cancer	9.3%	17.4%	1.87
Diabetes	4.6%	10.8%	2.31
Glaucoma	2.8%	7.1%	2.55
Cataract	3.6%	8.8%	2.45
None	6.9%	15.4%	2.24
Overall Average	**10.6%**	**20.2%**	**1.90**

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

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

[b] Average Medicare Episode Payment for episodes that contain a readmission divided by episodes that do not contain a readmission.

Episode Type 2: Pre-Acute Episodes

Exhibit 2.6 shows the number and percent of episodes, and average Medicare episode payments, by the number of prior admissions per episode. Almost 90 percent (89.4 percent) of episodes do not contain an admission prior to the index acute care hospitalization, while 9.1 percent of episodes contain one prior admission. The remaining 1.5 percent of episodes contains two or more prior admissions. As the number of prior admissions per episode increases, the average Medicare episode payment increases as well, from $11,972 for episodes without any prior admissions, to $42,872 for episodes containing three or more prior admissions.

Exhibit 2.6: Number of Episodes and Average Medicare Episode Payment by Number of Prior Admissions within an Episode for 60-Day Fixed-Length Pre-Acute Episodes (2007-2009)

Number of Prior Admissions	Number of Episodes	Percent of Episodes	Cumulative Percent of Episodes with Prior Admission	Percent of Admitted Episodes	Average Medicare Episode Payment	Percent of Total Medicare Episodes Payment
0	22,934,100	89.4%	0.0%	0.0%	$11,972	79.8%
1	2,322,800	9.1%	9.1%	85.1%	$23,842	16.1%
2	345,340	1.3%	10.4%	12.6%	$33,470	3.4%
3+	62,400	0.2%	10.6%	2.3%	$42,872	0.8%
Overall Average	**25,664,640**	**100.0%**	**10.6%**	**100.0%**	**$13,411**	**100.0%**

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

Exhibit 2.7 and Exhibit 2.8 show the percent of episodes that contain a prior admission and the average Medicare episode payment for those episodes by the number of chronic conditions per episode. Overall, the percent of episodes containing a prior admission increases with the number of chronic conditions per episode. However, episodes for patients with two or fewer chronic conditions have a similar rate of prior admissions (on average approximately 6.5 percent of episodes contain a prior admission). The increase in the percent of episodes containing a prior admission by number of chronic conditions suggests that prior admissions are partially attributable to the complexity of patients with multiple chronic conditions. Approximately 6.9 percent of episodes with no chronic conditions contain a prior admission while 27.9 percent of episodes with 15 chronic conditions contain a hospital admission prior to the index acute care hospitalization. It is interesting to note that, as primary chronic conditions increase in severity, the percent of episodes with prior admissions increases faster than the growth in the average Medicare episode payment for episodes.

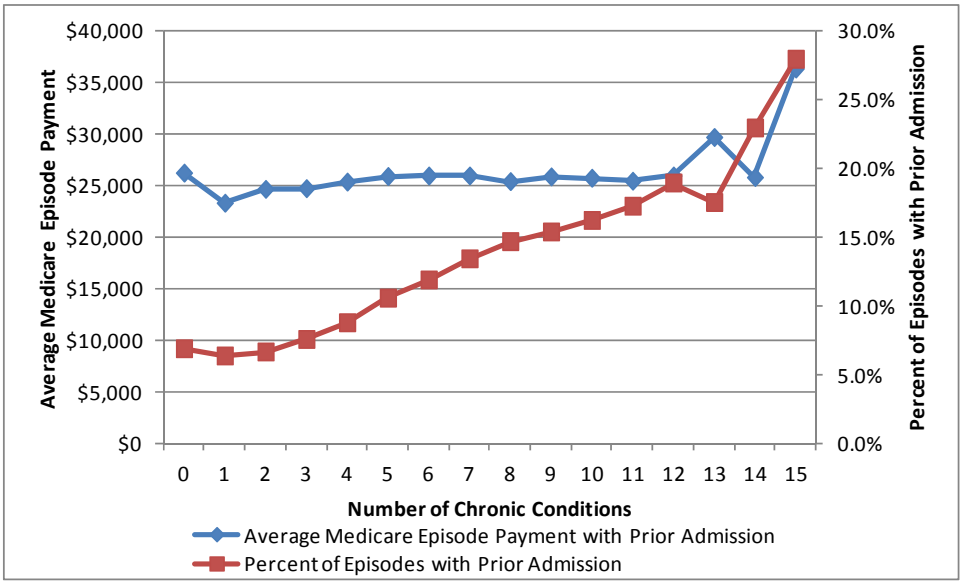
Episode Type 2: Pre-Acute Episodes

Exhibit 2.7: Percent of Episodes and Average Medicare Episode Payment for Episodes with Prior Admissions by Number of Chronic Conditions for 60-day Fixed-Length Pre-Acute Episodes (2007-2009)

Number of Chronic Conditions	Percent of Episodes	Percent of Episodes with Prior Admission	Average Medicare Episode Payment with Prior Admission
0	2.2%	6.9%	$26,180
1	5.0%	6.4%	$23,264
2	8.8%	6.6%	$24,604
3	12.3%	7.6%	$24,674
4	14.4%	8.8%	$25,311
5	14.9%	10.6%	$25,852
6	13.9%	11.9%	$25,901
7	11.3%	13.4%	$25,903
8	8.0%	14.7%	$25,356
9	4.9%	15.4%	$25,813
10	2.6%	16.2%	$25,684
11	1.2%	17.2%	$25,393
12	0.4%	18.9%	$25,895
13	0.1%	17.5%	$29,627
14	0.0%	22.9%	$25,747
15	0.0%	27.9%	$36,263
Overall Average	**100.0%**	**10.6%**	**$25,494**

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

Exhibit 2.8: Percent of Episodes and Average Medicare Episode Payment for Episodes with Prior Admissions by Number of Chronic Conditions for 60-day Fixed-Length Pre-Acute Episodes (2007-2009)



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

Exhibit 2.9 shows the proportion of episodes that contain a prior admission and the average Medicare episode payment by admission status by patient demographic characteristic. Overall, the average Medicare episode payment for episodes containing a prior admission is approximately twice the amount for episodes that did not contain a prior admission ($25,494 compared to $11,972). About 14.6 percent of episodes for patients who died during the index contained hospital admission prior to the index hospitalization. Additionally, 14.1 percent of episodes for dual eligibles contain a prior admission, which is higher than the overall average of 10.6 percent.

Episodes for patients aged 85 years and older have a lower than average proportion of episodes containing a prior admission. About 8 percent (7.8 percent) of episodes for these patients contains a prior admission, while the overall average across all episodes is 10.6 percent. The average Medicare episode payment for episodes both including and excluding prior admission is below average as well.

Exhibit 2.9: Percent of Episodes with Prior Admission and Average Medicare Episode Payment by Demographic Characteristic for 60-day Fixed-Length Post-Acute Episode (2007-2009)

Demographic Characteristic	Percent of Episodes with Prior Admission	Average Medicare Episode Payment for No Prior Admission	Average Medicare Episode Payment for Episodes with Prior Admission	Ratio of Average Medicare Episode Payment[a]
Live Alone	10.9%	$11,860	$24,755	2.09
Died during Index	14.6%	$14,107	$27,841	1.97
Dual Eligible	14.1%	$11,670	$25,489	2.18
Female	9.7%	$11,273	$24,167	2.14
Rural	10.8%	$11,347	$24,136	2.13
85 and Older	7.8%	$10,065	$21,526	2.14
Non-white	14.1%	$12,970	$28,298	2.18
Overall Average	**10.6%**	**$11,972**	**$25,494**	**2.13**

Source: Dobson | DaVanzo analysis of research-identifiable 5% SAF for all sites of service, 2007-2009, wage index adjusted by setting and geographic region, and standardized to 2009 dollars. All episodes have been extrapolated to reflect the universe of Medicare beneficiaries. Average Medicare Episode Payment includes care from all facility-based and ambulatory care settings and excludes beneficiary co-payments.
[a] Average Medicare Episode Payment for episodes that contain a readmission divided by episodes that do not contain a readmission.

Distribution of Episodes and Medicare Payments for Select Primary Chronic Conditions

In the remainder of this chapter, we present the pre-acute care average Medicare episode payments for select primary chronic conditions in more detail. These sections contain descriptive statistics on the percent of episodes containing a prior admission by chronic conditions within these episodes and the distribution of Medicare episode payments by prior admission status.

*CHF*COPD*

CHF*COPD is the most common and most severe primary chronic condition. This chronic condition represents almost one-quarter (24.9 percent) of all pre-acute care episodes, and Medicare payments for CHF*COPD episodes totaled $93.9 billion from 2007 to 2009 (Exhibit 2.2). Approximately 16.5 percent of CHF*COPD episodes contain an admission prior to the index acute care hospitalization, and these episodes represent more than one-quarter (28.7 percent) of all Medicare episode payments for CHF*COPD episodes (Exhibit 2.5).

Consistent with the trend across all pre-acute care episodes, as shown in Exhibit 2.10 and 2.11, the percent of episodes containing a prior admission increases with the number of chronic conditions per episode. On average, CHF*COPD episodes with two chronic conditions (i.e., the patient has no other chronic conditions except CHF and COPD) have the lowest percent of episodes with prior admission (9.0 percent of episodes); while episodes with 15 chronic conditions per episode has the highest proportion (27.9 percent of episodes).

Episode Type 2: Pre-Acute Episodes

Despite the increase in the number of chronic conditions represented per episode, the average Medicare episode payment for episodes containing a prior admission is relatively consistent. That is, episodes that have a prior admission and contain between four and 11 chronic conditions have an average Medicare episode payment of approximately $25,000. Episodes with three chronic conditions that contain a prior admission have the lowest average Medicare episode payment ($23,288), while episodes with 15 chronic conditions that contain a prior admission have the highest average Medicare episode payment ($36,263).

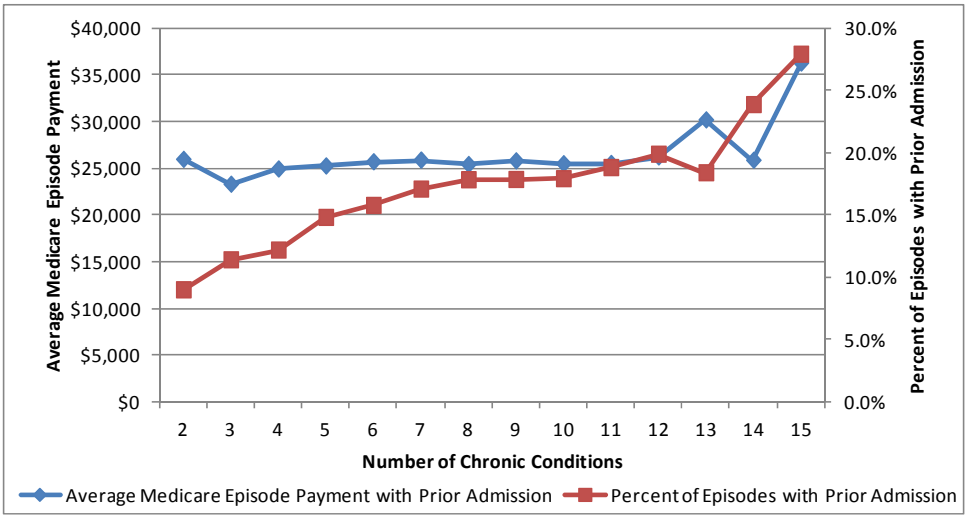
Exhibit 2.10: Percent of Episodes and Medicare Episode Payment for Episodes with Prior Admissions by Number of Chronic Conditions for Episodes Defined by CHF*COPD[a] for 60-day Fixed-Length Pre-Acute Episodes (2007-2009)

Number of Chronic Conditions	Percent of Episodes	Percent of Episodes with Prior Admission	Average Medicare Episode Payment with Prior Admission
2	0.4%	9.0%	$25,956
3	2.1%	11.4%	$23,288
4	6.2%	12.2%	$24,926
5	12.6%	14.8%	$25,245
6	18.0%	15.8%	$25,698
7	19.4%	17.1%	$25,874
8	16.7%	17.8%	$25,404
9	11.9%	17.8%	$25,797
10	7.3%	17.9%	$25,483
11	3.6%	18.8%	$25,514
12	1.4%	19.9%	$26,210
13	0.4%	18.4%	$30,179
14	0.1%	23.9%	$25,856
15	0.0%	27.9%	$36,263
Overall Average	**100.0%**	**16.5%**	**$25,578**

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

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

Exhibit 2.11: Percent of Episodes and Average Medicare Episode Payment for Episodes with Prior Admissions by Number of Chronic Conditions for Episodes Defined by CHF*COPD[a] for 60-day Fixed-Length Pre-Acute Episodes (2007-2009)



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

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

Exhibit 2.12 shows the proportion of episodes that contain a prior admission and the average Medicare episode payment by admission status by patient demographic characteristic. About one-in-five episodes for patients who are non-white (21.7 percent) contain an admission prior to the index acute care hospitalization – well above the overall average of 16.5 percent. A similar proportion (19.7 percent and 18.9 percent, respectively) of episodes for dual eligible patients and those who died during the index contain a prior admission as well. Consistently, episodes that contain a prior admission have an average Medicare episode payment double that of episodes without prior admissions (ratio of 1.93 to 2.10).

Exhibit 2.12: Percent of Episodes with Prior Admission and Average Medicare Episode Payment by Demographic Characteristic for Episodes Defined by CHF*COPD[a] for 60-day Fixed-Length Pre-Acute Episodes (2007-2009)

Demographic Characteristic	Percent of Episodes with Prior Admission	Average Medicare Episode Payment for No Prior Admission	Average Medicare Episode Payment for Episodes with Prior Admission	Ratio of Average Medicare Episode Payment[b]
Live Alone	15.8%	$12,069	$24,700	2.05
Died during Index	18.9%	$14,072	$27,145	1.93
Dual Eligible	19.7%	$12,377	$25,970	2.10
Female	15.5%	$11,818	$24,465	2.07
Rural	17.0%	$11,497	$23,819	2.07
85 and Older	11.8%	$10,557	$21,901	2.07
Non-white	21.7%	$14,044	$28,896	2.06
Overall Average	**16.5%**	**$12,571**	**$25,578**	**2.03**

Source: Dobson | DaVanzo analysis of research-identifiable 5% SAF for all sites of service, 2007-2009, wage index adjusted by setting and geographic region, and standardized to 2009 dollars. All episodes have been extrapolated to reflect the universe of Medicare beneficiaries. Average Medicare Episode Payment includes care from all facility-based and ambulatory care settings and excludes beneficiary co-payments.
[a] For methodology used to determine primary chronic condition, see Working Paper #1.
[b] Average Medicare Episode Payment for episodes that contain a readmission divided by episodes that do not contain a readmission.

Osteoporosis

Osteoporosis is the second most common primary chronic condition, and defines 15.0 percent of all pre-acute care episodes. Osteoporosis has the fifth highest acuity rating, which means that these episodes can also include any of the other chronic conditions with lower community risk scores. Medicare payments for osteoporosis episodes totaled $44.0 billion (Exhibit 2.2). Approximately 6.6 percent of osteoporosis episodes contain an admission prior to the index acute care hospitalization. This is the lowest prior admission rate of the top five primary chronic conditions, likely due to the high reliance on surgical (possibly planned) index acute care hospitalizations, as opposed to the medical (unplanned) index acute care hospitalizations of the other top primary chronic conditions. Osteoporosis episodes containing a prior admission account for 12.7 percent of all Medicare episode payments for osteoporosis episodes (Exhibit 2.5).

As shown in Exhibits 2.13 and 2.14, osteoporosis episodes with a single chronic condition (i.e., the patient has no other chronic conditions except for osteoporosis) have the lowest proportion of episodes with an admission prior to the index acute care hospitalization (17.7 percent), consistent with the overall trend among pre-acute care episodes. The proportion of episodes containing a prior admission increases with the number of chronic conditions. Episodes with 11 or more chronic conditions have the highest proportion of episodes containing a prior admission (9.2 percent).

