

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 #3: Baseline Statistics of Patient Pathways by Episode Type for Select MS-DRGs and Chronic Conditions

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 #3: Baseline Statistics of Patient Pathways by Episode Type for Select MS-DRGs and Chronic Conditions

Submitted to:

Alliance for Home Health Quality and Innovation (AHHQI)

Submitted by:

Dobson | DaVanzo

Allen Dobson, Ph.D.

Audrey El-Gamil

Steven Heath, M.P.A.

Jinglin Wang, M.P.A.

Gregory Berger

Joan E. DaVanzo, Ph.D., M.S.W.

Monday, May 21, 2012 — *Final Report*

Table of Contents

Preface	i
Key Concepts and Terms.....	ii
Introduction	1
Methods in Brief	5
Summary of Findings.....	10
Episode Type 1: 60-Day Post-Acute Care Episodes.....	17
Brief Review of Episode Definition	17
Descriptive Statistics across All Post-Acute Care Episodes.....	19
Distribution of Episodes and Average Number of Sequence Stops for Select MS-DRGs.....	34
Episode Type 2: 60-Day Pre-Acute Care Episodes	48
Brief Review of Episode Definition	48
Descriptive Statistics across All Pre-Acute Care Episodes	50
Distribution of Episodes and Average Number of Sequence Stops for Select Primary Chronic Conditions	62
Episode Type 3: Nine-Month Non-Post-Acute Care Community-Based Episodes.....	78
Brief Review of Episode Definition	78
Descriptive Statistics across All Non-Post-Acute Care Community-based Episodes	80
Distribution of Episodes and Average Number of Sequence Stops for Select Primary Chronic Conditions	93
Regional Variation.....	108
Appendix A: Determining Primary Chronic Conditions.....	120
Appendix B: States by DHHS Regions.....	122

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 third working paper in a series of focused reports on several important aspects of the study.

The CACEP analyses are based on all Medicare Part A and Part B claims for a five percent sample of Medicare beneficiaries from 2007 to 2009.² We expect that our working paper statistics will also be of use to policymakers as they consider various Medicare reform strategies.

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

This series of working papers will include the following topics:

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

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

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

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

Key Concepts and Terms

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

Key Concepts

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

Episode Types:

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

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

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

Patient Pathway: Sequence of settings patient enters during the episode. Each pathway consists of “**sequence stops,**” which are the discrete care settings the patient enters.

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

Key Concepts and Terms

Select Key Terms

CC	Complications/Comorbidities; severity level of MS-DRG
CCW Data	Chronic Condition Warehouse Dataset provided by CMS that flags each beneficiary for the presence of 21 chronic conditions
CHF	Congestive Heart Failure
Clean Period	Period prior to the index acute care hospitalization that does not contain any facility-based care or home health care
CMMI	Center for Medicare & Medicaid Innovation
CMS	Centers for Medicare & Medicaid Services
Community	First Setting; includes physician or outpatient visits
Community-Referred Home Health Admission	Admission to home health from the community, not from a facility-based care setting
COPD	Chronic Obstructive Pulmonary Disease
ER	Emergency Room
First Setting	First care setting patient enters following discharge from index acute care hospitalization
FFS	Fee-for-Service
HCC	Hierarchical Condition Category
HHA	Home Health Agency; refers to First Setting
Hospice	Hospice care; refers to First Setting
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
Patient Pathway	Sequence of settings patient enters during the episode
Post-Acute Care Episode	Episode Type 1: 60-days following index acute care hospital discharge
Pre-Acute Care Episode	Episode Type 2: 60-days prior to index acute care hospital admission
Primary Chronic Condition	Chronic condition identified by the highest community-risk score
Readmission	Acute care hospital admission following discharge from the index acute care hospitalization within the 60-day post-acute care episode
Sequence Stops	Discrete care setting the patient enters inside of a patient pathway
SNF	Skilled Nursing Facility; refers to First Setting
STACH	Short Term Acute Care Hospital; refers to First Setting and indicates patient was readmitted to the hospital before receiving care from another setting

Introduction

The overall purpose of the *Clinically Appropriate and Cost-Effective Placement (CACEP)* project is to determine how the Medicare home health benefit can better meet beneficiary needs and improve the quality and efficiency of care provided within the U.S. health care system. Before we can identify the types of patients and pathways of care for which home health can have the greatest impact, we must understand the relationships between the various acute and post-acute care providers and payment systems within patient episodes of care. In the two previous working papers, we explored the frequency of episodes across several episode definitions by different metrics (e.g., by Medicare-Severity Diagnosis-Related Group (MS-DRG), chronic condition and first setting after discharge from the acute care hospital), as well as the Medicare expenditures associated with these episodes. An important aspect of episode-based payment, which differs significantly from payment in the current mix of siloed post-acute care prospective payment systems, is the highly varying service mix and utilization that can occur within a given episode.

The purpose of this third CACEP working paper is to examine the “patient pathways” followed in various types of episodes, and how patient pathways influence Medicare expenditures. Under the new Medicare Bundled Payment for Care Improvement (BPCI) initiative being implemented through the Center for Medicare and Medicaid Innovation (CMMI), it is likely that “conveners” will attempt to simplify patient pathways both clinically and financially. In order to accomplish this, much more needs to be known about the journeys patients currently take as they progress through time-limited episodes of care. Investigation of patient pathways allows us to understand the clinical composition of these episodes. This understanding is critical to the success of any episode-based payment initiative as it enables care coordination and the provision of a more cost-effective mix of patient services within the episode.

Within each episode, patients may move across several settings, including the acute care hospital, post-acute care, and ambulatory care settings (such as the physician’s office or hospital outpatient department). For example, while a patient may have a “SNF first setting episode” – meaning that the first setting after discharge from the index acute care hospital was a skilled nursing facility (SNF) – the episode may also include care from an inpatient rehabilitation facility (IRF) or home health agency (HHA), as well as physician visits, all within the defined period of time. We define three types of patient episodes: 1) all care provided within 60 days after discharge from a short term acute care hospitalization (STACH); 2) all care provided with 60 days prior to a STACH admission; and 3) all care within nine months following discharge from a community admission to home health.

We have found, as did Mor et al., that patient pathways are highly varied and complex,³ with some MS-DRGs and chronic conditions exhibiting literally hundreds of different patient pathways. The number of unique patient pathways within episodes defined by first setting varies highly as well. Understanding pathways involves being able to answer numerous questions, some of which have no immediate answers. For instance, there is no easy way of telling, from our analyses of administrative data, how to distinguish between episodes with multiple and complex patient pathways that are clinically necessary versus episodes that reflect poor quality care.

Care Transitions

Recently, concern has grown around hospital readmissions and the complexity and inefficiency of many patient pathways, by clinicians, administrators, patients, and other stakeholders in the health care system. This concern has manifested itself most prominently through an increased focus in the literature on care transitions and improving the coordination of patient care. Many different care delivery models and programs have been developed, or are currently emerging, in response to these concerns.

One approach has been to provide integrated care coordination for patients across settings, and teaching patients how to manage multiple chronic conditions. Integrated care programs are comprehensive, include several sites of service, and are often collaborations between payers and providers. Examples of integrated care programs include the Veterans Affairs Home Based Primary Care (HBPC), the Medicare Program of All-Inclusive Care for the Elderly (PACE), and the community health teams created under Vermont’s Blueprint for Health.

A subset of care delivery models that typically impose an additional patient management component onto integrated delivery systems can also be implemented in markets where care is coordinated across different payers and providers, but not otherwise integrated organizationally or financially. In this instance, however, it can be far more difficult to

³ Mor V., Grabowski D. (2009). Understanding skilled nursing facility re-hospitalizations: Variation by patient type and region. Unpublished.