Despite the increase in the number of chronic conditions represented per episode, the average Medicare episode payment for episodes containing a prior admission is relatively consistent, and ranges from $21,136 for episodes with 11 or more chronic conditions to

$24,086 for episodes with 10 chronic conditions. This suggests that the number of chronic conditions may not be directly related to the cause of the prior admission or other care provided prior to the index acute care hospitalization.

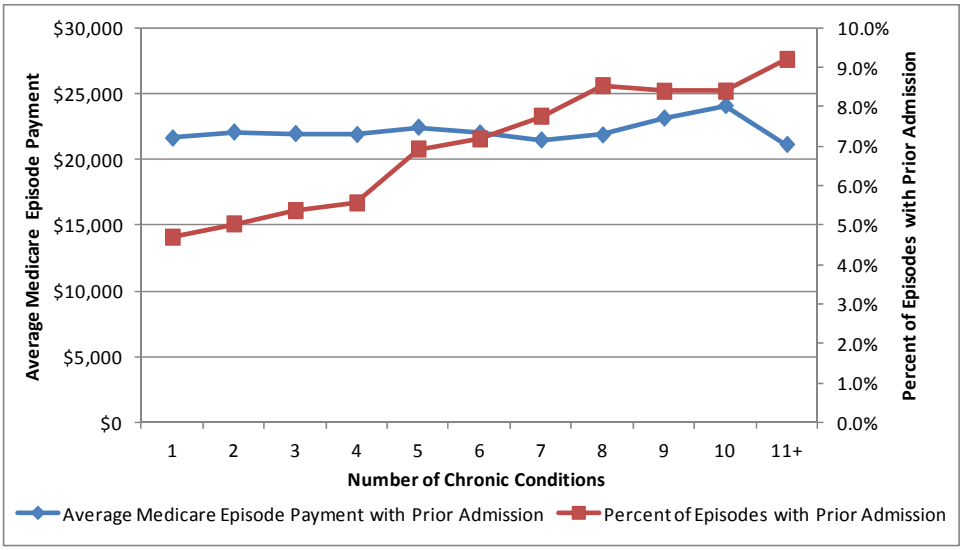
Exhibit 2.13: Percent of Episodes and Medicare Episode Payment for Episodes with Prior Admissions by Number of Chronic Conditions for Episodes Defined by Osteoporosis[a] for 60-day Fixed-Length Pre-Acute Episodes (2007-2009)

Number of Chronic Conditions	Percent of Episodes	Percent of Episodes with Prior Admission	Average Medicare Episode Payment with Prior Admission
1	1.5%	4.7%	$21,624
2	6.9%	5.0%	$22,081
3	14.7%	5.4%	$21,963
4	19.9%	5.6%	$21,891
5	20.2%	6.9%	$22,444
6	16.3%	7.2%	$22,006
7	10.7%	7.8%	$21,480
8	6.0%	8.5%	$21,861
9	2.7%	8.4%	$23,137
10	0.9%	8.4%	$24,086
11+	0.3%	9.2%	$21,136
Overall Average	**100.0%**	**6.6%**	**$22,056**

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

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

Exhibit 2.14: Percent of Episodes and Average Medicare Episode Payment for Episodes with Prior Admissions by Number of Chronic Conditions for Episodes Defined by Osteoporosis[a] for 60-day Fixed-Length Pre-Acute Episodes (2007-2009)



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

Exhibit 2.15 shows the proportion of episodes that contain a prior admission and the average Medicare episode payment by admission status by patient demographic characteristic (9.0 percent and 9.4 percent, respectively). The overall average Medicare episode payment for episodes containing a prior admission is twice that of episodes that do not contain a prior admission ($22,056 vs. $10,668). Consistent with the other primary chronic conditions, episodes for dual eligibles and those who died during the index acute care hospitalization have the highest proportion of episodes with prior admissions. Episodes for patients who died during the index also have the highest average Medicare episode payment across demographic characteristics for episodes containing a prior admission ($23,910). Osteoporosis episodes for patients 85 years and older have the lowest proportion of episodes and the lowest average Medicare episode payment for episodes containing a prior admission ($19,638).

Exhibit 2.15: Percent of Episodes with Prior admission and Average Medicare Episode Payment by Demographic Characteristic for Episodes Defined by Osteoporosis[a] for 60-day Fixed-Length Pre-Acute Episode (2007-2009)

Demographic Characteristic	Percent of Episodes with Prior Admission	Average Medicare Episode Payment for No Prior Admission	Average Medicare Episode Payment for Episodes with Prior Admission	Ratio of Average Medicare Episode Payment[b]
Live Alone	6.2%	$10,878	$21,475	1.97
Died during Episode	9.4%	$11,903	$23,910	2.01
Dual Eligible	9.0%	$10,357	$21,709	2.10
Female	6.2%	$10,477	$21,543	2.06
Rural	7.0%	$10,335	$21,553	2.09
85 and Older	4.9%	$9,250	$19,638	2.12
Non-white	8.0%	$11,196	$23,424	2.09
Overall Average	**6.6%**	**$10,668**	**$22,056**	**2.07**

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

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

[b] Average Medicare Episode Payment for episodes that contain a readmission divided by episodes that do not contain a readmission.

*DIABETES*CHF*

About 13.3 percent of pre-acute episodes are defined by a primary chronic condition of DIABETES*CHF. Medicare payment for DIABETES*CHF episodes totaled $52.6 billion between 2007 and 2009 (Exhibit 2.2). Approximately 12.6 percent of DIABETES*CHF episodes contain an admission prior to the index acute care hospitalization. DIABETES*CHF episodes containing a prior admission account for 23.4 percent of all Medicare episode payments for DIABETES*CHF episodes (Exhibit 2.5).

As shown in the other primary chronic conditions, episodes containing a few chronic conditions often have a low proportion of prior admissions, compared to episodes with more chronic conditions. Exhibit 2.16 and Exhibit 2.17 show that DIABETES*CHF episodes generally demonstrate this pattern. Episodes with two or three chronic conditions have a low proportion of prior admission (8.3 and 8.2 percent, respectively). However, episodes with four or more chronic conditions have a significantly higher proportion of episodes containing prior admissions, which slightly increases as the number of chronic conditions per episode approaches 11. In this range of chronic conditions, the percent of episodes containing prior admissions ranges from 11.7 to 13.8.

Despite the increase in the number of chronic conditions represented per episode, the average Medicare episode payment for episodes containing a prior admission is relatively consistent, and ranges from $23,846 for episodes with two chronic conditions to $29,850 for episodes with five chronic conditions. It is interesting to note that episodes with

twelve chronic conditions have the highest proportion of prior admissions (16.8 percent) but the second lowest average Medicare episode payment for those episodes ($23,924). It is also interesting to note that episodes with two chronic conditions have the lowest average Medicare episode payment, despite the general overall trend in DIABETES*CHF episodes that the average Medicare episode payment tends to decrease once the episode contains four or more chronic conditions.

Exhibit 2.16: Percent of Episodes and Medicare Episode Payment for Episodes with Prior Admissions by Number of Chronic Conditions for Episodes Defined by DIABETES*CHF[a] for 60-day Fixed-Length Pre-Acute Episodes (2007-2009)

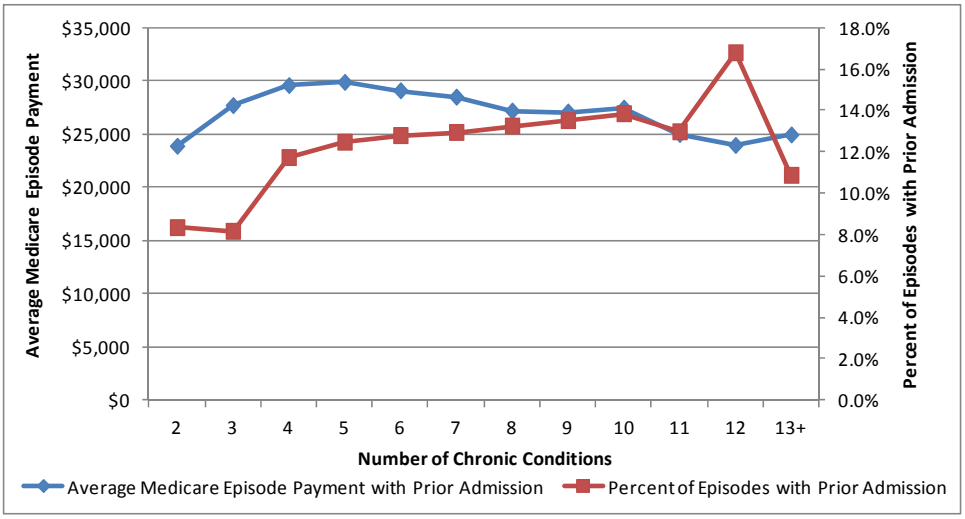
Number of Chronic Conditions	Percent of Episodes	Percent of Episodes with Prior Admission	Average Medicare Episode Payment with Prior Admission[b]
2	0.4%	8.3%	$23,846
3	3.7%	8.2%	$27,671
4	11.4%	11.7%	$29,554
5	18.7%	12.5%	$29,850
6	20.9%	12.8%	$29,060
7	18.6%	12.9%	$28,461
8	12.8%	13.2%	$27,151
9	7.7%	13.5%	$27,066
10	3.7%	13.8%	$27,427
11	1.5%	13.0%	$24,959
12	0.5%	16.8%	$23,924
13+	0.1%	10.9%	$24,911
Overall Average	**100.0%**	**12.6%**	**$28,509**

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

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

[b] Average Medicare Episode Payment for episodes that contain a readmission divided by episodes that do not contain a readmission.

Exhibit 2.17: Percent of Episodes and Average Medicare Episode Payment for Episodes with Prior Admissions by Number of Chronic Conditions for Episodes Defined by DIABETES*CHF[a] for 60-day Fixed-Length Pre-Acute Episodes (2007-2009)



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

Exhibit 2.18 shows the proportion of episodes that contain a prior admission and the average Medicare episode payment by admission status by patient demographic characteristic. Similar to episodes with a primary chronic condition of CHF*COPD, episodes for patients who are non-white contain the highest proportion of episodes with prior admissions (16.4 percent) – well above the overall average of 12.6 percent. A similar proportion of episodes for dual eligible patients and those who died during the index contain a prior admission as well (15.2 percent and 15.0 percent, respectively). Consistently, episodes that contain a prior admission have an average Medicare episode payment more than double that of episodes without prior admissions.

Exhibit 2.18: Percent of Episodes with Prior admission and Average Medicare Episode Payment by Demographic Characteristics for Episodes Defined by DIABETES*CHF[a] for 60-day Fixed-Length Pre-Acute Episode (2007-2009)

Demographic Characteristics	Percent of Episodes with Prior Admission	Average Medicare Episode Payment for No Prior Admission	Average Medicare Episode Payment for Episodes with Prior Admission	Ratio of Average Medicare Episode Payment[b]
Live Alone	12.0%	$12,695	$27,240	2.15
Died during Episode	15.0%	$15,452	$30,800	1.99
Dual Eligible	15.2%	$13,295	$29,318	2.21
Female	11.7%	$12,565	$26,929	2.14
Rural	12.3%	$12,545	$27,081	2.16
85 and Older	8.7%	$10,804	$22,818	2.11
Non-white	16.4%	$14,823	$31,557	2.13
Overall Average	**12.6%**	**$13,470**	**$28,509**	**2.12**

Source: Dobson | DaVanzo analysis of research-identifiable 5% SAF for all sites of service, 2007-2009, wage index adjusted by setting and geographic region, and standardized to 2009 dollars. All episodes have been extrapolated to reflect the universe of Medicare beneficiaries. Average Medicare Episode Payment includes care from all facility-based and ambulatory care settings and excludes beneficiary co-payments.
[a] For methodology used to determine primary chronic condition, see Working Paper #1.
[b] Average Medicare Episode Payment for episodes that contain a readmission divided by episodes that do not contain a readmission.

*CHF*RENAL*

More than five percent of pre-acute episodes have a primary chronic condition of CHF*RENAL. Medicare payment for CHF*RENAL episodes totaled $21.6 billion from 2007 to 2009 (Exhibit 2.2). Approximately 11.7 percent of CHF*RENAL episodes contain an admission prior to the index acute care hospitalization, and account for 21.3 percent of all Medicare episode payments for CHF*RENAL episodes (Exhibit 2.5).

The distribution of episodes containing a prior admission and the relationship to average Medicare episode payments for CHF*RENAL episodes is very different than the other primary chronic conditions analyzed. As shown in Exhibit 2.19 and Exhibit 2.20, as the number of chronic conditions increase within CHF*RENAL episodes, the percent of episodes containing a prior admission decreases. This inverse relationship is to the opposite of the other primary chronic conditions shown. CHF*RENAL episodes containing three chronic conditions have the highest proportion of episodes with a prior admission (14.4 percent), while episodes with 12 or more chronic conditions have the lowest proportion (8.8 percent). As the number of chronic conditions and the percent of episodes containing prior admissions decreases, the average Medicare episode payment for episodes containing a prior admission decreases as well. The average Medicare payment for episodes containing a prior admission ranges from $23,802 for episodes with 10 chronic conditions to $35,679 for episodes with two chronic conditions. This may suggest that episodes for patients with more chronic conditions may be dying during the episode, but warrants further investigation.

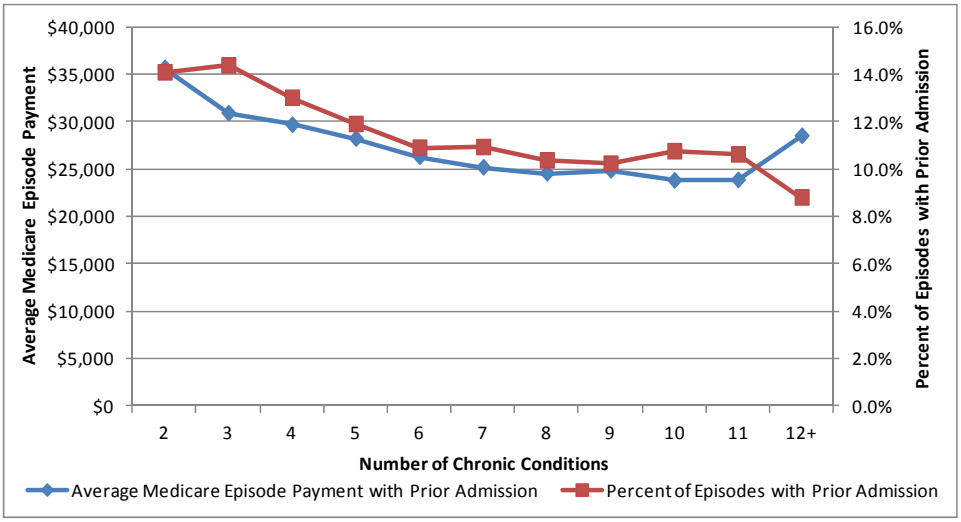
Exhibit 2.19: Percent of Episodes and Medicare Episode Payment for Episodes with Prior Admissions by Number of Chronic Conditions for Episodes Defined by CHF*RENAL[a] for 60-day Fixed-Length Pre-Acute Episodes (2007-2009)

Number of Chronic Conditions	Percent of Episodes	Percent of Episodes with Prior Admission	Average Medicare Episode Payment with Prior Admission
2	2.3%	14.1%	$35,679
3	7.9%	14.4%	$30,899
4	15.0%	13.0%	$29,677
5	19.9%	11.9%	$28,213
6	20.0%	10.9%	$26,301
7	16.0%	10.9%	$25,174
8	10.3%	10.4%	$24,551
9	5.6%	10.2%	$24,862
10	2.3%	10.8%	$23,802
11	0.7%	10.6%	$23,853
12+	0.2%	8.8%	$28,511
Overall Average	**100.0%**	**11.7%**	**$27,493**

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

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

Exhibit 2.20: Percent of Episodes and Average Medicare Episode Payment for Episodes with Prior Admissions by Number of Chronic Conditions for Episodes Defined by CHF*RENAL[a] for 60-day Fixed-Length Pre-Acute Episodes (2007-2009)



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

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

Episode Type 2: Pre-Acute Episodes

Exhibit 2.21 shows the proportion of episodes that contain a prior admission and the average Medicare episode payment by prior admission status by patient demographic characteristic for CHF*RENAL episodes. The overall average Medicare episode payment for episodes containing a prior admission is more than twice that of episodes that do not contain a prior admission ($27,493 vs. $13,419). Consistent with the other primary chronic conditions, episodes for dual eligibles and those who died during the index acute care hospitalization have the highest percent of episodes with prior admissions (14.1 percent and 12.7 percent, respectively). Episodes for patients who are non-white have the highest average Medicare episode payment across demographic characteristics for episodes containing a prior admission ($31,186). Similar to osteoporosis episodes, CHF*RENAL episodes for patients 85 years and older have the lowest proportion of episodes containing a prior admission (9.0 percent) and the lowest average Medicare episode payment for episodes containing a prior admission ($22,057).

Exhibit 2.21: Percent of Episodes with Readmission and Average Medicare Episode Payment by Demographic Characteristic for Episodes Defined by CHF*RENAL[a] for 60-day Fixed-Length Pre-Acute Episode (2007-2009)

Demographics	Percent of Episodes with Prior Admission	Average Medicare Episode Payment for No Prior Admission	Average Medicare Episode Payment for Episodes with Prior Admission	Ratio of Average Medicare Episode Payment[b]
Live Alone	10.4%	$12,003	$25,019	2.08
Died during Episode	12.7%	$14,564	$28,659	1.97
Dual Eligible	14.1%	$13,498	$28,199	2.09
Female	10.8%	$12,392	$25,464	2.05
Rural	11.6%	$12,534	$25,705	2.05
85 and Older	9.0%	$10,865	$22,057	2.03
Non-white	16.1%	$15,262	$31,186	2.04
Overall Average	**11.7%**	**$13,419**	**$27,493**	**2.05**

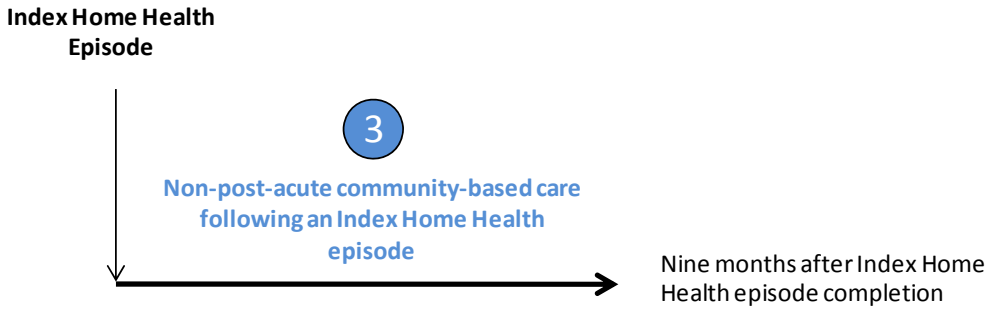
Source: Dobson | DaVanzo analysis of research-identifiable 5% SAF for all sites of service, 2007-2009, wage index adjusted by setting and geographic region, and standardized to 2009 dollars. All episodes have been extrapolated to reflect the universe of Medicare beneficiaries. Average Medicare Episode Payment includes care from all facility-based and ambulatory care settings and excludes beneficiary co-payments.
[a] For methodology used to determine primary chronic condition, see Working Paper #1.
[b] Average Medicare Episode Payment for episodes that contain a readmission divided by episodes that do not contain a readmission.

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

Brief Review of Episode Definition[21]

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

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



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

Episode Type 3: Non-Post-Acute Episodes

Similar to Episode Type 2, these episodes are clinically defined by the patients' primary chronic conditions. These were determined by mapping each chronic condition identified in the patients' CCW claims data onto the most-comparable HCC 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 and chronic obstructive pulmonary disease (CHF*COPD) were ranked with a higher severity than the individual conditions. The other two interacted conditions include diabetes and CHF (DIABETES*CHF), and CHF and renal failure (CHF*RENAL).

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

The Medicare episode payment data presented for the non-post-acute care community-based episodes include the Medicare payment for the first home health episode and all care for nine months following the patient's first home health discharge. Beneficiary copayments, deductibles, and payments from other third parties are excluded from all payment amounts.

Across all three years (2007-2009), there are 2,990,540 Type 3 episodes that represent $73.1 billion in Medicare payments.[22,23] In 2008, the non-post-acute-care community-based episodes represent about 11 percent of total Medicare fee-for-service spending.[24]

Distribution of Episodes and Medicare Payments by Primary Chronic Condition

Exhibit 3.2 shows the distribution of episodes and Medicare episode payments by primary chronic condition, sorted from highest to lowest severity. This mutually exclusive assignment of diagnoses allows us to conduct analyses by chronic condition without duplicating the number of episodes or Medicare payments.

As with Episode Type 2, CHF*COPD is the most prevalent primary chronic condition, representing 23.4 percent of episodes and 33.7 percent of total Medicare episode

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

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

[24] Dobson | DaVanzo analysis of research-identifiable 5% SAF for all sites of service, 2007-2009, wage index adjusted by setting and geographic region, and standardized to 2009 dollars, divided by the Congressional Budget Office, March Baselines for Medicare, 2010 (for 2009 Medicare spending).

payments. Osteoporosis and DIABETES*CHF remain the second and third most prevalent primary chronic conditions, representing 18.9 percent and 15.5 percent of all non-post-acute care community-based episodes, respectively. More than 90 percent of all non-post-acute care community-based episodes are contained within the top seven highest ranked primary chronic conditions. This suggests that home health serves chronically-ill patients who are at high community risk without having a hospital admission prior to their receiving home health. Only 1.4 percent of all non-post acute episodes have none of the listed chronic conditions. While these patients do not have any identified chronic conditions, these patients may be frail, which prevents them from leaving their home easily. This chapter will investigate the mix of services and Medicare payments for this type of community episode with and without hospital admissions.

Episode Type 3: Non-Post-Acute Episodes

Exhibit 3.2: Distribution of Episodes and Medicare Episode Payments 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 Payment (in millions)	Percent Medicare Episode Payment
CHF*COPD	699,540	23.4%	$24,663	33.7%
DIABETES*CHF	463,620	15.5%	$13,868	19.0%
CHF*RENAL	159,960	5.3%	$4,493	6.1%
Lung Cancer	38,400	1.3%	$1,030	1.4%
Osteoporosis	563,980	18.9%	$10,709	14.6%
COPD	186,140	6.2%	$3,937	5.4%
Rheumatoid Arthritis/Osteoarthritis	384,560	12.9%	$6,659	9.1%
Hip/Pelvic Fracture	14,080	0.5%	$360	0.5%
Heart Failure	72,580	2.4%	$1,199	1.6%
Alzheimer's Disease	90,800	3.0%	$1,494	2.0%
Alzheimer's Disease and Related Disorders or Senile	62,760	2.1%	$1,061	1.5%
Stroke/Transient Ischemic Attack	27,820	0.9%	$503	0.7%
Colorectal Cancer	7,140	0.2%	$212	0.3%
Depression	62,820	2.1%	$1,060	1.4%
Acute Myocardial Infarction	1,180	0.0%	$22	0.0%
Ischemic Heart Disease	50,320	1.7%	$671	0.9%
Atrial Fibrillation	3,740	0.1%	$58	0.1%
Chronic Kidney Disease	15,820	0.5%	$279	0.4%
Female Breast Cancer	3,720	0.1%	$67	0.1%
Prostate Cancer	2,400	0.1%	$23	0.0%
Endometrial Cancer	300	0.0%	$5	0.0%
Diabetes	24,500	0.8%	$206	0.3%
Glaucoma	4,680	0.2%	$34	0.0%
Cataract	8,840	0.3%	$70	0.1%
None	40,840	1.4%	$417	0.6%
Total	**2,990,540**	**100.0%**	**$73,101**	**100.0%**

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

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

Exhibit 3.3 shows the overall average Medicare episode payment and the percent of episodes that contain a hospital admission by primary chronic condition. As the primary chronic conditions decrease in severity, the percent of episodes that contain a hospital admission generally decreases as well. Episodes with a primary chronic condition of

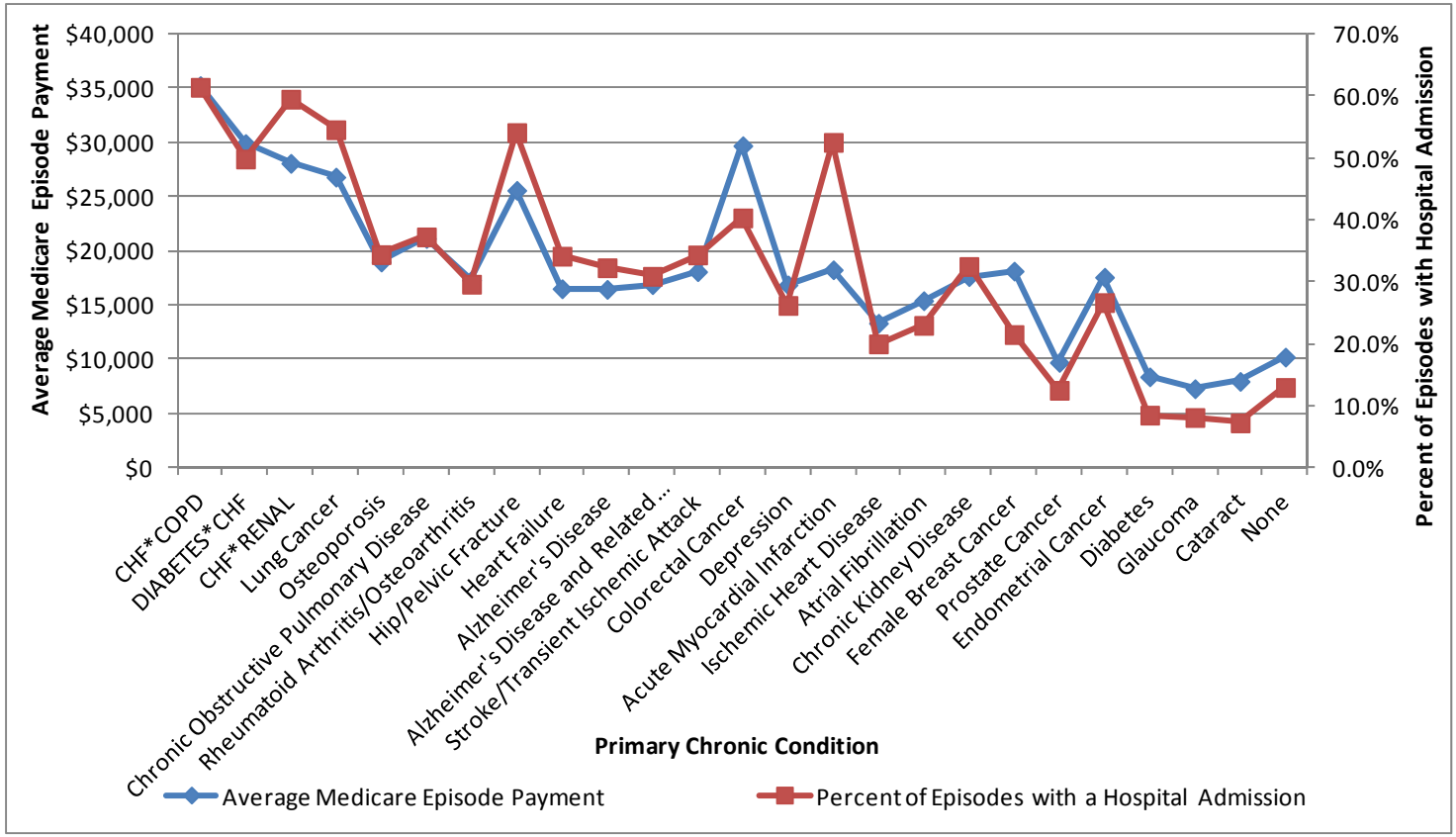
Episode Type 3: Non-Post-Acute Episodes

CHF*COPD have the highest proportion of episodes containing a hospital admission (61.4 percent), while episodes with a primary chronic condition of cataract have the lowest proportion (7.2 percent). As the severity of the primary chronic condition decreases, the proportion of episodes that contain a hospital admission and the overall Medicare episode payment generally decreases as well. These two metrics appear to be related to each other as there is some consistency in the trends by primary chronic condition. Episodes with a primary chronic condition of the various cancer types, hip/pelvic fractures and acute myocardial infarction appear to differ from this decreasing trend, as these episodes contain a higher proportion of admissions than their placement in the hierarchy suggests.

Exhibit 3.4 shows the percent of episodes and average Medicare episode payment by primary chronic condition for episodes that contain a hospital admission compared to episodes that do not. Across all primary chronic conditions, episodes with a hospital admission have an average Medicare episode payment almost four times that of episodes without an admission ($11,162 compared to $41,953, ratio of 3.76). This suggests that avoiding hospital admissions within a non-post-acute care community-based episode through the use of care coordination could produce significant Medicare savings.

As the severity of the primary chronic condition decreases, the relative difference in the average Medicare episode payment for episodes containing, and not containing prior admissions increases. For example, for diabetes and cataract primary chronic condition episodes, those with a hospital admission have an average Medicare episode payment of about five times the average payment for episodes not containing a hospital admission. This is likely due to the lower payments for ambulatory care provided in episodes without a hospital admission compared to the facility-based care payments for the admission. CHF*COPD, DIABETES*CHF, and CHF*RENAL episodes that contain a hospital admission have an average Medicare episode payment more than 3.5 times higher than the average payment for episodes not containing a hospital admission.

Exhibit 3.3: Average Medicare Episode Payment and Percent of Episodes Containing Hospital Admission by Primary Chronic Condition[a] for Nine-Month Fixed-Length Non-Post-Acute Care Community-Based Episodes (2007-2009)



Source: Dobson | DaVanzo analysis of research-identifiable 5% SAF for all sites of service, 2007-2009, wage index adjusted by setting and geographic region, and standardized to 2009 dollars. Average Medicare Episode Payment includes care from all facility-based and ambulatory care settings and excludes beneficiary co-payments.

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

Episode Type 3: Non-Post-Acute Episodes

Exhibit 3.4: Percent of Episodes, Average Medicare Episode Payment by Admission Status by Primary Chronic Condition[a] for Nine-Month Fixed-Length Non-Post-Acute Care Community-Based Episodes (2007-2009)

	Total			Episode Does Not Contain Hospital Admission		Episode Contains Hospital Admission		Ratio of Average Medicare Episode Payment[b]
Primary Chronic Condition	Percent of Episodes	Average Medicare Episode Payment	Percent of Episodes with Admission	Percent of Episodes	Average Medicare Episode Payment	Percent of Episodes	Average Medicare Episode Payment	
CHF*COPD	23.4%	$35,256	61.4%	15.9%	$13,849	33.3%	$48,691	3.52
DIABETES*CHF	15.5%	$29,913	49.9%	13.7%	$12,897	17.9%	$47,031	3.65
CHF*RENAL	5.3%	$28,088	59.5%	3.8%	$10,711	7.4%	$39,914	3.73
Lung Cancer	1.3%	$26,814	54.6%	1.0%	$14,366	1.6%	$37,171	2.59
Osteoporosis	18.9%	$18,988	34.4%	21.8%	$10,496	15.0%	$35,176	3.35
Chronic Obstructive Pulmonary Disease	6.2%	$21,151	37.3%	6.9%	$11,814	5.4%	$36,857	3.12
Rheumatoid Arthritis/Osteoarthritis	12.9%	$17,316	29.6%	15.9%	$10,347	8.8%	$33,856	3.27
Hip/Pelvic Fracture	0.5%	$25,598	54.1%	0.4%	$9,658	0.6%	$39,111	4.05
Heart Failure	2.4%	$16,519	34.2%	2.8%	$9,505	1.9%	$30,033	3.16
Alzheimer's Disease	3.0%	$16,458	32.3%	3.6%	$9,755	2.3%	$30,514	3.13
Alzheimer's Disease and Related Disorders	2.1%	$16,898	30.9%	2.6%	$9,274	1.5%	$33,939	3.66
Stroke/Transient Ischemic Attack	0.9%	$18,094	34.4%	1.1%	$9,495	0.7%	$34,518	3.64
Colorectal Cancer	0.2%	$29,712	40.3%	0.3%	$19,720	0.2%	$44,494	2.26
Depression	2.1%	$16,868	26.2%	2.7%	$9,585	1.3%	$37,381	3.90
Acute Myocardial Infarction	0.0%	$18,266	52.5%	0.0%	$6,888	0.0%	$28,544	4.14
Ischemic Heart Disease	1.7%	$13,337	20.0%	2.4%	$8,671	0.8%	$32,011	3.69
Atrial Fibrillation	0.1%	$15,415	23.0%	0.2%	$8,639	0.1%	$38,105	4.41
Chronic Kidney Disease	0.5%	$17,634	32.5%	0.6%	$10,489	0.4%	$32,480	3.10
Female Breast Cancer	0.1%	$18,144	21.5%	0.2%	$14,075	0.1%	$32,998	2.34
Prostate Cancer	0.1%	$9,718	12.5%	0.1%	$7,861	0.0%	$22,715	2.89
Endometrial Cancer	0.0%	$17,579	26.7%	0.0%	$12,691	0.0%	$31,020	2.44
Diabetes	0.8%	$8,389	8.5%	1.3%	$6,515	0.2%	$28,588	4.39
Glaucoma	0.2%	$7,293	8.1%	0.3%	$6,428	0.0%	$17,084	2.66
Cataract	0.3%	$7,969	7.2%	0.5%	$6,151	0.0%	$31,262	5.08
None	1.4%	$10,210	13.0%	2.1%	$6,708	0.4%	$33,692	5.02
Total	**100.0%**	**$24,444**	**43.2%**	**100.0%**	**$11,162**	**100.0%**	**$41,933**	**3.76**

Source: Dobson | DaVanzo analysis of research-identifiable 5% SAF for all sites of service, 2007-2009, wage index adjusted by setting and geographic region, and standardized to 2009 dollars. Average Medicare Episode Payment includes care from all facility-based and ambulatory care settings and excludes beneficiary co-payments.