Introduction

manage patient care across settings given the lack of financial, clinical, and organizational cohesiveness. The Transitional Care Model developed by Mary Naylor and the Care Transition Intervention™ developed by Eric Coleman focus on managing patient transitions from the hospital to the community in order to ensure that patients are safe and stable at home. Both of these interventions have been shown to reduce rehospitalizations and average cost per patient.^{4,5}

Many programs authorized under the Patient Protection and Affordable Care Act of 2010 (Affordable Care Act), such as accountable care organizations (ACOs), a national pilot for bundled payments, patient-centered medical homes, and the Independence at Home demonstration, are different approaches to address the issues of efficiency in health care delivery and better coordination of patient care. These programs should all have a positive impact on patient pathways. Overall, the literature assessing the types of programs described above suggests that widespread adoption and implementation of such programs could improve patient outcomes and reduce healthcare expenditures.

As noted in our previous literature review,⁶ through providing care in a patient's home, home health agencies do not incur the costs of dedicated physical space or the provision of 24-hour care. This often makes home health the more efficient provider.

Implications

In considering the importance of patient pathways, the need for coherent coordination of care becomes evident. Many of the reforms in the Affordable Care Act would create incentives for change in provider behavior by rewarding clinical integration and the careful management of quality and patient transitions across settings. The issue of patient pathways in post-acute care must be addressed if delivery system reform and, ultimately, cost control are to be achieved, as patient pathways are at the core of the current post-acute care system both from the perspective of payment and from the perspective of patient clinical care.

An investigation of patient pathways will help us to understand the types and mix of care that patients are currently receiving. The implications of a particular pathway on overall episode costs and, to some extent, patient quality of care can also be seen by examining patient pathways. That is, understanding patient pathways will be critical to evaluating the impact of changing the role of home health care as a component of both post-acute and pre-acute episodes.

⁴ Naylor MD, Brooten DA, Campbell RL, Maislin G, McCauley KM, Schwartz JS. (2004). Transitional care of older adults hospitalized with heart failure: A randomized, controlled trial. *Journal of the American Geriatric Society*, 52: 675-684.

⁵ Brown R. (2009). Models that decrease hospitalizations and improve outcomes for Medicare beneficiaries with chronic illnesses. Mathematica Policy Research, Inc.

⁶ Dobson A, DaVanzo JE, El-Gamil A, Berger G, Heath S. (2011). Using home health care to improve quality, outcomes, and efficiency in the U.S. healthcare system: The role transitional care, self-management, and care coordination can have in an integrated care management system at home. Submitted to the Alliance for Home Health Quality and Innovation.

Upcoming Study Analyses

The analyses of patient pathways presented in this report will support our future analyses, in which we model changes in patient discharges to the first setting of care, as well as transitions across care settings based on the current Medicare home health benefit. In order to understand how home health care is provided to Medicare beneficiaries at different stages of their care, this study will include simulations that model the effect of greater use of home health care on Medicare expenditures and, for example, hospital readmissions, under different payment policy changes.

In the remainder of this report, we re-introduce the methodology for developing our three episode types, as well as present episode frequencies and Medicare expenditures by various patient pathways. These descriptive statistics present the frequency distribution and distribution of Medicare expenditures within episodes and by care setting within the clinical context available in the data (MS-DRG or chronic condition). We present descriptive statistics for each of the three episode definitions, as well as a final chapter investigating how patient pathways and expenditures vary by region within each of the episode definitions.

Methods in Brief

We present a brief review of the analytic methods in this chapter. For a full description of the analytic methods for the CACEP study, see *Working Paper #1 – Creating and Benchmarking Episodes: Baseline Statistics of Episode Frequency and Patient Diagnoses*. This review is followed by chapters each devoted to a single episode type: 1) post-acute care episodes; 2) pre-acute care episodes; and 3) non-post-acute care community-based episodes. We provide additional descriptions of each type of episode in the introduction to each of these chapters.

Datasets

CACEP analyses are based on claims from a five percent sample of fee-for-service Medicare beneficiaries for all sites of service from 2007-2009, including: inpatient and outpatient hospitals, long-term care hospitals (LTCH), skilled nursing facilities (SNF), inpatient rehabilitation facilities (IRF), home health agencies (HHA), hospice, and physician and outpatient therapy visits. These claims represent all Medicare Part A and Part B claims, except for durable medical equipment (DME).⁷ All payment information presented is exclusive of Medicare co-payments, deductibles, and third party payments, and as such represent Medicare paid amounts not Medicare allowed amounts. These data were requested from the Centers for Medicare & Medicaid Services (CMS) Chronic Condition Warehouse (CCW),⁸ which flags each patient claim with the clinical conditions for which the patient has been historically treated. The CCW data contain flags for 21 common conditions, including, but not limited to, diabetes, congestive heart failure, osteoporosis, various cancers, depression, and stroke.

Episode Definitions

Patient “episodes” were created to capture all health care utilization following (or preceding) key points in the patient’s care. An “episode” consists of all care during a

⁷ Prescription drug costs that are provided under facility-based prospective payment systems (SNF, IRF, LTCHs) are included in the average Medicare episode payment. However, the Medicare payments for these services provided outside of the facility (such as in home health) are not included.

⁸ Data were provided by CMS under Data Use Agreement number #21007.

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 SNF, a home health “episode”, and/or an outpatient “visit”). The concept of an episode begins to change the way care is viewed (e.g., breaks down the siloed prospective payments that characterize the current health care system).

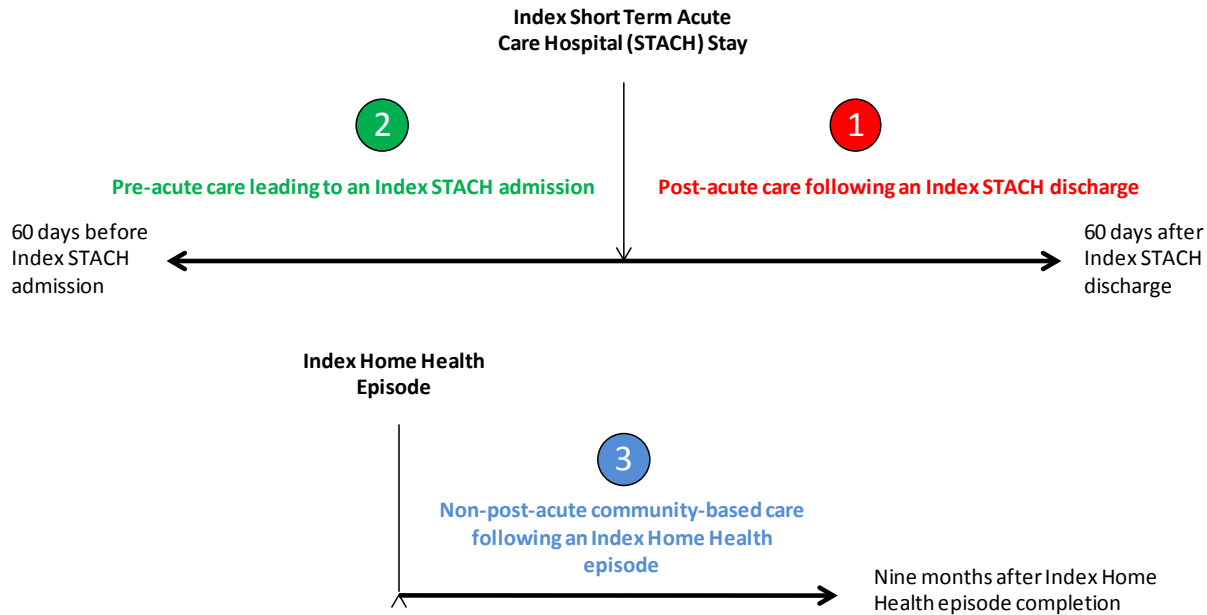
Three episode definitions were developed to capture the following uses of home health care:

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

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

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

Exhibit A.1: Relationship between Episode Types



We used the same database for this report (Working Paper #3) as Working Paper #2. As discussed in Working Paper #2, there have been several modifications to the database since Working Paper #1 was written. For Working Papers #2 and #3, we standardized the database by adjusting all Medicare expenditures by the appropriate wage index for the labor-related portion for each type of provider. This removes the effect from different wage structures across geographic regions. We also standardized the database to 2009 dollars by inflating all Medicare payments for 2007 and 2008 to 2009 dollars.