[a] For methodology used to determine primary chronic condition, see Working Paper #1. [b] Average Medicare Episode Payment for episodes that contain a readmission divided by episodes that do not contain a readmission.

Episode Type 3: Non-Post-Acute Episodes

As shown in Exhibit 3.5, the percent of episodes containing a hospital admission is disproportionate to the amount of Medicare episode payments they represent. For example, 61.4 percent of CHF*COPD episodes contain a hospital admission, but these episodes represent 84.9 percent of Medicare episode payments for CHF*COPD episodes. Therefore, the ratio of episode payments to proportion of episodes is 1.38. As the severity of the primary chronic condition decreases, the percent of episodes containing a hospital admission decreases faster than the percent of Medicare episode payment represented by these episodes, increasing the ratio of episode payment to proportion of episode. This ratio is driven by the high cost of a hospitalization relative to the service mix contained in the episodes by primary chronic condition. Episodes with a primary chronic condition of CHF*COPD have the lowest ratio of Medicare episode payment to proportion of episodes (1.38), which is likely due to the high intensity of care that patients with CHF*COPD receive outside of the hospital. The additional cost of the hospitalization over the nine-month fixed length episode is relatively small. However, cataract primary chronic condition episodes have the highest ratio (3.92), as 7.2 percent of episodes represent 28.4 percent of Medicare episode payments. Medicare payments for a hospital admission are very high compared to the typical treatment regimen for homebound patients with no high-severity chronic conditions.

Episode Type 3: Non-Post-Acute Episodes

Exhibit 3.5: Percent of Episodes and Percent of Medicare Episode Payment for Episodes with a Hospital Admission by Primary Chronic Condition[a] for Nine-Month Fixed-Length Non-Post-Acute Care Community-Based Episodes (2007-2009)

Primary Chronic Conditions	Percent of Episodes with Hospital Admission	Percent of Paid for Episodes with Hospital Admission	Ratio of Medicare Episode Payment to Proportion of Episodes
CHF*COPD	61.4%	84.9%	1.38
DIABETES*CHF	49.9%	78.4%	1.57
CHF*RENAL	59.5%	84.6%	1.42
Lung Cancer	54.6%	75.7%	1.39
Osteoporosis	34.4%	63.7%	1.85
COPD	37.3%	65.0%	1.74
Rheumatoid Arthritis/Osteoarthritis	29.6%	58.0%	1.96
Hip/Pelvic Fracture	54.1%	82.7%	1.53
Heart Failure	34.2%	62.1%	1.82
Alzheimer's Disease	32.3%	59.9%	1.85
Alzheimer's Disease and Related Disorders or Senile	30.9%	62.1%	2.01
Stroke/Transient Ischemic Attack	34.4%	65.6%	1.91
Colorectal Cancer	40.3%	60.4%	1.50
Depression	26.2%	58.1%	2.22
Acute Myocardial Infarction	52.5%	82.1%	1.56
Ischemic Heart Disease	20.0%	48.0%	2.40
Atrial Fibrillation	23.0%	56.8%	2.47
Chronic Kidney Disease	32.5%	59.8%	1.84
Female Breast Cancer	21.5%	39.1%	1.82
Prostate Cancer	12.5%	29.2%	2.34
Endometrial Cancer	26.7%	47.1%	1.76
Diabetes	8.5%	28.9%	3.41
Glaucoma	8.1%	19.0%	2.34
Cataract	7.2%	28.4%	3.92
None	13.0%	42.8%	3.30
Overall Average	**43.2%**	**74.0%**	**1.72**

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

Exhibit 3.6 shows the number and percent of episodes, and average Medicare episode payment, by the number of admissions per episode. More than one-half (56.8 percent) of episodes do not contain a hospital admission, while about one-quarter (24.6 percent) of episodes contain one hospital admission during the nine-month fixed-length episode. An additional 10.5 percent of episodes contain two hospital admissions, while the remaining 8.1 percent of episodes contain three or more hospital admissions. As the number of admissions per episode increases, the average Medicare episode payment increases as

well, from $11,162 for episodes without any admissions, to $77,203 for episodes containing three or more hospital admissions.

Exhibit 3.6: Number of Episodes and Average Medicare Episode Payment by Number of Admissions within an Episode for Nine-Month Fixed-Length Non-Post-Acute Care Community-Based Episodes (2007-2009)

Number of Admissions	Number of Episodes	Percent of Episodes	Cumulative Percent of Episodes with Hospital Admission	Percent of Admitted Episodes	Average Medicare Episode Payment	Percent of Total Medicare Episodes Payment
0	1,699,720	56.8%	0.0%	0.0%	$11,162	26.0%
1	734,620	24.6%	24.6%	56.9%	$28,377	28.5%
2	313,500	10.5%	35.0%	24.3%	$46,394	19.9%
3+	242,700	8.1%	43.2%	18.8%	$77,203	25.6%
Total	**2,990,540**	**100.0%**	**43.2%**	**100.0%**	**$24,444**	**100.0%**

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

Exhibit 3.7 and Exhibit 3.8 show the percent of episodes that contain a hospital admission and the average Medicare episode payment for those episodes by the number of chronic conditions. Overall, the percent of episodes containing a hospital admission increases with the number of chronic conditions per episode. The increase in the proportion of episodes containing a hospital admission by number of chronic conditions suggests that readmissions are partially attributable to the complexity of patients with multiple chronic conditions. Approximately 13.0 percent of episodes with no chronic conditions contain a hospital admission while 78.7 percent of episodes with 14 or more chronic conditions contain a hospital admission. It is interesting to note, however, that the growth in the proportion of episodes with an admission increases faster than the growth in the average Medicare episode payment for the admitted episodes. This seems reasonable considering that as the percent of episodes containing an admission rises, Medicare episode payments rise disproportionately relative to base Medicare episode payments.

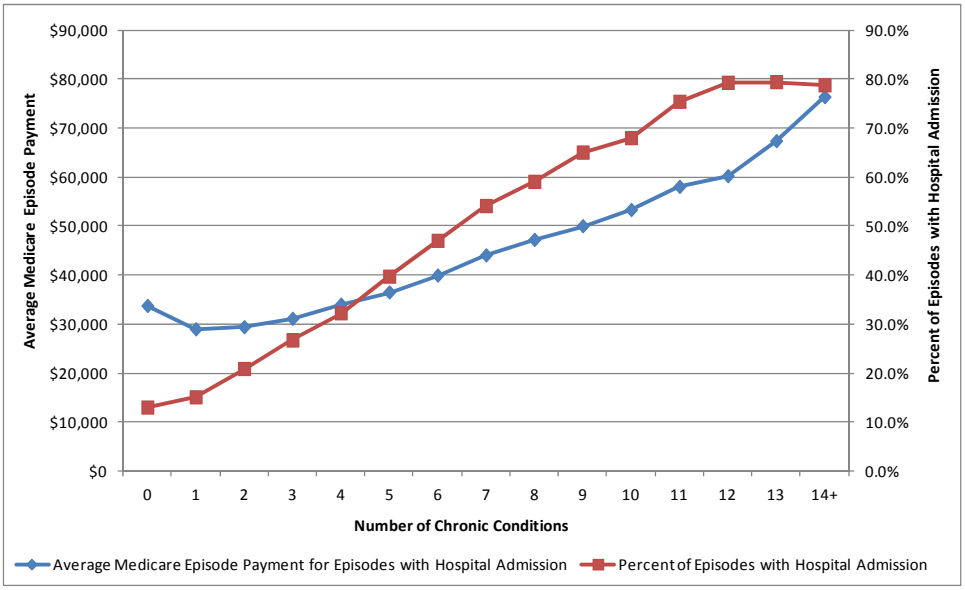
Episode Type 3: Non-Post-Acute Episodes

Exhibit 3.7: Percent of Episodes and Medicare Episode Payment for Episodes with Hospital Admissions by Number of Chronic Conditions for Nine-Month Fixed-Length Non-Post-Acute Care Community-Based Episodes (2007-2009)

Number of Chronic Condition	Percent of Episodes	Percent of Episodes with Hospital Admission	Average Medicare Episode Payment with Hospital Admission
0	1.4%	13.0%	$33,692
1	3.6%	15.1%	$28,942
2	6.7%	20.8%	$29,348
3	10.1%	26.7%	$31,066
4	13.3%	32.2%	$33,967
5	15.2%	39.7%	$36,461
6	14.9%	47.0%	$39,898
7	12.9%	54.1%	$44,009
8	9.9%	59.0%	$47,180
9	6.2%	65.0%	$49,973
10	3.5%	67.9%	$53,267
11	1.6%	75.4%	$57,996
12	0.6%	79.2%	$60,175
13	0.2%	79.4%	$67,321
14+	0.0%	78.7%	$76,316
Overall Average	**100.0%**	**43.2%**	**$41,933**

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

Exhibit 3.8: Percent of Episodes and Average Medicare Episode Payment for Episodes with Hospital Admissions by Number of Chronic Conditions for Nine-Month Fixed-Length Non-Post-Acute Care Community-Based Episodes (2007-2009)



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

Exhibit 3.9 shows the proportion of episodes that contain a hospital admission and the average Medicare episode payment by admission status by patient demographic characteristic. The average Medicare episode payment for episodes containing a hospital admission is approximately four times higher than the payment for episodes that did not contain an admission ($41,933 compared to $11,162). Almost two-thirds (63.5 percent) of episodes for patients who died during the episode contained a hospital admission. Episodes for patients who are non-white have the lowest proportion of episodes containing an admission (38.7 percent), but this population has the highest average Medicare payment for episodes both containing and not containing a hospital admission ($47,946 and $13,401, respectively).

Episode Type 3: Non-Post-Acute Episodes

Exhibit 3.9: Percent of Episodes with Hospital Admission and Average Medicare Episode Payment by Demographic Characteristic for Nine-Month Fixed-Length Non-Post-Acute Care Community-Based Episodes (2007-2009)

Demographic Characteristics	Percent of Episodes with Hospital Admission	Average Medicare Episode Payment for No Hospital Admission	Average Medicare Episode Payment for Episodes with Hospital Admission	Ratio of Average Medicare Episode Payment[a]
Live Alone	44.3%	$11,213	$42,187	3.76
Died during Episode	63.5%	$11,981	$45,018	3.76
Dual Eligible	41.6%	$13,087	$46,273	3.54
Female	42.7%	$10,938	$40,665	3.72
Rural	45.6%	$10,245	$39,461	3.85
85 and Older	45.6%	$9,940	$36,234	3.65
Non-white	38.7%	$13,401	$47,946	3.58
Overall Average	**43.2%**	**$11,162**	**$41,933**	**3.76**

Source: Dobson | DaVanzo analysis of research-identifiable 5% SAF for all sites of service, 2007-2009, wage index adjusted by setting and geographic region, and standardized to 2009 dollars. All episodes have been extrapolated to reflect the universe of Medicare beneficiaries. Average Medicare Episode Payment includes care from all facility-based and ambulatory care settings and excludes beneficiary co-payments.
[a] Average Medicare Episode Payment for episodes that contain a readmission divided by episodes that do not contain a readmission.

Distribution of Episodes and Medicare Payments for Select Primary Chronic Conditions

In the remainder of this chapter, we analyze the non-post-acute care community-based episode payments for select primary chronic conditions in more detail. These sections contain descriptive statistics on the proportion of episodes containing a hospital admission by chronic condition within these episodes and the allocation of Medicare episode payments by admission status.

*CHF*COPD*

Similar to the pre-acute care episodes, CHF*COPD is the most common primary chronic condition among the non-post-acute care community-based episodes and has the highest community risk score. This chronic condition represents almost one-quarter (23.4 percent) of all non-post-acute care community-based services. Medicare payment for CHF*COPD episodes totaled $24.6 billion from 2007 to 2009 (Exhibit 3.2). Approximately 61.4 percent of CHF*COPD episodes contain a hospital admission, which represents 84.9 percent of all Medicare episode payments for CHF*COPD episodes (Exhibit 3.5).

Consistent with the trend across all non-post-acute care community-based episodes, as shown in Exhibit 3.10 and 3.11, the proportion of episodes containing a hospital admission increases with the number of chronic conditions per episode. On average, CHF*COPD episodes with two chronic conditions (i.e., the patient has no other chronic conditions except CHF and COPD) have the lowest percent of episodes with a hospital

admission (43.8 percent of episodes); while episodes with 12 chronic conditions per episode have the highest percent (80.4 percent of episodes).

As the proportion of episodes that contain a hospital admission increases, the average Medicare episode payment for episodes containing a hospital admission increases at a similar rate. However, once an episode contains 12 or more chronic conditions, the proportion of episodes that contain a hospital admission decreases, but the average Medicare episode payment for those episodes increases faster than the average Medicare episode payment for episodes with fewer chronic conditions. Episodes with two chronic conditions that contain a hospital admission have the lowest average Medicare episode payment ($26,007), while episodes with 14 or more chronic conditions that contain a hospital admission have the highest average Medicare episode payment ($76,234).

Exhibit 3.10: Percent of Episodes and Medicare Episode Payment for Episodes with Hospital Admissions by Number of Chronic Conditions for Episodes Defined by CHF*COPD[a] for Nine-Month Fixed-Length Non-Post-Acute Care Community-Based Episodes (2007-2009)

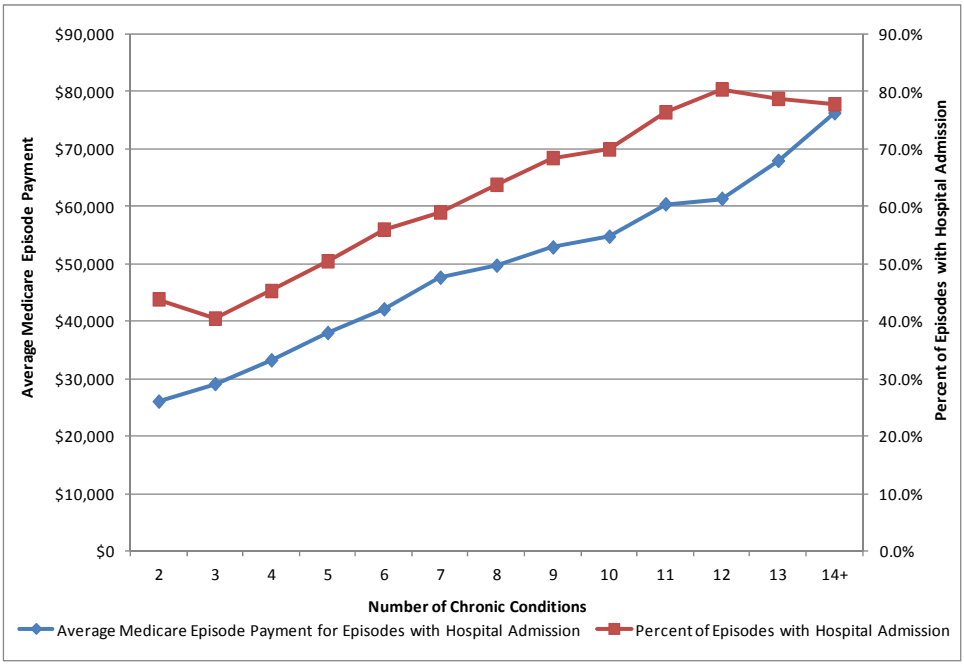
Number of Chronic Conditions	Percent of Episodes	Percent of Episodes with Hospital Admission	Average Medicare Episode Payment with Hospital Admission
2	0.3%	43.8%	$26,007
3	1.5%	40.5%	$29,058
4	4.3%	45.3%	$33,198
5	9.7%	50.4%	$37,951
6	15.5%	56.0%	$42,074
7	18.9%	58.9%	$47,582
8	18.9%	63.8%	$49,678
9	14.0%	68.4%	$52,856
10	9.5%	69.9%	$54,717
11	4.9%	76.4%	$60,365
12	1.8%	80.4%	$61,328
13	0.6%	78.7%	$67,929
14+	0.1%	77.8%	$76,234
Overall Average	**100.0%**	**61.4%**	**$48,691**

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

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

Episode Type 3: Non-Post-Acute Episodes

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



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

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

Exhibit 3.12 shows the proportion of episodes that contain a hospital admission and the average Medicare episode payment by admission status by patient demographic characteristic. On average, 61.4 of CHF*COPD episodes contain a hospital admission and have an average Medicare episode payment of $48,691, in comparison to $13,849 for episodes without an admission. Episodes for patients who are non-white or dual eligible have a lower than average proportion of episodes that contain a hospital admission (55.9 percent and 58.4 percent, respectively). However, episodes for these patient demographic characteristics have an average Medicare episode payment that is above the average, regardless of hospital admission status. Episodes for patients who reside in rural areas have the highest proportion of episodes that contain a hospital admission (63.6 percent), but a lower than average Medicare episode payment by hospital admission status ($11,511 for episodes without and $44,203 for episodes with an admission). This may be attributed to a greater use of ambulatory care as compared to more expensive facility-based care.

Episode Type 3: Non-Post-Acute Episodes

Exhibit 3.12: Percent of Episodes with Hospital Admission and Average Medicare Episode Payment by Demographic Characteristic for Episodes Defined by CHF*COPD[a] for Nine-Month Fixed-Length Non-Post-Acute Care Community-Based Episodes (2007-2009)

Demographic Characteristics	Percent of Episodes with Hospital Admission	Average Medicare Episode Payment for No Hospital Admission	Average Medicare Episode Payment for Episodes with Hospital Admission	Ratio of Average Medicare Payment[b]
Live Alone	61.2%	$14,209	$48,901	3.44
Died during Episode	75.2%	$12,792	$53,016	4.14
Dual Eligible	58.4%	$16,801	$53,012	3.16
Female	61.6%	$13,402	$47,706	3.56
Rural	63.6%	$11,511	$44,203	3.84
85 and Older	62.7%	$11,665	$41,597	3.57
Non-white	55.9%	$18,146	$55,814	3.08
Overall Average	**61.4%**	**$13,849**	**$48,691**	**3.52**

Source: Dobson | DaVanzo analysis of research-identifiable 5% SAF for all sites of service, 2007-2009, wage index adjusted by setting and geographic region, and standardized to 2009 dollars. All episodes have been extrapolated to reflect the universe of Medicare beneficiaries. Average Medicare Episode Payment includes care from all facility-based and ambulatory care settings and excludes beneficiary co-payments.
[a] For methodology used to determine primary chronic condition, see Working Paper #1.
[b] Average Medicare Episode Payment for episodes that contain a readmission divided by episodes that do not contain a readmission.

Osteoporosis

Osteoporosis is the second most common primary chronic condition for non-post-acute care community-based episodes and defines 18.9 percent of all non-post-acute care community-based episodes. Medicare payment for osteoporosis episodes totaled $10.7 billion from 2007-2009 (Exhibit 3.2). Approximately one-third (34.4 percent) of osteoporosis episodes contain a hospital admission, the lowest hospital admission rate of the top five primary chronic conditions. Osteoporosis episodes containing a hospital admission account for 63.7 percent of all Medicare episode payments for osteoporosis episodes (Exhibit 3.5).

As shown in Exhibits 3.13 and 3.14, osteoporosis episodes with a single chronic condition (i.e., the patient has no other chronic conditions except for osteoporosis) have the lowest percent of episodes with a hospital admission, consistent with the overall trend among non-post-acute care community-based episodes. The proportion of episodes containing a hospital admission increases with the number of chronic conditions, but at a faster rate than the increase in the average Medicare episode payments.

About 13.0 percent of episodes with one chronic condition contain a hospital admission, which has an average Medicare episode payment of $24,208. More than two-thirds of episodes with 11 or more chronic conditions contain a hospital admission (67.2 percent), which have an average Medicare episode payment of $47,262. This suggests that the hospital admission may not be the driver of the average Medicare episode payment as the number of number of chronic conditions contained in the episode increases.

Episode Type 3: Non-Post-Acute Episodes

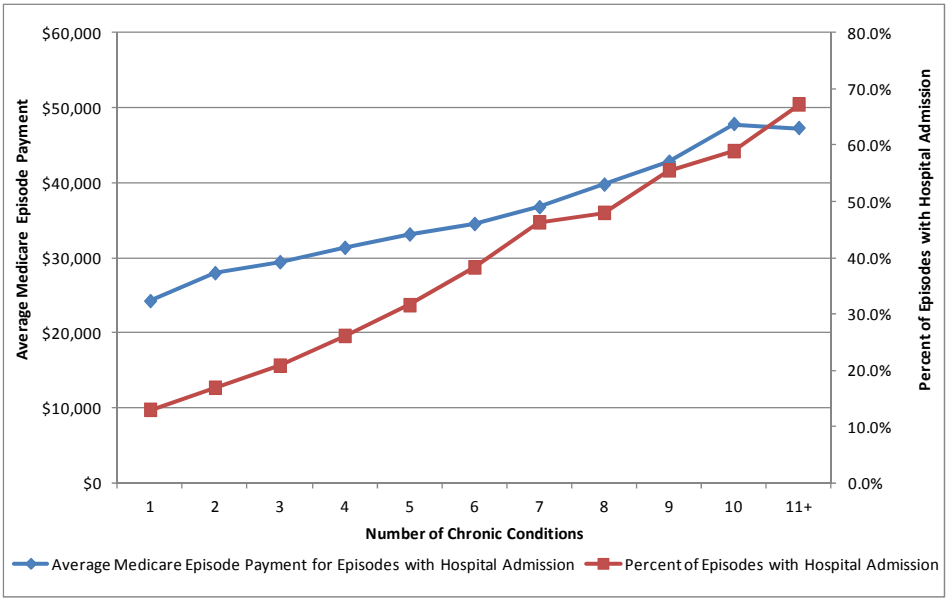
Exhibit 3.13: Percent of Episodes and Medicare Episode Payment for Episodes with Hospital Admissions by Number of Chronic Conditions for Episodes Defined by Osteoporosis[a] for Nine-Month Fixed-Length Non-Post-Acute Care Community-Based Episodes (2007-2009)

Number of Chronic Conditions	Percent of Episodes	Percent of Episodes with Hospital Admission	Average Medicare Episode Payment with Hospital Admission
1	1.1%	13.0%	$24,208
2	5.2%	16.9%	$27,926
3	10.9%	20.8%	$29,390
4	17.4%	26.1%	$31,309
5	20.2%	31.5%	$33,085
6	18.2%	38.3%	$34,473
7	13.1%	46.3%	$36,722
8	8.3%	48.0%	$39,726
9	3.9%	55.5%	$42,768
10	1.3%	58.9%	$47,791
11+	0.4%	67.2%	$47,262
Overall Average	**100.0%**	**34.4%**	**$35,176**

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

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

Exhibit 3.14: Percent of Episodes and Average Medicare Episode Payment for Episodes with Hospital Admissions by Number of Chronic Conditions for Episodes Defined by Osteoporosis[a] for Nine-Month Fixed-Length Non-Post-Acute Care Community-Based Episodes (2007-2009)



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

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

Episode Type 3: Non-Post-Acute Episodes

Exhibit 3.15 shows the proportion of episodes that contain a hospital admission and the average Medicare episode payment by admission status by patient demographic characteristic. Unlike the other primary chronic conditions, the proportion of episodes that contain a hospital admission is generally consistent across demographic characteristics. About one-third of episodes for patients who live alone, are female, reside in a rural area, or are 85 years old or older contain a hospital admission (ranging from 30.2 percent for dual eligibles to 37.5 for patients 85 years or older). More than one-half of episodes for patients who died during the episode contain a hospital admission (56.0 percent), while only about one-quarter (25.3 percent) of episodes for patients who are non-white contain a hospital admission.

The average Medicare episode payment for episodes that contain a hospital admission across all patient demographic characteristics are also very consistent, ranging from $32,872 for patients aged 85 or older to $36,933 for episodes for patients who are non-white. The average Medicare episode payment ranges from $9,591 for patients who are age 85 or older to $12,346 for patients who are dual eligible for episodes without a hospital admission, and ranges from $32,872 for patients age 85 or older to $36,933 for patients who are non-white for episodes that contain an admission.

Exhibit 3.15: Percent of Episodes with Hospital Admission and Average Medicare Episode Payment by Demographic Characteristic for Episodes Defined by Osteoporosis[a] for Nine-Month Fixed-Length Non-Post-Acute Care Community-Based Episodes (2007-2009)

Demographic Characteristics	Percent of Episodes with Hospital Admission	Average Medicare Episode Payment for No Hospital Admission	Average Medicare Episode Payment for Episodes with Hospital Admission	Ratio of Average Medicare Episode Payment[b]
Live Alone	35.3%	$10,379	$35,471	3.42
Died during Episode	56.0%	$11,668	$36,668	3.14
Dual Eligible	30.2%	$12,346	$36,230	2.93
Female	34.0%	$10,352	$34,446	3.33
Rural	37.4%	$9,767	$34,360	3.52
85 and Older	37.5%	$9,591	$32,872	3.43
Non-white	25.3%	$12,291	$36,933	3.00
Overall Average	**34.4%**	**$10,496**	**$35,176**	**3.35**

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

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

[b] Average Medicare Episode Payment for episodes that contain a readmission divided by episodes that do not contain a readmission.

*DIABETES*CHF*

DIABETES*CHF episodes comprise 15.5 percent of all non-post-acute care community-based episodes. Medicare payment for DIABETES*CHF episodes totaled $13.9 billion from 2007-2009 (Exhibit 3.2). Approximately one-half (49.9 percent) of DIABETES*CHF episodes contain an admission. DIABETES*CHF episodes containing

a hospital admission account for more than three-quarters (78.4 percent) of all Medicare episode payments for DIABETES*CHF episodes (Exhibit 3.5).

As shown in the other primary chronic conditions, the proportion of episodes that contain a hospital admission is directly proportional to the number of chronic conditions. Exhibit 3.16 and Exhibit 3.17 show that DIABETES*CHF episodes generally exhibit this pattern. Episodes with two or three chronic conditions have a relatively low percent of hospital admissions (20.5 and 30.0 percent, respectively). However, the vast majority of episodes with 13 or more chronic conditions contain a hospital admission (83.9 percent).

As the number of chronic conditions and percent of episodes containing a hospital admission increase, so does the average Medicare episode payment. Episodes with two chronic conditions have an average Medicare episode payment of $23,110 while episodes with 13 or more chronic conditions have an average Medicare episode payment of $67,665.

Exhibit 3.16: Percent of Episodes and Medicare Episode Payment for Episodes with Hospital Admission by Number of Chronic Conditions for Episodes Defined by DIABETES*CHF[a] for Nine-Month Fixed-Length Non-Post-Acute Care Community-Based Episodes (2007-2009)

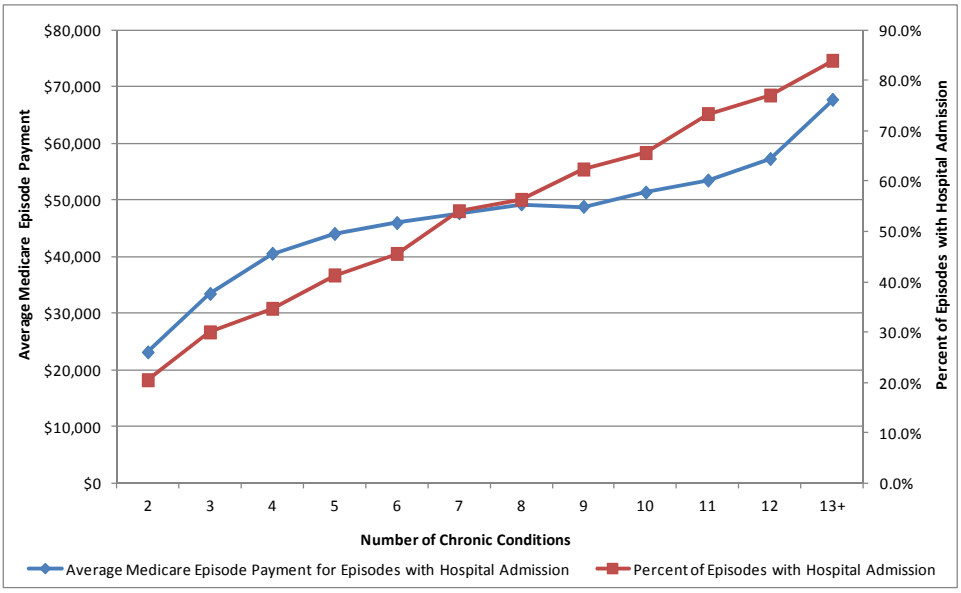
Number of Chronic Condition	Percent of Episodes	Percent of Episodes with Hospital Admission	Average Medicare Episode Payment with Hospital Admission
2	0.5%	20.5%	$23,110
3	3.0%	30.0%	$33,417
4	9.0%	34.6%	$40,514
5	16.3%	41.3%	$44,004
6	19.9%	45.5%	$45,922
7	19.3%	54.0%	$47,667
8	14.9%	56.3%	$49,233
9	9.2%	62.3%	$48,780
10	5.1%	65.6%	$51,310
11	2.0%	73.3%	$53,432
12	0.6%	77.0%	$57,232
13+	0.1%	83.9%	$67,665
Overall Average	**100.0%**	**49.9%**	**$47,031**

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

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

Episode Type 3: Non-Post-Acute Episodes

Exhibit 3.17: Percent of Episodes and Average Medicare Episode Payment for Episodes with Hospital Admission by Number of Chronic Conditions for Episodes Defined by DIABETES*CHF[a] for Nine-Month Fixed-Length Non-Post-Acute Care Community-Based Episodes (2007-2009)



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

Exhibit 3.18 shows the proportion of episodes that contain a hospital admission and the average Medicare episode payment by admission status by patient demographic characteristic. Episodes for patients who died during the episode contain the highest proportion of episodes with hospital admissions (69.3 percent), well above the overall average of 49.9 percent. Given the medical complexity of this primary chronic condition, a high admission rate for patients with this primary chronic condition is expected. The average Medicare payment for episodes in which the patient dies and has a hospital admission is four times the average episode payment for patients who die without an admission ($50,981 compared to $12,734). Episodes for patients who are non-white have the lowest proportion of episodes containing a hospital admission (47.3 percent), but the average Medicare episode payment for those with a hospital admission is the highest ($53,048 compared to the overall average of $47,031).