Defining Patient Pathways

Patient pathways reflect the sequence of care a patient received within the episode. The pathway consists of “sequence stops,” which captures care within each new care setting. All patient pathways presented in this report include the index acute care hospitalization or community-referred home health episode; therefore, each episode has at least one sequence stop.

Sequence stops are identified as either facility-based or ambulatory-based. Facility-based sequence stops consist of all formal care settings, including the acute care hospital (both the index acute care hospitalization and any readmissions or prior admissions), HHA, IRF, SNF, and LTCH. For purposes of this analysis, we categorized home health as a facility-based sequence stop even though it is not provided in a facility. Ambulatory-based sequence stops include the Community, which consists of physician or outpatient visits, emergency room, hospital outpatient visits, outpatient therapy, hospice, or other

Methods in Brief

inpatient. Consistent with our designation of Community first setting episodes, multiple physician or outpatient visits are aggregated into a single sequence stop as long as they are not interrupted by another facility- or ambulatory-based care setting. The remaining ambulatory-based care settings are not aggregated, and occur as many times as reflected in the pathway.

Additionally, while the Community sequence stops capture physician and outpatient visits in the community, physician visits while patients are residing in facility-based settings are not captured as individual sequence stops. For example, physician visits for a patient residing in a SNF will not appear in the pathway. However, physician visits occurring during a HHA segment are recorded as a sequence stop. The “H-C-H” pathway would represent two home health segments and one physician or outpatient hospital visit. This structure allows us to investigate the relationship between home health and physician care. Note that our use of the term “segment” does not correspond to a HHA episode as defined by CMS for payment.

An example of a pathway is presented below:

A patient was discharged from the index acute care hospitalization and admitted to a SNF. While residing in the SNF, the patient was readmitted to an acute care hospital, and ultimately discharged back to the SNF. Upon completion of the SNF stay, the patient returned home and received physician and outpatient services for the remainder of the episode. The pathway for this episode would be:

A-S-A-S-C

The key to interpreting patient pathway sequence stops is presented in Exhibit A.2.

Exhibit A.2: Identification of Facility-based and Ambulatory-based Sequence Stops within Patient Pathways

Facility-based Sequence Stops:	
A	STACH (Index or Readmission)
H	HHA
I	IRF
L	LTCH
S	SNF
Ambulatory-based Sequence Stops	
C	Community (Physician and Outpatient Visits)
E	ER
P	OP Therapy
T	Hospice
Z	Other IP

Methods in Brief

In the remainder of this report, all descriptive statistics, including the 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 observations are suppressed, per our data use agreement with CMS.

Summary of Findings

Because the concept of the care pathway is generally multifaceted, we have defined the concept as it specifically relates to this project. In the broadest sense, the care pathway can be thought of as the actual care process or path experienced by each individual patient throughout the duration of the episode (e.g., 60 days). The care pathway is the sequence of “stops” in the care process. For example, a patient discharged from the index acute care hospital who goes directly to an IRF for a week and then to home health care would have three “sequence stops” – the acute care hospitalization, the IRF, and the HHA. A sequence stop represents a discrete care setting the patient enters inside of a care pathway. Sequential outpatient hospital or physician visits that are not interrupted by care from another setting are considered a single sequence stop. Ambulatory services (such as physician visits) that are provided during a facility-based sequence stop do not appear as a sequence stop, with the exception of home health, as mentioned above.

This report describes the care pathways found in post-acute care, pre-acute care, and non-post-acute care community-based episodes created in the project.

Post-Acute Care Episodes

Post-acute care episodes are clinically defined in this series of working papers by the index acute care hospitalization MS-DRG. These episodes contain various pathways, and thus the possibilities for the clinically appropriate and cost-effective use of home health care. Post-acute episodes are administratively defined by the first setting to which the patient is discharged from the acute care hospital.

Readmissions

- Episodes that contain a hospital readmission have almost twice as many sequence stops during the episode compared to episodes that do not contain a readmission (total average episode sequence stops of 5.68 compared to 2.79). Of the additional 2.89 more sequence stops per episode, 2.03 are facility-based and 0.86 are ambulatory-based.

Summary of Findings

First Setting

- HHA first setting episodes have more overall sequence stops than SNF first setting episodes (4.37 versus 4.12); however, a larger proportion of the HHA first setting sequence stops are ambulatory-based (1.60 versus 1.13).
- On average, HHA first setting episodes have more overall ambulatory-based sequence stops and fewer facility-based sequence stops than other formal first setting episodes, suggesting that physicians may have a larger role in HHA first setting episodes than they do in other facility-based first settings.
- OP Therapy and ER first setting episodes have minimal facility-based sequence stops after discharge but have the highest average number of ambulatory-based sequence stops (3.52 and 3.43, respectively).

Patient Demographic Characteristics

- Episodes for patients who live alone average 0.81 more sequence stops than those for patients who live with a spouse or caregiver (total sequence stops of 4.06 compared to 3.25). Episodes for patients who live alone have 0.76 more facility-based sequence stops and 0.05 more ambulatory-based sequence stops than episodes for those who do not live alone.

Results for Specific MS-DRGs

- Whether or not a beneficiary lives alone is correlated with the average number of sequence stops across MS-DRGs: MS-DRG 460 – Spinal fusion except cervical without MCC – has the largest difference in the average number of sequence stops for episodes for patients who live alone, while MS-DRG 481 – Hip & femur procedures except major joint with CC – has the smallest difference in the average number of sequence stops for patients who live alone. This finding indicates that caregiver support at home plays a very important role in reducing pathway complexity.
- MS-DRG 481 – Hip and femur procedure except major joint with CC – has the smallest difference in the average number of sequence stops for episodes that contain a hospital readmission compared to those that do not (5.76 versus 3.53). Episodes that contain a readmission have 2.23 more sequence stops than those that do not contain a readmission for this MS-DRG.

Chronic Conditions

- The number of chronic conditions a beneficiary has influences the average number of sequence stops in an episode. Episodes for patients with no chronic conditions contain, on average, 2.64 total sequence stops (1.64 after the index acute care hospitalization), while episodes with 15 chronic conditions have on

Summary of Findings

average 5.83 total sequence stops. As would be expected, episodes with more chronic conditions and a greater average number of sequence stops are associated with higher Medicare episode payments.

- For MS-DRG 470, episodes for patients with no chronic conditions have 3.70 sequence stops on average, of which 1.92 are facility-based and 1.78 are ambulatory-based. Episodes with 13 chronic conditions have an average of 5.26 sequence stops, of which 3.77 are facility-based and 1.49 are ambulatory-based.
- These observations suggest that average sequence stops vary by MS-DRG, number of chronic conditions, and specific patient demographic characteristics. However, the impact of these factors on patient pathways and episode payments varies by first setting. In addition, facility-based and ambulatory-based sequence stops are distributed differently among first settings, both within and across MS-DRGs.

For certain patients, substituting home health care instead of care in a more expensive facility-based setting shows promise as a way to reduce Medicare expenditures, but public policy in this area will need to be very carefully considered, given the complexity of the relationships observed in these data.

Pre-Acute Care Episodes

Pre-acute care episodes are clinically defined by the patient's primary chronic condition. In this study, the chronic conditions are hierarchically ordered using Medicare Advantage payment weights. These episodes raise the questions of whether investing in care such as home health care could be worthwhile to prevent index acute care hospitalizations and other unnecessarily expensive care.