Episode Type 3: Non-Post-Acute Episodes

Exhibit 3.19: Percent of Episodes with Hospital Admission and Average Medicare Episode Payment by Demographic Characteristic for Episodes Defined by DIABETES*CHF[a] for Nine-Month Fixed-Length Non-Post-Acute Care Community-Based Episodes (2007-2009)

Demographic Characteristics	Percent of Episodes with Hospital Admission	Average Medicare Episode Payment for No Hospital Admission	Average Medicare Episode Payment for Episodes with Hospital Admission	Ratio of Average Medicare Episode Payment[b]
Live Alone	50.2%	$12,818	$45,704	3.57
Died during Episode	69.3%	$12,734	$50,981	4.00
Dual Eligible	48.1%	$14,437	$50,588	3.50
Female	49.6%	$12,639	$45,517	3.60
Rural	52.9%	$12,490	$44,973	3.60
85 and Older	51.0%	$11,291	$39,688	3.51
Non-white	47.3%	$14,879	$53,048	3.57
Overall Average	**49.9%**	**$12,897**	**$47,031**	**3.65**

Source: Dobson | DaVanzo analysis of research-identifiable 5% SAF for all sites of service, 2007-2009, wage index adjusted by setting and geographic region, and standardized to 2009 dollars. All episodes have been extrapolated to reflect the universe of Medicare beneficiaries. Average Medicare Episode Payment includes care from all facility-based and ambulatory care settings and excludes beneficiary co-payments.
[a] For methodology used to determine primary chronic condition, see Working Paper #1.
[b] Average Medicare Episode Payment for episodes that contain a readmission divided by episodes that do not contain a readmission.

*CHF*RENAL*

More than five percent (5.3 percent) of non-post-acute care community-based episodes have a primary chronic condition of CHF*RENAL. Medicare payment for CHF*RENAL episodes totaled $4.5 billion from 2007 – 2009 (Exhibit 3.2). Approximately 59.5 percent of CHF*RENAL episodes contain a hospital admission, and account for 84.6 percent of all Medicare episode payments for CHF*RENAL episodes (Exhibit 3.5).

While CHF*RENAL episodes generally follow the reported trend that the percent of episodes with a hospital admission increases as the number of chronic conditions contained within the episode increases, the clinical complexity of CHF*RENAL episodes introduces additional drivers of average Medicare episode payments. Shown in Exhibit 3.20 and Exhibit 3.21, as the number of chronic conditions increase within CHF*RENAL episodes, the percent of episodes containing a hospital admission increases, but at a slower rate than the other primary chronic conditions analyzed. More than one-half (51.1 percent) of episodes for patients with two chronic conditions contain a hospital admission (the highest admission rate of all primary chronic conditions analyzed). Additionally, three-quarters of episodes for patients with 11 chronic conditions contain a hospital admission (78.3 percent). This suggests that compared to other chronic conditions, CHF*RENAL episodes have the smallest increase in the proportion of episodes containing a hospital admission by number of chronic conditions because they start from a high base. Episodes with 12 or more chronic conditions have one of the lowest proportions of hospital admissions, likely due to patient death.

Episode Type 3: Non-Post-Acute Episodes

As the number of chronic conditions and the percent of episodes containing a hospital admission increase, the average Medicare episode payment for episodes containing a hospital admission increases as well, but at a rate relatively slower than other primary chronic conditions. The average Medicare payment for episodes containing a hospital admission ranges from $32,259 for episodes with three chronic conditions to $51,313 for episodes with 12 or more chronic conditions.

Exhibit 3.20: Percent of Episodes and Medicare Episode Payment for Episodes with Hospital Admissions by Number of Chronic Conditions for Episodes Defined by CHF*RENAL[a] for Nine-Month Fixed-Length Non-Post-Acute Care Community-Based Episodes (2007-2009)

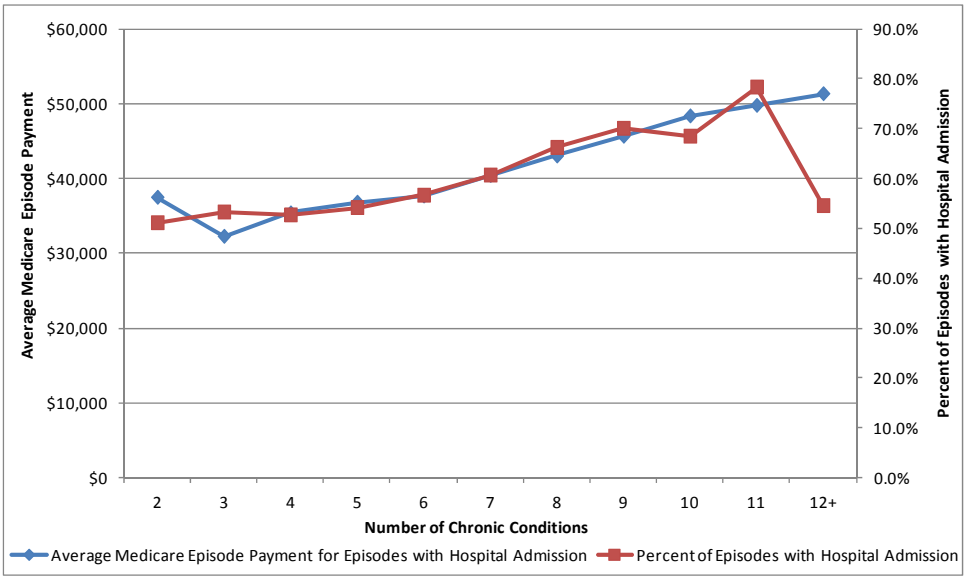
Number of Chronic Conditions	Percent of Episodes	Percent of Episodes with Hospital Admission	Average Medicare Episode Payment with Hospital Admission
2	1.1%	51.1%	$37,473
3	4.8%	53.3%	$32,259
4	10.5%	52.7%	$35,395
5	16.9%	54.1%	$36,820
6	20.2%	56.6%	$37,650
7	18.8%	60.7%	$40,398
8	14.4%	66.2%	$42,998
9	8.0%	70.0%	$45,632
10	3.7%	68.5%	$48,351
11	1.3%	78.3%	$49,755
12+	0.3%	54.5%	$51,313
Overall Average	**100.0%**	**59.5%**	**$39,914**

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

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

Episode Type 3: Non-Post-Acute Episodes

Exhibit 3.21: Percent of Episodes and Average Medicare Episode Payment for Episodes with Hospital Admissions by Number of Chronic Conditions for Episodes Defined by CHF*RENAL[a] for Nine-Month Fixed-Length Non-Post-Acute Care Community-Based Episodes (2007-2009)



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

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

Exhibit 3.22 shows the proportion of episodes that contain a hospital admission and the average Medicare episode payment by admission status by patient demographic characteristic. Similar to osteoporosis episodes, the proportion of episodes that contain a hospital admission is generally consistent across demographic characteristics. More than one-half of episodes for patients who live alone are dual eligible, female, reside in a rural area, are 85 years old or older, or are non-white contain a hospital admission (ranging from 55.8 percent for dual eligibles to 60.1 for patients who live alone). Almost three-quarters of episodes for patients who died during the episode contain a hospital admission (72.1 percent). Given the distribution of hospital admissions by number of chronic conditions presented in Exhibit 3.21, we anticipate that most of these patients have a significant number of chronic conditions.

Consistent across demographic characteristics, episodes that contain a hospital admission have an average Medicare episode payment that is roughly four times the payment for episodes that do not contain a hospital admission.

Episode Type 3: Non-Post-Acute Episodes

Exhibit 3.22: Percent of Episodes with Hospital Admission and Average Medicare Episode Payment by Demographic Characteristic for Episodes Defined by CHF*RENAL[a] for Nine-Month Fixed-Length Non-Post-Acute Care Community-Based Episodes (2007-2009)

Demographic Characteristics	Percent of Episodes with Hospital Admission	Average Medicare Episode Payment for No Hospital Admission	Average Medicare Episode Payment for Episodes with Hospital Admission	Ratio of Average Medicare Episode Payment[b]
Live Alone	60.1%	$10,322	$40,177	3.89
Died during Episode	72.1%	$11,151	$40,426	3.63
Dual Eligible	55.8%	$11,812	$44,785	3.79
Female	59.4%	$10,636	$39,250	3.69
Rural	59.9%	$11,081	$37,632	3.40
85 and Older	59.8%	$10,011	$36,677	3.66
Non-white	57.4%	$11,894	$44,236	3.72
Overall Average	**59.5%**	**$10,711**	**$39,914**	**3.73**

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

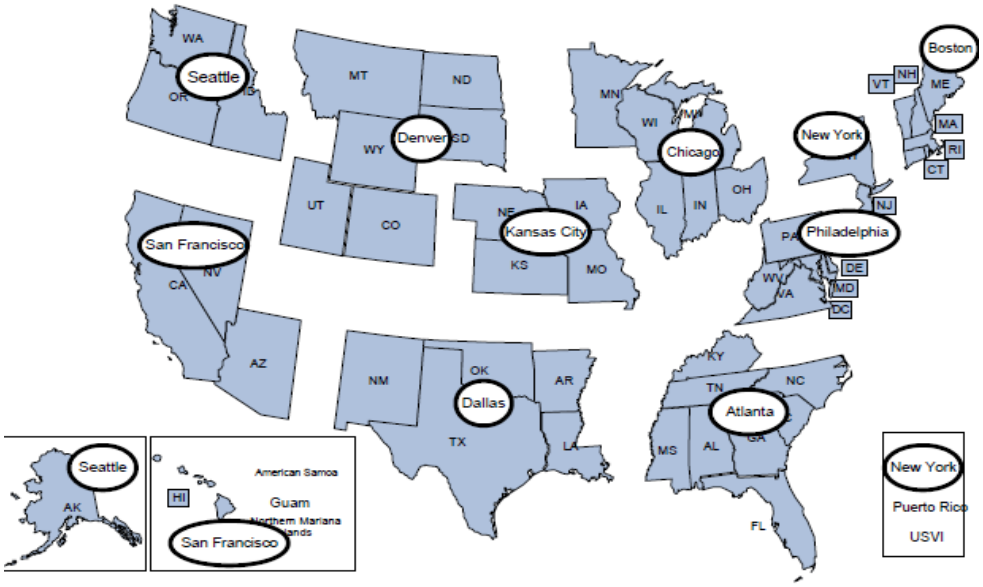
[a] For methodology used to determine primary chronic condition, see Working Paper #1.

[b] Average Medicare Episode Payment for episodes that contain a readmission divided by episodes that do not contain a readmission.

Regional Variation

To explore the regional variation in the frequency of hospital admissions and readmissions, and their impact on Medicare payments across episode types (Type 1 – Post-Acute, Type 2 – Pre-Acute, and Type 3 – Non-Post-Acute Care Community-Based), we conducted an analysis of Medicare episode payments by CMS region. We chose the 10 CMS regions (see Exhibit 4.1 below) because they represent smaller geographic regions than broader census areas, without compromising data presentation due to sample size issues. All Medicare payment amounts have been wage adjusted (standardized) to remove the effect of geographic price differences.

Exhibit 4.1: Map of 10 CMS Regions



Source: Centers for Medicare & Medicaid Services

Regional Variation in Episode Type 1: Post-Acute Care

Exhibit 4.2A shows the distribution of episodes, frequency of episodes with a hospital readmission, average Medicare episode payments for readmission episodes, and number of readmission episodes per 1,000 fee-for-service Medicare beneficiaries for 60-day fixed-length post-acute care episodes. Across all regions, Region IV (Atlanta) has the greatest proportion of post-acute care episodes at 23.1 percent and Region X (Seattle) has the lowest proportion at 2.9 percent. Across regions, the average Medicare episode payment for a post-acute care episode without a readmission is $15,286, with Region IX (San Francisco) the highest at $16,331 and Region VII (Kansas City) the lowest at $14,267. The overall average Medicare episode payment for a post-acute care episode with a readmission is $33,893, with Region IX (San Francisco) again the highest at $36,574 and Region VII (Kansas City) again the lowest at $31,630. The average Medicare episode payment with a readmission is approximately twice as high as without a readmission within each region.

Region II (New York) has the greatest proportion of post-acute care episodes that contain a readmission (24.6 percent) and Region X (Seattle) has the lowest proportion (18.9 percent). Region VII (Kansas City) has the highest average number of post-acute care readmission episodes per 1,000 fee-for-service beneficiaries (72) while Region X (Seattle) has the lowest (40). The rate of readmission episodes per 1,000 fee-for-service beneficiaries varies by almost two-fold across regions.

Exhibit 4.2A: Average Medicare Episode Payment for Readmission and Percent of Episodes with Readmission by CMS Region for 60-day Fixed-Length Post-Acute Episode (2008)

CMS Region	Percent of Episodes	Average Medicare Episode Payment without Readmission	Average Medicare Episode Payment with Readmission	Percent of Episodes with Readmission	Readmission Episodes per 1,000 Fee-for-Service Beneficiaries
Region I-Boston	5.2%	$15,666	$33,530	22.2%	54
Region II-New York	9.6%	$15,852	$35,733	24.6%	66
Region III-Philadelphia	11.3%	$15,418	$34,365	23.5%	69
Region IV-Atlanta	23.1%	$15,010	$33,001	22.1%	61
Region V-Chicago	18.8%	$14,928	$33,124	23.2%	64
Region VI-Dallas	10.5%	$15,623	$35,104	21.7%	52
Region VII-Kansas City	6.5%	$14,267	$31,630	22.4%	72
Region VIII-Denver	3.0%	$14,837	$31,756	19.5%	54
Region IX-San Francisco	9.1%	$16,331	$36,574	22.1%	48
Region X-Seattle	2.9%	$15,060	$32,350	18.9%	40
Overall Average	**100.0%**	**$15,286**	**$33,893**	**22.5%**	**60**

Source: Dobson | DaVanzo analysis of research-identifiable 5% SAF for all sites of service, 2008, wage index adjusted by setting and geographic region, and standardized to 2008 dollars. All episodes have been extrapolated to reflect the universe of Medicare beneficiaries. Average Medicare Episode Payment includes care from all facility-based and ambulatory care settings and excludes beneficiary co-payments. Center for Medicare and Medicaid Services, Health Care Financing Review, Statistical Supplement, 2008.

Regional Variation

Exhibit 4.2B presents the total number of days of care per 1,000 fee-for-service beneficiaries for the index acute care hospitalization and readmissions by region. These data indicate that regions with relatively high index acute care hospital days of care per 1,000 fee-for-service beneficiaries have a disproportionately high number of readmission days of care per 1,000 fee-for-service beneficiaries. That is, Region II (New York) has the highest number of index acute care hospital days of care per 1,000 beneficiaries (214.3) and Region X (Seattle) has the lowest (119.6). Therefore, Region II's (New York) index acute care hospital days of care per 1,000 is 179 percent that of Region X. However, in terms of readmission days of care per 1,000 fee-for-service beneficiaries, Region II (New York) has 235 percent more days of care than Region X (Seattle) (84.2 compared to 35.8). This suggests that regions with high index acute care hospital days of care are more likely to experience acute care hospital readmissions.

Exhibit 4.2B: Days of Care per 1,000 Fee-for-Service Beneficiaries for the Index Acute Care Hospital Stay and Readmissions by CMS Region for 60-day Fixed-Length Post-Acute Episode (2008)

CMS Region	Index Hospital Stay DOC per 1,000 FFS Beneficiaries	Episode Readmission DOC per 1,000 FFS Beneficiaries
Region I-Boston	150.5	53.4
Region II-New York	214.3	84.2
Region III-Philadelphia	181.9	68.9
Region IV-Atlanta	166.8	59.1
Region V-Chicago	166.7	62.2
Region VI-Dallas	146.8	50.7
Region VII-Kansas City	163.3	59.4
Region VIII-Denver	130.0	41.2
Region IX-San Francisco	148.2	51.1
Region X-Seattle	119.6	35.8
Overall Average	**164.2**	**59.3**

Source: Dobson | DaVanzo analysis of research-identifiable 5% SAF for all sites of service, 2008, wage index adjusted by setting and geographic region, and standardized to 2008 dollars. All episodes have been extrapolated to reflect the universe of Medicare beneficiaries. Average Medicare Episode Payment includes care from all facility-based and ambulatory care settings and excludes beneficiary co-payments. Center for Medicare and Medicaid Services, Health Care Financing Review, Statistical Supplement, 2008.