Hospital Admissions

- Episodes that contain a hospital admission prior to the index acute care hospitalization have, on average, twice as many sequence stops as episodes that do not contain a hospital admission.

Patient Demographic Characteristics

- The number of facility-based sequence stops is relatively consistent among episodes for dual and non-dual eligibles. However, episodes for dual eligibles have more ambulatory-based sequence stops than those for non-dual eligibles.
- Episodes for beneficiaries who live in rural areas have slightly fewer facility-based sequence stops but more ambulatory-based sequence stops.

Summary of Findings

Chronic Conditions

- The severity of primary chronic conditions is correlated with the average number of sequence stops in an episode. In general, more severe primary chronic conditions have more sequence stops. The average number of sequence stops also tends to increase with the number of chronic conditions a beneficiary has, but this relationship is not as strong as it is in the post-acute episodes.
- Hip/pelvic fractures have the highest number of facility-based sequence stops. This is likely due to the long recovery time and high intensity rehabilitation that is needed. Depression episodes contain the most ambulatory-based sequence stops.

The relationship between average episode expenditures, average sequence stops, primary chronic condition, and number of chronic conditions is less clear in the pre-acute episodes than in the post-acute episodes. However, there is a general trend of increased ambulatory-based sequence stops in the pre-acute episodes, and the range of average ambulatory-based sequence stops increases more quickly than the range of facility-based sequence stops as the number of chronic conditions increases.

Given the importance of a hospital admission on average Medicare episode payments and the average number of sequence stops within 60 days of an index acute care hospitalization, there may be significant opportunity to streamline care in order to prevent rehospitalizations, and perhaps even prevent the index acute care hospitalization itself. It is possible that better care management, including chronic condition management that involves use of home health care, could prevent many of these hospitalizations and other facility-based sequence stops.

Non-Post-Acute Care Community-Based Episodes

Non-post-acute care community-based episodes are defined clinically by primary chronic conditions. Our findings concerning these episodes indicate the potential that lies in improving continuity and coordination of care.

Hospital Admissions

- As with the post-acute and pre-acute episodes, the presence of a hospital admission has a very strong impact on the average number of sequence stops in the episode. Across all chronic conditions, episodes with a hospital admission contain 12.04 sequence stops, which is twice as many sequence stops as episodes without a hospital admission (6.03).

Patient Demographic Characteristics

- Dual eligible status is an important demographic characteristic and generally increases the average number of sequence stops in an episode. However, dual

Summary of Findings

eligibles with some primary chronic conditions (such as acute myocardial infarction) have fewer sequence stops than non-dual eligibles with the same primary chronic condition.

- Beneficiary demographic characteristics had differential effects across primary chronic conditions (see below).

Chronic Conditions

- Similar to the pre-acute episodes, more severe primary chronic conditions tend to have a higher average number of sequence stops in an episode. There is a direct correlation between the average number of sequence stops and the number of chronic conditions within an episode – as the number of chronic conditions across primary chronic condition categories increases, so does the average number of sequence stops. For example, an osteoporosis episode with only one chronic condition had 4.82 sequence stops on average, while an osteoporosis episode with 12 chronic conditions had 13.56 sequence stops on average.
- For CHF**COPD* episodes, there is the largest correlation among dual eligible status and patients over the age of 85 on the average number of sequence stops. However, whether a beneficiary lives alone also has an impact. For osteoporosis, the demographic characteristics with the greatest correlation with average sequence stops were dual eligibility and whether or not the beneficiary died during the episode, while for *DIABETES*CHF* episodes, race and rural status were the most important.

The relationship between utilization (in terms of average sequence stops), severity of illness, and episode expenditures is much clearer in the non-post-acute care community-based episodes than in the pre-acute episodes. Our findings on non-post-acute care community-based episodes indicate a possibility of using home health care to reduce the complexity of patient care pathways through greater coordination of care and prevention of unnecessary hospitalizations (e.g. ambulatory care sensitive conditions) and subsequent readmissions.

Regional Variation

Regional variation was investigated across all three episode types.

Post-acute Care Episodes

- Region I – Boston – has the highest overall average and facility-based sequence stops, while Region X – Seattle – has the lowest.
- Region IX – San Francisco – generally has the highest Medicare expenditures per episode.

Summary of Findings

- There are no obvious relationships between average Medicare expenditures per episode, number of sequence stops per episode, distribution of facility- and ambulatory-based sequence stops per episode, or number of episodes per 1,000 beneficiaries across regions.

Pre-acute Care Episodes

- Region IX – San Francisco – generally has the highest average expenditures, while Region VII – Kansas City – and Region VIII – Denver – have the lowest average expenditures.
- Region X – Seattle – has the highest average number of sequence stops while Region II – New York – has the lowest average number of sequence stops across regions.
- Region I – Boston – and Region V – Chicago – typically have the highest average number of facility-based sequence stops, while Seattle has the lowest. There is less variation in facility-based than ambulatory-based sequence stops, where Region II – New York – has the lowest average number of ambulatory-based sequence stops across regions.
- Region IX – San Francisco – and Region X – Seattle – tend to have the lowest episodes per 1,000 beneficiaries and Region VII – Kansas City – has the highest.
- The relationship between average Medicare expenditures per episode, number of sequence stops per episode, distribution of facility- and ambulatory-based sequence stops per episode, or number of episodes per 1,000 beneficiaries across regions remains unclear in the pre-acute episodes, similar to the post-acute episodes across the 10 CMS regions.

Non-post-acute Care Community-based Episodes

- Region VI – Dallas – has the highest average Medicare expenditures, average number of sequence stops, average facility-based sequence stops, average ambulatory-based sequence stops, and episodes per 1,000 beneficiaries.
- Region X – Seattle – has the lowest average Medicare expenditures, average number of facility-based sequence stops, and episodes per 1,000 beneficiaries.
- Region II – New York – has the lowest average number of sequence stops and the lowest average number of ambulatory-based stops, as well as generally low episodes per 1,000 beneficiaries.
- Unlike the post-acute and pre-acute episodes, there appears to be a stronger relationship between high utilization regions (in terms of pathway complexity

Summary of Findings

and episodes per 1,000 beneficiaries) and average Medicare expenditures per episode.

Regional variation in episode expenditures, patient pathways, and population-based episode rates further demonstrates the complexity of beneficiary episodes of care as beneficiaries navigate the health care system in different geographic regions. Variation is even larger at the level of individual MS-DRGs or chronic conditions. Given the trends observed across regions, for clinically-appropriate patients there appears to be opportunities to substitute home health for facility-based care.

Implications for Home Health

Working paper #3 presents unprecedented information on patient pathways by episode type, select MS-DRGs, and primary chronic conditions to illustrate how and where patients are receiving care within their episode. The implications of pathway analyses for providers, including home health agencies, is that there is a clear need for improved efforts to address readmissions and potentially to streamline pathways with fewer transitions. As possible, this may mean less reliance on the more expensive care in facilities. Pathways are not just about where the patient is in the pathway, but also what the patient's next stop in the pathway is. On average, 50% of post-acute care episode payments are for care provided after the index acute care hospitalization. Decisions about post-acute care placement are therefore critical not only to the quality of the patient's care, but also have profound implications on overall health care expenditures.

The descriptive statistics in this working paper indicate the need for further research on, among other topics:

- Identifying best practices for clinically appropriate patient care and placement, and determining whether there may be corresponding patient pathways that reflect those best practices; and
- Determining what factors may underlie the demographic and clinical trends seen in the data as we continue to explore patient pathways.

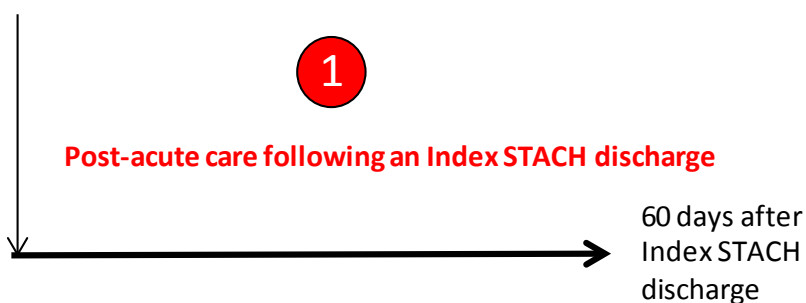
Episode Type 1: 60-Day Post-Acute Care Episodes

Brief Review of Episode Definition⁹

Initiated by an index acute care hospital stay, Episode Type 1 captures all post-acute care (facility-based, home health, and ambulatory) that patients receive following an acute care 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

**Index Short Term Acute
Care Hospital (STACH) Stay**



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

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

Episode Type 1: Post-Acute Episodes

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
Other IP	Other inpatient hospital, such as psychiatric hospital admission
No Care	Patient received no inpatient or ambulatory care during the episode

The patient pathways (i.e., the sequence of care settings a patient enters during the course of the episode) presented for the post-acute care episodes include both the index acute care hospitalization and all subsequent care settings. That is, every episode contains at least one sequence stop to represent the index acute care hospitalization. In the analysis presented below, we present the average total number of sequence stops in the episode, and separately present the average number of facility-based and ambulatory-based sequence stops. A “facility-based” sequence stop includes all formal care settings: the index acute care hospitalization, hospital readmissions, HHA, SNF, IRF, LTCH, and hospice. An “ambulatory-based” sequence stop includes physician and outpatient visits, ER visits, outpatient therapy, hospice, and other inpatient. Additionally, in order to control the length of the pathways, consecutive physician or outpatient procedures without the presence of other care settings are represented as a single sequence stop. For example, a pathway from the index acute care hospitalization to the Community and then to SNF represents three sequence stops, regardless of the number of physician visits that occurred while in the “Community.”

In order to better determine which variables are significant predictors of the number of patient pathways, we conducted a multivariate regression analysis. The regression equation attempts to explain the number of sequence stops within a pathway through a series of independent variables, such as patient clinical and demographic characteristics. In this report, we limit our descriptive statistics to the independent variables that have the most significant impact on patient pathways ($p < 0.05$).

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 post-acute care

Episode Type 1: Post-Acute Episodes

episodes and a total of \$472.8 billion in Medicare payments.^{10,11} In 2008, the 9.2 million post-acute care episodes represent about 55 percent of total Medicare fee-for-service spending in that year.¹²

Descriptive Statistics across All Post-Acute Care 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, and contains 3.44 sequence stops. On average, there are more facility-based sequence stops (1.92) than ambulatory sequence stops (1.52) during the episode. More than half (52.7 percent) of all post-acute episodes have a first setting of Community, indicating that a physician or outpatient visit is the first care a patient receives following discharge from the acute care hospital.

Community first setting episodes represent 39.1 percent of total Medicare episode payments and have the lowest average number of sequence stops (3.03). SNF first setting episodes represent 16.2 percent of episodes and have an average of 4.12 sequence stops. Almost three of these stops (2.99) are facility-based, which indicates that patients often enter another form of facility-based care after the index acute care hospitalization and SNF. HHA first setting episodes represent 12.4 percent of episodes and contain 4.37 sequence stops, of which 2.77 are facility-based and 1.60 are ambulatory-based. While patients with HHA first setting episodes have more overall sequence stops than SNF first setting episodes, a larger proportion of the HHA first setting sequence stops are ambulatory-based. Compared to the other formal first settings (SNF, IRF, LTCH), HHA first setting episodes have the lowest average Medicare episode payment (\$20,345).

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

¹¹ 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.

¹² 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

Exhibit 1.3: Distribution of Episodes, Medicare Episode Payments, and Sequence Stops by First Setting for 60-Day Fixed-Length Post-Acute Episode (2007-2009)

First Setting	Number of Episodes	Percent of Episodes	Medicare Episode Paid (in millions)	Percent of Total Episode Paid	Average Medicare Episode Paid	Average Sequence Stops	Average Facility-based Sequence Stops	Average Ambulatory-based Sequence Stops
HHA	3,005,900	12.4%	\$61,155	12.9%	\$20,345	4.37	2.77	1.60
SNF	3,938,080	16.2%	\$115,064	24.3%	\$29,218	4.12	2.99	1.13
IRF	675,840	2.8%	\$29,867	6.3%	\$44,193	4.88	3.33	1.55
LTCH	154,480	0.6%	\$13,883	2.9%	\$89,869	4.03	3.20	0.83
STACH	655,420	2.7%	\$19,475	4.1%	\$29,713	4.43	2.96	1.47
Community	12,762,420	52.7%	\$184,772	39.1%	\$14,478	3.03	1.41	1.62
ER	729,840	3.0%	\$11,943	2.5%	\$16,364	4.78	1.65	3.13
OP Therapy	342,680	1.4%	\$5,220	1.1%	\$15,233	4.77	1.36	3.41
Hospice	481,000	2.0%	\$8,490	1.8%	\$17,651	3.04	1.10	1.94
Other IP	99,020	0.4%	\$2,334	0.5%	\$23,572	4.34	1.66	2.68
No Care ^a	1,394,400	5.8%	\$20,583	4.4%	\$14,761	1.00	1.00	0.00
Overall Average	24,239,080	100.0%	\$472,786	100.0%	\$19,505	3.44	1.92	1.52

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

^a Episodes include deaths during index admission.

Exhibits 1.4A and 1.4B present the five most frequent patient pathways overall, and by first setting, and the distribution of episodes and average Medicare episode payments. The most frequent pathway, represented by more than one-third of all post-acute care episodes is “A-C,” which indicates that the patient was discharged from the index acute care hospital and returned to the community to receive only physician and outpatient care. This pathway does not involve any formal or facility-based care beyond the index acute care hospitalization. Due to the ambulatory nature of the pathway, the average Medicare episode payment is significantly lower than the overall average payment across all post-acute care episodes (\$10,003 compared to \$19,505). The second most frequent pathway involves home health care following discharge from the index acute care hospital, followed by care in the community. Overall, the top five most frequent pathways have an average Medicare episode payment of \$12,799 compared to the overall average of \$19,505. This indicates that, on average, streamlined pathways such as these top five are not the drivers of high average Medicare episode payments. It is likely that the complicated pathways, which include several facility-based settings, drive overall Medicare payments. It is important to note that readmissions are not very prevalent in the top five patient pathways, and are only represented following a Community first setting episode.

Episode Type 1: Post-Acute Episodes

Exhibit 1.4A: Distribution of Episodes and Medicare Episode Payments for Most Frequent Patient Pathways across First Settings for 60-Day Fixed-Length Post-Acute Episode (2007-2009)

First Setting	Pathway Pattern	Percent of Episodes	Average Medicare Episode Paid
Total	A-C	34.5%	\$10,003
	A-H-C	7.1%	\$16,048
	A	5.8%	\$14,761
	A-C-A-C	2.8%	\$22,395
	A-S	2.8%	\$25,568
	Subtotal		52.9%
	Other	47.1%	\$27,039
Total		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. Average Medicare Episode Paid includes care from all facility-based and ambulatory care settings and excludes beneficiary co-payments.