At the overall level, the proportion of total post-acute care episodes, frequency of hospital readmissions, and the impact of readmissions on Medicare episode payments do not appear to have a strong relationship to each other. Region X (Seattle) is the only region that has a consistently low ranking in each category, including below-average Medicare episode payments for episodes with a readmission. Region VII (Kansas City), in comparison, has the lowest Medicare episode payments for readmission episodes but has the highest number of readmissions per 1,000 fee-for-service beneficiaries.

As in regional analyses from previous working papers, we observe greater regional variation at the MS-DRG level than at the overall level across MS-DRGs. However, the regional trends at the MS-DRG level are consistent with overall trends.

Regional Variation

Exhibit 4.3 shows the frequency of episodes with a hospital readmission and average Medicare episode payment for readmission episodes by region for post-acute care episodes with an index acute care hospitalization of MS-DRG 470 (major joint replacement w/o MCC). Across all regions, Region IV (Atlanta) has the greatest proportion of post-acute care episodes at 21.7 percent and Region X (Seattle) has the lowest proportion at 3.9 percent. The overall average Medicare episode payment for a MS-DRG 470 episode with a readmission was $38,470, with Region II (New York) the highest at $40,896 and Region X (Seattle) the lowest at $34,036.

Region II (New York) again has the greatest proportion of episodes that contain a readmission (10.5 percent) and Region X (Seattle) had the lowest proportion (6.2 percent). Similar to the overall rates of readmission, Region VIII (Denver) has the highest average number of readmission episodes per 1,000 fee-for-service beneficiaries (1.80) while Region X (Seattle) has the lowest (0.80). The rate of readmission episodes per 1,000 fee-for-service beneficiaries varies by almost two-fold across regions for MS-DRG 470 as well as overall across MS-DRGs.

Exhibit 4.3: Average Medicare Episode Payment for Readmission Episodes and Percent of Episodes with Readmission by CMS Region for MS-DRG 470 for 60-day Fixed-Length Post-Acute Episode (2008)

CMS Region	Percent of Episodes	Average Medicare Episode Payment for Readmission Episode	Percent of Episodes with Readmission	Readmission Episodes per 1,000 Fee-for-Service Beneficiaries
Region I-Boston	5.0%	$39,718	10.4%	1.10
Region II-New York	7.0%	$40,896	10.5%	0.95
Region III-Philadelphia	10.4%	$39,286	9.1%	1.13
Region IV-Atlanta	21.7%	$38,991	9.4%	1.12
Region V-Chicago	20.2%	$36,579	10.1%	1.37
Region VI-Dallas	10.9%	$39,506	9.7%	1.10
Region VII-Kansas City	7.1%	$37,015	9.4%	1.51
Region VIII-Denver	4.5%	$36,525	9.6%	1.80
Region IX-San Francisco	9.2%	$40,147	8.9%	0.89
Region X-Seattle	3.9%	$34,036	6.2%	0.80
Overall Average	**100.0%**	**$38,470**	**9.5%**	**1.15**

Source: Dobson | DaVanzo analysis of research-identifiable 5% SAF for all sites of service, 2008, wage index adjusted by setting and geographic region, and standardized to 2008 dollars. All episodes have been extrapolated to reflect the universe of Medicare beneficiaries. Average Medicare Episode Payment includes care from all facility-based and ambulatory care settings and excludes beneficiary co-payments. Center for Medicare and Medicaid Services, Health Care Financing Review, Statistical Supplement, 2008.

Exhibit 4.4 shows the frequency of episodes with a hospital readmission and average Medicare episode payments for readmission episodes by region for post-acute care episodes with an index acute care hospitalization of MS-DRG 291 (heart failure and shock with MCC). Across all regions, Region IV (Atlanta) has the greatest proportion of post-acute care episodes at 23.4 percent, while Region VIII (Denver) has the lowest

proportion at 2.0 percent. The overall average Medicare episode payment for a MS-DRG 291 episode with a readmission was $33,681, with Region II (New York) the highest at $36,348 and Region VII (Kansas City) the lowest at $31,238. In comparison to MS-DRG 470, the percent of episodes with a readmission for MS-DRG 291 is almost three times larger in each region.

Region II (New York) again has the greatest proportion of episodes that contain a readmission (39.3 percent) and Region X (Seattle) had the lowest proportion (25.3 percent). Region III (Philadelphia) has the highest average number of post-acute care readmission episodes per 1,000 fee-for-service beneficiaries (1.82) while Region X (Seattle) has the lowest (0.64). The rate of readmissions per 1,000 fee-for-service beneficiaries varies by almost three-fold across regions, suggesting there may be higher variation in readmissions for medical MS-DRG episodes than surgical MS-DRG episodes.

Exhibit 4.4: Average Medicare Episode Payment for Readmission Episodes and Percent of Episodes with Readmission by CMS Region for MS-DRG 291 for 60-day Fixed-Length Post-Acute Episode (2008)

CMS Region	Percent of Episodes	Average Medicare Episode Payment for Readmission Episode	Percent of Episodes with Readmission	Readmission Episodes per 1,000 Fee-for-Service Beneficiaries
Region I-Boston	4.9%	$33,537	32.8%	1.13
Region II-New York	10.0%	$36,348	39.3%	1.64
Region III-Philadelphia	12.8%	$32,741	36.7%	1.82
Region IV-Atlanta	23.4%	$33,719	35.4%	1.48
Region V-Chicago	19.1%	$33,552	36.1%	1.52
Region VI-Dallas	10.6%	$35,792	33.7%	1.21
Region VII-Kansas City	5.6%	$31,238	35.3%	1.46
Region VIII-Denver	2.0%	$31,278	30.7%	0.83
Region IX-San Francisco	9.2%	$31,745	29.2%	0.95
Region X-Seattle	2.4%	$31,666	25.3%	0.64
Overall Average	**100.0%**	**$33,681**	**34.9%**	**1.37**

Source: Dobson | DaVanzo analysis of research-identifiable 5% SAF for all sites of service, 2008, wage index adjusted by setting and geographic region, and standardized to 2008 dollars. All episodes have been extrapolated to reflect the universe of Medicare beneficiaries. Average Medicare Episode Payment includes care from all facility-based and ambulatory care settings and excludes beneficiary co-payments. Center for Medicare and Medicaid Services, Health Care Financing Review, Statistical Supplement, 2008.

Regional Variation in Episode Type 2: Pre-Acute Care

As pre-acute care episodes capture all of the care that is delivered within 60 days prior to an index acute care hospital admission, the hospitalizations presented in this analysis are not readmissions but hospital admissions that occurred prior to the index acute care hospitalization. Exhibit 4.5 shows the distribution of episodes, frequency of episodes with a hospital admission, average Medicare episode payments for episodes with a prior admission, and number of pre-acute episodes with a prior admission per 1,000 fee-for-service Medicare beneficiaries for 60-day fixed-length pre-acute episodes. Across all regions, Region IV (Atlanta) has the greatest proportion of post-acute care episodes at 23.1 percent and Region X (Seattle) has the lowest proportion at 2.9 percent (by definition, the same distribution as for the post-acute care episodes as it is based on the index acute care hospitalization).

Across regions, the average Medicare episode payment for a pre-acute care episode without a prior admission is $11,871, with Region IX (San Francisco) the highest at $12,991 and Region VII (Kansas City) the lowest at $11,098. The overall average Medicare episode payment for a pre-acute care episode with a hospital admission was $25,236, with Region IX (San Francisco) the highest at $27,149 and Region VIII (Denver) the lowest at $24,053. As with the post-acute care episodes, the average Medicare pre-acute episode payment with a prior admission is approximately twice as high as with a hospital admission within each region.

Region III (Philadelphia) has the greatest proportion of pre-acute care episodes that contain a hospital admission (11.1 percent) and Region I (Boston) has the lowest proportion (9.1 percent). Region VII (Kansas City) has the highest average number of pre-acute care episodes with a prior admission per 1,000 fee-for-service beneficiaries (35) while Region X (Seattle) has the lowest (20).

Exhibit 4.5: Average Medicare Episode Payment for Episodes with a Prior Admission and Percent of Episodes with Hospital Admission by CMS Region for 60-day Fixed-Length Pre-Acute Episode (2008)

CMS Region	Percent of Episodes	Average Medicare Episode Payment without Hospital Admission	Average Medicare Episode Payment for Episode with Hospital Admission	Percent of Episodes with Hospital Admission	Episodes with Prior Admission per 1,000 Fee-for-Service Beneficiaries
Region I-Boston	5.2%	$11,392	$24,098	9.1%	22
Region II-New York	9.6%	$12,414	$26,586	11.0%	30
Region III-Philadelphia	11.3%	$11,993	$25,476	11.1%	32
Region IV-Atlanta	23.1%	$11,754	$24,782	10.5%	29
Region V-Chicago	18.8%	$11,490	$24,307	11.0%	30
Region VI-Dallas	10.5%	$12,009	$26,131	10.3%	25
Region VII-Kansas City	6.5%	$11,098	$24,104	11.0%	35
Region VIII-Denver	3.0%	$11,368	$24,053	9.6%	26
Region IX-San Francisco	9.1%	$12,991	$27,149	10.6%	23
Region X-Seattle	2.9%	$12,130	$25,924	9.3%	20
Overall Average	**100.0%**	**$11,871**	**$25,236**	**10.6%**	**28**

Source: Dobson | DaVanzo analysis of research-identifiable 5% SAF for all sites of service, 2008, wage index adjusted by setting and geographic region, and standardized to 2008 dollars. All episodes have been extrapolated to reflect the universe of Medicare beneficiaries. Average Medicare Episode Payment includes care from all facility-based and ambulatory care settings and excludes beneficiary co-payments. Center for Medicare and Medicaid Services, Health Care Financing Review, Statistical Supplement, 2008.

Much like the post-acute episodes, the frequency of prior admissions in pre-acute episodes and the impact of prior admissions on Medicare episode payments do not appear to have a strong relationship to each other. No region is ranked consistently low or high across categories.

As shown below, we observe greater regional variation at the primary chronic condition level than at the overall level. However, the regional trends at the primary chronic condition level are consistent with overall trends.

Exhibit 4.6 shows the frequency of episodes with a prior admission and average Medicare episode payments for episodes with a prior admission by region for pre-acute care episodes with a primary chronic condition of CHF*COPD. Across all regions, Region IV (Atlanta) has the greatest percent of post-acute care episodes at 23.6 percent and Region VIII (Denver) and Region X (Seattle) have the lowest proportions at 2.4 percent each. The overall average Medicare episode payment for a CHF*COPD episode with a prior admission is $25,280, with Region IX (San Francisco) the highest at $27,638 and Region VIII (Denver) the lowest at $22,857.

Region VII (Kansas City) has the greatest proportion of episodes that contain a hospital admission (17.4 percent) and Region I (Boston) has the lowest proportion (13.1 percent). Region VII (Kansas City) has the highest average number of pre-acute care episodes with a hospital admission per 1,000 fee-for-service beneficiaries (14.35) while Region X

(Seattle) has the lowest (6.54). The rate of hospital admissions per 1,000 fee-for-service beneficiaries varies by more than two-fold across regions.

Exhibit 4.6: Average Medicare Episode Payment for Episodes with a Prior Admission and Percent of Episodes with Hospital Admission by CMS Region for Episodes Defined by CHF*COPD[a] for 60-day Fixed-Length Pre-Acute Episode (2008)

CMS Region	Percent of Episodes	Average Medicare Episode Payment for Episode with Hospital Admission	Percent of Episodes with Hospital Admission	Episodes with Prior Admissions per 1,000 Fee-for-Service Beneficiaries
Region I-Boston	4.8%	$24,202	13.1%	7.56
Region II-New York	10.2%	$26,876	16.4%	12.00
Region III-Philadelphia	11.6%	$25,716	17.2%	13.16
Region IV-Atlanta	23.6%	$24,556	16.6%	11.93
Region V-Chicago	19.2%	$24,363	17.1%	12.33
Region VI-Dallas	10.4%	$26,416	16.1%	9.71
Region VII-Kansas City	6.5%	$23,523	17.4%	14.35
Region VIII-Denver	2.4%	$22,857	15.6%	8.73
Region IX-San Francisco	8.8%	$27,638	16.8%	8.96
Region X-Seattle	2.4%	$26,718	15.0%	6.54
Overall Average	**100.0%**	**$25,280**	**16.5%**	**11.14**

Source: Dobson | DaVanzo analysis of research-identifiable 5% SAF for all sites of service, 2008, wage index adjusted by setting and geographic region, and standardized to 2008 dollars. All episodes have been extrapolated to reflect the universe of Medicare beneficiaries. Average Medicare Episode Payment includes care from all facility-based and ambulatory care settings and excludes beneficiary co-payments. Center for Medicare and Medicaid Services, Health Care Financing Review, Statistical Supplement, 2008.

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

The relative rankings across region with respect to frequency of prior admissions in pre-acute care episodes and average Medicare payments for pre-acute episodes with prior admissions are similar for other primary chronic conditions.

For Diabetes*CHF (Exhibit 4.7), CHF*RENAL (Exhibit 4.8), and osteoporosis (Exhibit 4.9), Region IV (Atlanta) has the highest percent of pre-acute care episodes and Region VIII (Denver) or Region X (Seattle) the lowest. Regions II (New York) and IX (San Francisco) have the highest average Medicare episode payments for pre-acute care episodes with a prior admission, although the region with the lowest average Medicare episode payment varies more by primary chronic condition. Regions III (Philadelphia), V (Chicago), and VII (Kansas City) have the highest percent of pre-acute care episodes with a prior admission, and Region I (Boston) has the lowest. Regions II (New York), III (Philadelphia), and VII (Kansas City) have the highest prior admissions per 1,000 Medicare beneficiaries, while Region X (Seattle) has the lowest.

Region X (Seattle) tends to have the lowest rankings and Region VII (Kansas City) some of the highest rankings across categories for both pre-acute and post-acute care

episodes, both at the overall level and within MS-DRGs or primary chronic conditions, but other regions do not have as many similarities across episode types.

Exhibit 4.7: Average Medicare Episode Payment for Prior Admission and Percent of Episodes with Hospital Admission by CMS Region for Episodes Defined by Diabetes*CHF[a] for 60-day Fixed-Length Pre-Acute Episode (2008)

CMS Region	Percent of Episodes	Average Medicare Episode Payment for Episode with Hospital Admission	Percent of Episodes with Hospital Admission	Episodes with Prior Admissions per 1,000 Fee-for-Service Beneficiaries
Region I-Boston	4.5%	$26,696	11.3%	3.23
Region II-New York	12.8%	$30,012	12.5%	6.03
Region III-Philadelphia	11.5%	$27,532	12.8%	5.13
Region IV-Atlanta	21.8%	$26,787	12.2%	4.26
Region V-Chicago	18.5%	$27,639	12.8%	4.71
Region VI-Dallas	11.2%	$28,908	12.3%	4.20
Region VII-Kansas City	5.4%	$27,755	12.5%	4.47
Region VIII-Denver	2.5%	$28,392	12.3%	3.70
Region IX-San Francisco	9.5%	$30,669	12.7%	3.82
Region X-Seattle	2.5%	$29,047	12.7%	3.02
Overall Average	**100.0%**	**$28,201**	**12.5%**	**4.43**

Source: Dobson | DaVanzo analysis of research-identifiable 5% SAF for all sites of service, 2008, wage index adjusted by setting and geographic region, and standardized to 2008 dollars. All episodes have been extrapolated to reflect the universe of Medicare beneficiaries. Average Medicare Episode Payment includes care from all facility-based and ambulatory care settings and excludes beneficiary co-payments. Center for Medicare and Medicaid Services, Health Care Financing Review, Statistical Supplement, 2008.