Facility-based Sequence Stops:	
A	STACH (Index or Readmission)
H	HHA
I	IRF
L	LTCH
S	SNF
Ambulatory-based Sequence Stops	
C	Community (Physician and Outpatient Visits)
E	ER
P	OP Therapy
T	Hospice
Z	Other IP

Exhibit 1.4B presents the top five most frequent patient pathways, and the distribution of episodes and Medicare episode payments by first setting. Among HHA first setting episodes, the most frequent patient pathway, represented by more than one-half of all episodes (56.9 percent), is “A-H-C.” This patient pathway represents a patient who enters HHA immediately after discharge from the index acute care hospitalization and then returns to the community for physician and outpatient services.

SNF first setting patient pathways are not as concentrated as HHA first setting patient pathways, with the most frequent pathway only representing 17.1 percent of all SNF first setting episodes. This patient pathway (“A-S”) represents a patient that is admitted to a SNF following discharge from the index acute care hospitalization, and only receives SNF care for the remainder of the episode. This pathway may represent a patient who died in the SNF, or possibly a long-term care or dual eligible patient. SNF first setting episodes within the top five most frequent patient pathways have a slightly lower than average Medicare episode payment (\$25,233 compared to \$29,218), which again indicates that it is the complex and less frequent pathways that often drive the overall Medicare episode payments.

The remaining top pathways for the other first settings show a comparable trend, in that the most frequent pathways generally have a lower than average Medicare episode payment. Additionally, while readmissions are represented in the top five pathways by first setting, they are generally infrequent.

Episode Type 1: Post-Acute Episodes

Exhibit 1.4B: Distribution of Episodes and Medicare Episode Payments for Most Frequent Patient Pathways by First Setting for 60-Day Fixed-Length Post-Acute Episode (2007-2009)

First Setting	Pathway Pattern	Percent of Episodes	Average Medicare Episode Paid
HHA	A-H-C	56.9%	\$16,048
	A-H-C-A-H-C	4.2%	\$28,054
	A-H-C-E-H-C	2.9%	\$17,512
	A-H	2.3%	\$12,755
	A-H-C-A	1.7%	\$29,489
	Subtotal	68.0%	\$17,072
	Other	32.0%	\$27,293
	Total	100.0%	\$20,345
SNF	A-S	17.1%	\$25,568
	A-S-H-C	16.4%	\$25,547
	A-S-C	15.0%	\$20,417
	A-S-A-S	3.3%	\$41,552
	A-S-E	2.3%	\$28,035
	Subtotal	54.1%	\$25,223
	Other	45.9%	\$33,928
	Total	100.0%	\$29,218
IRF	A-I-H-C	28.1%	\$37,931
	A-I-C	8.7%	\$33,085
	A-I-S	5.9%	\$52,783
	A-I-P-P	2.5%	\$34,579
	A-I-S-H-C	2.3%	\$43,988
	Subtotal	47.4%	\$38,999
	Other	52.6%	\$48,869
	Total	100.0%	\$44,193
LTCH	A-L	18.1%	\$96,557
	A-L-S	11.4%	\$98,357
	A-L-H-C	11.4%	\$61,260
	A-L-C	7.5%	\$55,990
	A-L-A	3.6%	\$122,701
	Subtotal	51.9%	\$85,170
	Other	48.1%	\$94,946
	Total	100.0%	\$89,869
Community	A-C	65.6%	\$10,003
	A-C-A-C	5.3%	\$22,395
	A-C-E-C	4.3%	\$11,453
	A-C-A	2.6%	\$23,659
	A-C-H-C	1.9%	\$14,892
	Subtotal	79.7%	\$11,466
	Other	20.3%	\$26,270
	Total	100.0%	\$14,478

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 Paid includes care from all facility-based and ambulatory care settings and excludes beneficiary co-payments.

Episode Type 1: Post-Acute Episodes

Descriptive Statistics by MS-DRG and Patient Characteristics

Exhibit 1.5 shows the average number of sequence stops for the top 20 MS-DRGs ranked by total Medicare episode payments. On average, the top 20 MS-DRGs have 3.54 total sequence stops, of which 2.02 are facility-based and 1.52 are ambulatory-based. The top MS-DRG in terms of number of episodes and Medicare episode payments – MS-DRG 470: major joint replacement or reattachment of lower extremity without MCC – represents 4.7 percent of all episodes, and 5.5 percent of all episode payments across all MS-DRGs. MS-DRG 470 contains 4.22 sequence stops on average, of which 2.41 are facility-based and 1.81 are ambulatory. MS-DRG 291 – heart failure & shock with MCC – is the third highest ranked MS-DRG by total Medicare episode paid (but highest ranked medical MS-DRG) and contains an average of 3.84 sequence stops (2.24 are facility-based and 1.60 are ambulatory-based).

Exhibit 1.6 shows the average number of sequence stops by primary chronic condition, ranked by HCC community-risk. As the HCC community-risk decreases, so does the average number of sequence stops – both facility- and ambulatory-based. CHF* COPD episodes contain the greatest number of overall sequence stops (3.89), but hip/pelvic fractures have the highest number of facility-based sequence stops (2.37). This is likely due to the long recovery time and high intensity rehabilitation that is needed. Depression episodes contain the most ambulatory-based sequence stops (1.69).

Episode Type 1: Post-Acute Episodes

Exhibit 1.5: Total Medicare Episode Paid, Number of Episodes and Average Sequence Stops by Top 20 MS-DRGs (Ranked by Total Medicare Episode Expenditures) for 60-day Fixed-Length Post-Acute Episode (2007-2009)

MS-DRG	Number of Episodes	Percent of Episodes	Total Medicare Episode Paid (in millions)	Average Medicare Episode Paid	Average Sequence Stops	Average Facility-based Sequence Stops	Average Ambulatory-based Sequence Stops
470: Major joint replacement or reattachment of lower extremity w/o MCC	1,131,040	4.7%	\$25,999	\$22,986	4.22	2.41	1.81
871: Septicemia or severe sepsis w/o MV 96+ hours w MCC	425,600	1.8%	\$9,952	\$23,383	3.25	1.99	1.26
291: Heart failure & shock w MCC	359,980	1.5%	\$7,765	\$21,572	3.84	2.24	1.60
003: ECMO or trach w MV 96+ hrs or PDX exc face, mouth & neck w maj O.R.	39,580	0.2%	\$7,208	\$182,116	3.29	2.56	0.73
194: Simple pneumonia & pleurisy w CC	503,760	2.1%	\$7,159	\$14,210	3.34	1.88	1.46
481: Hip & femur procedures except major joint w CC	194,720	0.8%	\$6,400	\$32,869	3.96	2.87	1.09
292: Heart failure & shock w CC	381,060	1.6%	\$6,380	\$16,744	3.77	2.17	1.60
065: Intracranial hemorrhage or cerebral infarction w CC	251,800	1.0%	\$6,175	\$24,522	3.83	2.44	1.39
392: Esophagitis, gastroent & misc digest disorders w/o MCC	609,240	2.5%	\$6,102	\$10,016	3.16	1.59	1.57
690: Kidney & urinary tract infections w/o MCC	454,100	1.9%	\$6,064	\$13,355	3.48	1.98	1.50
247: Perc cardiovasc proc w drug-eluting stent w/o MCC	337,080	1.4%	\$6,026	\$17,878	2.66	1.30	1.36
641: Nutritional & misc metabolic disorders w/o MCC	414,520	1.7%	\$5,165	\$12,461	3.45	1.92	1.53
329: Major small & large bowel procedures w MCC	106,640	0.4%	\$5,098	\$47,808	3.65	2.44	1.21
460: Spinal fusion except cervical w/o MCC	148,000	0.6%	\$4,913	\$33,198	3.42	1.93	1.49
287: Circulatory disorders except AMI, w card cath w/o MCC	306,040	1.3%	\$4,775	\$15,604	2.98	1.51	1.47
293: Heart failure & shock w/o CC/MCC	323,380	1.3%	\$4,416	\$13,657	3.56	1.97	1.59
683: Renal failure w CC	237,680	1.0%	\$4,296	\$18,075	3.62	2.08	1.54
193: Simple pneumonia & pleurisy w MCC	223,560	0.9%	\$4,278	\$19,137	3.49	2.04	1.45
312: Syncope & collapse	399,200	1.6%	\$4,252	\$10,650	3.11	1.67	1.44
280: Acute myocardial infarction, discharged alive w MCC	150,400	0.6%	\$4,232	\$28,135	3.89	2.38	1.51
Subtotal-Top 20 MS-DRGs	6,997,380	28.9%	\$136,656	\$19,530	3.54	2.02	1.52
Other	17,241,700	71.1%	\$336,129	\$19,495	3.39	1.27	2.13
Overall Average	24,239,080	100.0%	\$472,786	\$19,505	3.44	1.92	1.52

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 Paid includes care from all facility-based and ambulatory care settings and excludes beneficiary co-payments.

Episode Type 1: Post-Acute Episodes

Exhibit 1.6: Total Medicare Episode Paid, Number of Episodes, and Average Sequence Stops by Primary Chronic Conditions^a for 60-day Fixed-Length Post-Acute Episode (2007-2009)

Primary Chronic Conditions	Number of Episodes	Percent of Episodes	Total Medicare Episode Paid (in millions)	Average Medicare Episode Paid	Average Sequence Stops	Average Facility-based Sequence Stops	Average Ambulatory-based Sequence Stops
CHF*COPD	6,070,360	25.0%	\$138,124	\$22,754	3.89	2.24	1.65
DIABETES*CHF	3,242,820	13.4%	\$74,072	\$22,842	3.63	2.06	1.57
CHF*RENAL	1,362,880	5.6%	\$31,159	\$22,863	3.59	2.11	1.48
Lung Cancer	490,440	2.0%	\$10,742	\$21,903	3.51	1.91	1.60
Osteoporosis	3,640,180	15.0%	\$62,704	\$17,226	3.34	1.89	1.45
COPD	1,863,880	7.7%	\$31,460	\$16,879	3.23	1.72	1.51
Rheumatoid Arthritis/Osteoarthritis	2,662,900	11.0%	\$45,582	\$17,118	3.35	1.81	1.54
Hip/Pelvic Fracture	139,380	0.6%	\$3,537	\$25,379	3.54	2.37	1.17
Heart Failure	634,980	2.6%	\$11,381	\$17,923	3.00	1.66	1.34
Alzheimer's Disease	324,380	1.3%	\$5,249	\$16,182	3.20	1.88	1.32
Alzheimer's Disease and Related Disorders	340,120	1.4%	\$6,105	\$17,948	3.23	1.88	1.35
Stroke/Transient Ischemic Attack	416,140	1.7%	\$7,433	\$17,862	3.06	1.64	1.42
Colorectal Cancer	125,140	0.5%	\$2,760	\$22,057	3.08	1.70	1.38
Depression	756,080	3.1%	\$10,904	\$14,422	3.18	1.49	1.69
Acute Myocardial Infarction	97,880	0.4%	\$1,892	\$19,331	2.49	1.32	1.17
Ischemic Heart Disease	812,420	3.4%	\$12,046	\$14,827	2.59	1.35	1.24
Atrial Fibrillation	76,520	0.3%	\$1,063	\$13,889	2.62	1.38	1.24
Chronic Kidney Disease	259,280	1.1%	\$4,668	\$18,002	2.82	1.51	1.31
Female Breast Cancer	32,600	0.1%	\$446	\$13,666	2.70	1.42	1.28
Prostate Cancer	49,300	0.2%	\$550	\$11,158	2.41	1.23	1.18
Endometrial Cancer	9,400	0.0%	\$136	\$14,460	2.59	1.41	1.18
Diabetes	171,140	0.7%	\$2,015	\$11,773	2.50	1.33	1.17
Glaucoma	51,860	0.2%	\$579	\$11,158	2.43	1.26	1.17
Cataract	128,520	0.5%	\$1,434	\$11,161	2.44	1.26	1.18
None	480,480	2.0%	\$6,744	\$14,037	2.64	1.40	1.24
Overall Average	24,239,080	100.0%	\$472,786	\$19,505	3.44	1.92	1.52

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. Medicare Episode Paid 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 1: Post-Acute Episodes

Exhibit 1.7 and Exhibit 1.8 show the average Medicare episode payments and average sequence stops by the number of chronic conditions per episode. The number of chronic conditions per episode is normally distributed, with an average of 5.1 chronic conditions per episode (data not shown).

As the number of chronic conditions per episode increases, the average Medicare episode payment increases, as well as the average number of sequence stops. Episodes with no chronic conditions contain, on average, 2.64 total sequence stops, while episodes with 15 chronic conditions have on average 5.83 total sequence stops.

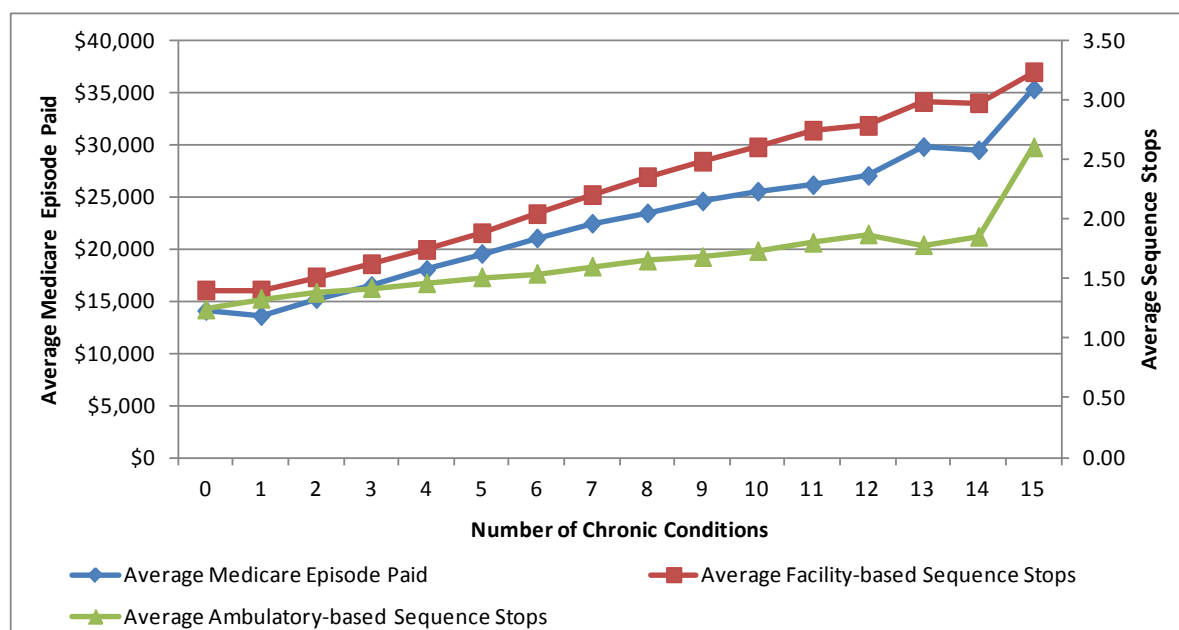
Exhibit 1.7: Average Medicare Episode Paid and Average Sequence Stops by Number of Chronic Conditions for 60-day Fixed-Length Post-Acute Episode (2007-2009)

Number of Chronic Conditions	Percent of Episodes	Average Medicare Episode Paid	Average Sequence Stops	Average Facility-based Sequence Stops	Average Ambulatory-based Sequence Stops
0	2.0%	\$14,037	2.64	1.40	1.24
1	4.9%	\$13,545	2.73	1.40	1.33
2	8.8%	\$15,174	2.89	1.51	1.38
3	12.2%	\$16,429	3.04	1.62	1.42
4	14.4%	\$17,971	3.20	1.74	1.46
5	15.0%	\$19,502	3.39	1.88	1.51
6	13.9%	\$20,991	3.58	2.04	1.54
7	11.4%	\$22,400	3.80	2.20	1.60
8	8.0%	\$23,390	4.00	2.35	1.65
9	4.9%	\$24,530	4.16	2.48	1.68
10	2.7%	\$25,469	4.33	2.60	1.73
11	1.2%	\$26,090	4.54	2.74	1.80
12	0.4%	\$26,982	4.65	2.78	1.87
13	0.1%	\$29,746	4.76	2.98	1.78
14	0.0%	\$29,432	4.82	2.97	1.85
15	0.0%	\$35,267	5.83	3.23	2.60
Overall Average	100.0%	\$19,505	3.44	1.92	1.52

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 Paid includes care from all facility-based and ambulatory care settings and excludes beneficiary co-payments.