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

Exhibit 4.8: Average Medicare Episode Payment for Prior Admission and Percent of Episodes with Hospital Admission by CMS Region for Episodes Defined by CHF*RENAL[a] for 60-day Fixed-Length Pre-Acute Episode (2008)

CMS Region	Percent of Episodes	Average Medicare Episode Payment for Episode with Hospital Admission	Percent of Episodes with Hospital Admission	Episodes with Prior Admissions per 1,000 Fee-for-Service Beneficiaries
Region I-Boston	5.8%	$29,363	10.0%	1.54
Region II-New York	9.3%	$30,493	10.4%	1.54
Region III-Philadelphia	11.7%	$26,324	12.4%	2.12
Region IV-Atlanta	21.3%	$29,564	11.1%	1.60
Region V-Chicago	19.6%	$25,301	11.1%	1.81
Region VI-Dallas	10.2%	$27,724	11.9%	1.56
Region VII-Kansas City	6.3%	$26,801	11.1%	1.96
Region VIII-Denver	3.3%	$24,577	12.2%	2.06
Region IX-San Francisco	9.2%	$26,495	11.4%	1.41
Region X-Seattle	3.1%	$22,166	12.1%	1.54
Overall Average	**100.0%**	**$27,316**	**11.3%**	**1.69**

Source: Dobson | DaVanzo analysis of research-identifiable 5% SAF for all sites of service, 2008, wage index adjusted by setting and geographic region, and standardized to 2008 dollars. All episodes have been extrapolated to reflect the universe of Medicare beneficiaries. Average Medicare Episode Payment includes care from all facility-based and ambulatory care settings and excludes beneficiary co-payments. Center for Medicare and Medicaid Services, Health Care Financing Review, Statistical Supplement, 2008.

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

Exhibit 4.9: Average Medicare Episode Payment for Prior Admission and Percent of Episodes with Hospital Admission by CMS Region for Episodes Defined by Osteoporosis[a] for 60-day Fixed-Length Pre-Acute Episode (2008)

CMS Region	Percent of Episodes	Average Medicare Episode Payment for Episode with Hospital Admission	Percent of Episodes with Hospital Admission	Episodes with Hospital Admissions per 1,000 Fee-for-Service Beneficiaries
Region I-Boston	5.7%	$22,036	6.0%	2.41
Region II-New York	9.7%	$21,525	6.4%	2.65
Region III-Philadelphia	11.6%	$21,950	6.5%	2.98
Region IV-Atlanta	22.3%	$21,046	5.9%	2.38
Region V-Chicago	17.9%	$20,364	7.3%	2.93
Region VI-Dallas	10.0%	$23,473	6.2%	2.15
Region VII-Kansas City	6.4%	$22,140	7.4%	3.57
Region VIII-Denver	3.4%	$22,339	6.7%	3.11
Region IX-San Francisco	9.9%	$23,853	6.9%	2.44
Region X-Seattle	3.1%	$21,403	6.2%	2.07
Overall Average	**100.0%**	**$21,769**	**6.6%**	**2.62**

Source: Dobson | DaVanzo analysis of research-identifiable 5% SAF for all sites of service, 2008, wage index adjusted by setting and geographic region, and standardized to 2008 dollars. All episodes have been extrapolated to reflect the universe of Medicare beneficiaries. Average Medicare Episode Payment includes care from all facility-based and ambulatory care settings and excludes beneficiary co-payments. Center for Medicare and Medicaid Services, Health Care Financing Review, Statistical Supplement, 2008.

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

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

As non-post-acute care community-based episodes capture all of the care that is delivered within nine months following an index home health discharge, the hospitalizations presented in this analysis are not readmissions but hospital admissions that occurred after discharge from the index home health episode.

Exhibit 4.10 shows the distribution of episodes, frequency of episodes with a hospital admission, average Medicare episode payments for episodes with a hospital admission, and number of non-post-acute care community-based episodes with a hospital admission per 1,000 fee-for-service Medicare beneficiaries for nine-month fixed-length non-post-acute care community-based episodes. Across all regions, Region IV (Atlanta) has the greatest proportion of non-post-acute care community-based episodes at 28.3 percent and Region VIII (Denver) has the lowest proportion at 2.1 percent.

Across regions, the overall average Medicare episode payment for non-post-acute care community-based episode without a hospital admission is $11,329, with Region VI (Dallas) has the highest at $13,421 and Region I (Boston) has the lowest at $8,084. The overall average Medicare episode payment for a non-post-acute care community-based episode with a hospital admission is $42,422, with Region VI (Dallas) has the highest at

$46,439 and Region X (Seattle) has the lowest at $35,218. The average Medicare non-post-acute care community-based episode payment with a hospital admission is approximately four times as high as that without a hospital admission within each region.

Region VII (Kansas City) has the greatest proportion of non-post-acute care community-based episodes that contain a hospital admission (48.4 percent) and Region VI (Dallas) has the lowest proportion (39.0 percent). Region VI (Dallas) has the highest average number of non-post-acute care community-based episodes with a hospital admission per 1,000 fee-for-service beneficiaries (25) while Region X (Seattle) has the lowest (11).

Exhibit 4.10: Average Medicare Episode Payment for Hospital Admission and Percent of Episodes with Hospital Admission by CMS Region for Nine-Month Fixed-Length Non-Post-Acute Community-Based Episode (2008)

CMS Region	Percent of Episodes	Average Medicare Episode Payment with No Admission	Average Medicare Episode Payment for Episode with Hospital Admission	Percent of Episodes with Hospital Admission	Episodes with Hospital Admissions per 1,000 Fee-for-Service Beneficiaries
Region I-Boston	5.6%	$8,084	$39,029	45.3%	20
Region II-New York	6.3%	$9,008	$41,240	45.3%	13
Region III-Philadelphia	7.6%	$8,914	$40,909	46.6%	15
Region IV-Atlanta	28.3%	$12,979	$42,733	43.5%	24
Region V-Chicago	18.3%	$11,178	$41,976	43.3%	19
Region VI-Dallas	17.4%	$13,421	$46,439	39.0%	25
Region VII-Kansas City	3.6%	$8,681	$40,869	48.4%	14
Region VIII-Denver	2.1%	$10,284	$38,449	39.2%	12
Region IX-San Francisco	8.5%	$9,554	$43,206	42.4%	14
Region X-Seattle	2.4%	$8,248	$35,218	41.1%	11
Overall Average	**100.0%**	**$11,329**	**$42,422**	**43.1%**	**19**

Source: Dobson | DaVanzo analysis of research-identifiable 5% SAF for all sites of service, 2008, wage index adjusted by setting and geographic region, and standardized to 2008 dollars. All episodes have been extrapolated to reflect the universe of Medicare beneficiaries. Average Medicare Episode Payment includes care from all facility-based and ambulatory care settings and excludes beneficiary co-payments. Center for Medicare and Medicaid Services, Health Care Financing Review, Statistical Supplement, 2008.

Much like the post-acute and pre-acute episodes, the frequency of hospital admissions in non-post-acute care community-based episodes and the impact of hospital admissions on Medicare episode payments do not appear to have a strong relationship to each other, with one exception. Region VI (Dallas) has the lowest percent of non-post-acute care community-based episodes with a hospital admission (39.0 percent), but has the highest average Medicare episode payment ($46,439) and the highest number of non-post-acute care community-based episodes with a hospital admission per 1,000 fee-for-service beneficiaries (25).

Regional Variation

We observe greater regional variation at the primary chronic condition level than at the overall level in non-post-acute care community-based episodes as well. However, the regional trends at the primary chronic condition level are consistent with overall trends.

Exhibit 4.11 shows the frequency of episodes with a hospital admission and average Medicare episode payment for episodes with a hospital admission by region for non-post-acute care community-based episodes with a primary chronic condition of CHF*COPD. Across all regions, Region IV (Atlanta) has the greatest proportion of post-acute care episodes at 29.3 percent and Region VIII (Denver) has the lowest proportions at 1.7 percent. The overall average Medicare episode payment for a CHF*COPD episode with a hospital admission is $49,233, with Region IX (San Francisco) the highest at $53,595 and Region X (Seattle) the lowest at $39,996.

Regions I (Boston) and III (Philadelphia) have the greatest proportion of episodes that contain a hospital admission (66.0 percent) and Region X (Seattle) has the lowest proportion (56.1 percent). Region VI (Dallas) has the highest average number of pre-acute care episodes with a hospital admission per 1,000 fee-for-service beneficiaries (8.55) while Region X (Seattle) has the lowest (2.77). The rate of hospital admissions per 1,000 fee-for-service beneficiaries varies by more than three-fold across regions.

Exhibit 4.11: Average Medicare Episode Payment for Hospital Admission and Percent of Episodes with Hospital Admission by CMS Region for CHF*COPD[a] for Nine-Month Fixed-Length Non-Post-Acute Community-Based Episode (2008)

CMS Region	Percent of Episodes	Average Medicare Episode Payment for Episode with Hospital Admission	Percent of Episodes with Hospital Admission	Episodes with Hospital Admissions per 1,000 Fee-for-Service Beneficiaries
Region I-Boston	4.8%	$47,220	66.0%	5.73
Region II-New York	5.8%	$48,103	65.3%	4.09
Region III-Philadelphia	7.4%	$48,488	66.0%	4.91
Region IV-Atlanta	29.3%	$48,909	60.5%	8.15
Region V-Chicago	21.0%	$48,615	60.2%	7.17
Region VI-Dallas	16.3%	$51,907	59.6%	8.55
Region VII-Kansas City	3.6%	$46,023	64.5%	4.46
Region VIII-Denver	1.7%	$44,869	60.1%	3.54
Region IX-San Francisco	8.3%	$53,595	63.3%	4.80
Region X-Seattle	1.8%	$39,996	56.1%	2.77
Overall Average	**100.0%**	**$49,233**	**61.5%**	**6.27**

Source: Dobson | DaVanzo analysis of research-identifiable 5% SAF for all sites of service, 2008, wage index adjusted by setting and geographic region, and standardized to 2008 dollars. All episodes have been extrapolated to reflect the universe of Medicare beneficiaries. Average Medicare Episode Payment includes care from all facility-based and ambulatory care settings and excludes beneficiary co-payments. Center for Medicare and Medicaid Services, Health Care Financing Review, Statistical Supplement, 2008.

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

Regional Variation

For Diabetes*CHF (Exhibit 4.12), CHF*RENAL (Exhibit 4.13), and osteoporosis (Exhibit 4.14), Atlanta has the highest percent of pre-acute care episodes and Denver the lowest. Region IX (San Francisco) has the highest average Medicare episode payment for non-post-acute care community-based episodes with a hospital admission, and Region X (Seattle) generally has the lowest average. Region VII (Kansas City) has the highest percent of non-post-acute care community-based episodes with a hospital admission, and Regions VI (Dallas) and VIII (Denver) have the lowest. And Region VI (Dallas) generally has the highest hospital admissions per 1,000 Medicare beneficiaries, while Region X (Seattle) generally has the lowest.

Again, Region X (Seattle) tends to have the low rankings and Regions VI (Dallas) and VII (Kansas City) some of the highest rankings across categories for non-post-acute care community-based episodes, both at the overall level and within primary chronic conditions. The trends observed in Region VI (Dallas) suggest that the relationship between hospital admissions, average Medicare episode payments, and episodes per 1,000 fee-for-service beneficiaries is complex.

Exhibit 4.12: Average Medicare Episode Payment for Hospital Admission and Percent of Episodes with Hospital Admission by CMS Region for Diabetes*CHF[a] for Nine-Month Fixed-Length Non-Post-Acute Community-Based Episode (2008)

CMS Region	Percent of Episodes	Average Medicare Episode Payment for Episode with Hospital Admission	Percent of Episodes with Hospital Admission	Episodes with Hospital Admissions per 1,000 Fee-for-Service Beneficiaries
Region I-Boston	4.4%	$43,851	50.4%	2.60
Region II-New York	8.1%	$47,470	52.2%	3.00
Region III-Philadelphia	8.0%	$43,993	56.1%	2.91
Region IV-Atlanta	23.7%	$49,504	53.2%	3.78
Region V-Chicago	20.8%	$44,768	47.3%	3.64
Region VI-Dallas	18.4%	$53,155	46.2%	4.89
Region VII-Kansas City	3.5%	$48,684	58.1%	2.54
Region VIII-Denver	1.7%	$45,161	51.3%	2.02
Region IX-San Francisco	9.4%	$42,969	46.4%	2.60
Region X-Seattle	2.0%	$40,908	51.7%	1.92
Overall Average	**100.0%**	**$47,429**	**50.2%**	**3.34**

Source: Dobson | DaVanzo analysis of research-identifiable 5% SAF for all sites of service, 2008, wage index adjusted by setting and geographic region, and standardized to 2008 dollars. All episodes have been extrapolated to reflect the universe of Medicare beneficiaries. Average Medicare Episode Payment includes care from all facility-based and ambulatory care settings and excludes beneficiary co-payments. Center for Medicare and Medicaid Services, Health Care Financing Review, Statistical Supplement, 2008.

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

Exhibit 4.13: Average Medicare Episode Payment for Hospital Admission and Percent of Episodes with Hospital Admission by CMS Region for CHF*RENAL[a] for Nine-Month Fixed-Length Non-Post-Acute Community-Based Episode (2008)

CMS Region	Percent of Episodes	Average Medicare Episode Payment for Episode with Hospital Admission	Percent of Episodes with Hospital Admission	Episodes with Hospital Admissions per 1,000 Fee-for-Service Beneficiaries
Region I-Boston	6.3%	$40,972	56.5%	1.42
Region II-New York	6.5%	$38,684	60.7%	0.94
Region III-Philadelphia	8.1%	$38,051	63.5%	1.13
Region IV-Atlanta	26.5%	$40,056	57.1%	1.53
Region V-Chicago	18.6%	$43,062	57.7%	1.35
Region VI-Dallas	15.1%	$47,172	58.0%	1.70
Region VII-Kansas City	4.3%	$39,577	65.3%	1.18
Region VIII-Denver	1.9%	$37,926	52.0%	0.77
Region IX-San Francisco	9.1%	$39,453	61.1%	1.12
Region X-Seattle	3.5%	$35,002	55.8%	1.21
Overall Average	**100.0%**	**$41,174**	**58.6%**	**1.32**

Source: Dobson | DaVanzo analysis of research-identifiable 5% SAF for all sites of service, 2008, wage index adjusted by setting and geographic region, and standardized to 2008 dollars. All episodes have been extrapolated to reflect the universe of Medicare beneficiaries. Average Medicare Episode Payment includes care from all facility-based and ambulatory care settings and excludes beneficiary co-payments. Center for Medicare and Medicaid Services, Health Care Financing Review, Statistical Supplement, 2008.

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

Exhibit 4.14: Average Medicare Episode Payment for Hospital Admission and Percent of Episodes with Hospital Admission by CMS Region for Osteoporosis[a] for Nine-Month Fixed-Length Non-Post-Acute Community-Based Episode (2008)

CMS Region	Percent of Episodes	Average Medicare Episode Payment for Episode with Hospital Admission	Percent of Episodes with Hospital Admission	Episodes with Hospital Admissions per 1,000 Fee-for-Service Beneficiaries
Region I-Boston	6.2%	$35,094	37.8%	3.45
Region II-New York	6.4%	$30,855	32.5%	1.86
Region III-Philadelphia	7.5%	$32,297	36.4%	2.22
Region IV-Atlanta	30.0%	$36,330	33.9%	3.84
Region V-Chicago	15.3%	$34,077	36.4%	2.59
Region VI-Dallas	17.3%	$39,821	29.8%	3.71
Region VII-Kansas City	3.3%	$35,501	39.8%	2.05
Region VIII-Denver	2.5%	$35,897	35.1%	2.55
Region IX-San Francisco	8.9%	$35,112	33.5%	2.22
Region X-Seattle	2.7%	$32,879	32.4%	2.00
Overall Average	**100.0%**	**$35,510**	**34.1%**	**2.84**

Source: Dobson | DaVanzo analysis of research-identifiable 5% SAF for all sites of service, 2008, wage index adjusted by setting and geographic region, and standardized to 2008 dollars. All episodes have been extrapolated to reflect the universe of Medicare beneficiaries. Average Medicare Episode Payment includes care from all facility-based and ambulatory care settings and excludes beneficiary co-payments. Center for Medicare and Medicaid Services, Health Care Financing Review, Statistical Supplement, 2008.

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

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