Episode Type 1: Post-Acute Episodes

Exhibit 1.8: Average Medicare Episode Paid and Average Facility-based and Ambulatory-based Sequence Stops by Number of Chronic Conditions for 60-day Fixed-Length Post-Acute Episode (2007-2009)



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

Patient demographic characteristics are also correlated with the amount of care patients receive and whether care is facility-based or ambulatory care. Exhibit 1.9 shows the total average number of sequence stops, and facility- and ambulatory-sequence stops by select beneficiary demographic characteristics.

Episodes that contain a hospital readmission have almost twice as many sequence stops during the 60-day episode compared to episodes that do not contain a readmission (total sequence stops of 5.68 compared to 2.79). Episodes that contain a hospital readmission contain 2.89 more sequence stops on average, of which 2.03 are facility-based and 0.86 are ambulatory-based. The increase in the number of sequence stops directly affects the average Medicare episode payment, which is \$33,926 for episodes that contain a hospital readmission, and \$18,590 for episodes that do not (data not shown).

Whether a patient lives alone also has an impact on the number of sequence stops contained in an episode. Across all MS-DRGs, episodes for patients who live alone have 0.81 more sequence stops than those who live with a spouse or caregiver (total sequence stops of 4.06 compared to 3.25). Episodes for patients who live alone have 0.76 more facility-based sequence stops than episodes for those who do not live alone, and 0.05 more ambulatory-based sequence stops.

Episode Type 1: Post-Acute Episodes

Episodes for patients who die during the episode and episodes for dual eligible patients have 0.36 more sequence stops than episodes for patients without these characteristics. Episodes for patients who die during the episode have 0.43 more facility-based sequence stops and 0.07 fewer ambulatory sequence stops. Episodes for dual eligibles have 0.08 more facility-based sequence stops and 0.28 more ambulatory-based sequence stops.

Exhibit 1.9: Average Sequence Stops for Beneficiary Demographic Characteristics for 60-day Fixed-Length Post-Acute Episode (2007-2009)

Beneficiary Demographic Characteristics	Percent of Episodes for "Yes"	Yes			No			Difference		
		Average Sequence Stops	Average Facility-based Sequence Stops	Average Ambulatory-based Sequence Stops	Average Sequence Stops	Average Facility-based Sequence Stops	Average Ambulatory-based Sequence Stops	Average Sequence Stops	Average Facility-based Sequence Stops	Average Ambulatory-based Sequence Stops
Live Alone	22.5%	4.06	2.51	1.55	3.25	1.75	1.50	0.81	0.76	0.05
Died during Episode	24.6%	3.71	2.25	1.46	3.35	1.82	1.53	0.36	0.43	-0.07
Dual Eligible	25.5%	3.70	1.98	1.72	3.34	1.90	1.44	0.36	0.08	0.28
Female	60.4%	3.48	1.98	1.50	3.37	1.84	1.53	0.11	0.14	-0.03
Non-white Race	15.6%	3.52	1.92	1.60	3.42	1.92	1.50	0.10	0.00	0.10
Resides in Rural Area	26.9%	3.41	1.85	1.56	3.45	1.95	1.50	-0.04	-0.10	0.06
Older than 84 Years	20.7%	3.54	2.19	1.35	3.41	1.85	1.56	0.13	0.34	-0.21
Episode Contains Readmission	22.4%	5.68	3.50	2.18	2.79	1.47	1.32	2.89	2.03	0.86

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.

Episode Type 1: Post-Acute Episodes

Exhibit 1.10 and 1.11 show average sequence stops by MS-DRG for episodes that contain hospital readmissions and episodes for patients who live alone, respectively. According to our regression analysis, these beneficiary demographic characteristics are associated with more complex patient pathways.

On average, episodes that contain an acute care readmission have an average Medicare episode payment that is \$18,590 higher than episodes that do not contain a readmission, and contain 2.89 more sequence stops (Exhibit 1.10). Within the top 20-MS-DRGs by total Medicare episode payments, MS-DRG 329 – major small & large bowel procedure with MCC – has the largest difference in the average number of sequence stops for episodes that contain an acute care hospital readmission compared to episodes that do not. MS-DRG 329 episodes with an acute care rehospitalization contain 3.31 more sequence stops (6.15 versus 2.84), of which 2.55 are facility-based and 0.76 are ambulatory-based. MS-DRG 481 – Hip and femur procedure except major joint with CC – shows the smallest difference in the average number of sequence stops for episodes that contain a hospital readmission compared to those that do not (5.76 versus 3.53). Episodes that contain readmission have 2.23 more sequence stops than those that do not contain a readmission, of which 2.04 are facility-based and 0.19 are ambulatory-based.

On average, episodes for beneficiaries who are living alone have an average Medicare episode payment that is \$4,343 higher than episodes for beneficiaries who live with caregiver support, and contain 0.81 more sequence stops (Exhibit 1.11). Within the top 20 MS-DRGs by total Medicare episode payments, MS-DRG 460 – Spinal fusion except cervical without MCC – has the largest difference in the average number of sequence stops for episodes for patients that live alone. Episodes within this MS-DRG for patients who live alone have 1.06 more sequence stops; these beneficiaries have 1.07 more facility-based sequence stops but 0.01 fewer ambulatory-based sequence stops than beneficiaries who do not live alone. This finding indicates the importance of caregiver support in order for patients to remain ambulatory following a spinal fusion. MS-DRG 481 – Hip & femur procedures except major joint with CC – has the smallest difference in the average number of sequence stops for episodes for patients who live alone. Patients who live alone within this MS-DRG have only 0.05 more sequence stops than those who live with caregiver support, suggesting that the rehabilitation following this procedure generally requires the same amount of facility- and ambulatory-based care, regardless of the level of support at home.

Episode Type 1: Post-Acute Episodes

Exhibit 1.10: Average Sequence Stops by Presence of Acute Care Hospital Readmission by Top 20 MS-DRGs (Ranked by Total Medicare Episode Paid) for 60-day Fixed-Length Post-Acute Episode (2007-2009)

MS-DRG	Percent of Episodes that Contain Readmission	Episode Contains Readmission					Episode Does Not Contain Readmission					Difference			
		Average Medicare Episode Paid	Percent of Total Readmission Episodes	Average Sequence Stops	Average Facility-based Sequence Stops	Average Ambulatory-based Sequence Stops	Average Medicare Episode Paid	Percent of Total No Readmission Episodes	Average Sequence Stops	Average Facility-based Sequence Stops	Average Ambulatory-based Sequence Stops	Average Medicare Episode Paid	Average Sequence Stops	Average Facility-based Sequence Stops	Average Ambulatory-based Sequence Stops
470: Major joint replacement or reattachment of lower extremity w/o MCC	9.5%	\$38,871	2.0%	6.53	4.45	2.08	\$21,319	5.4%	3.98	2.20	1.78	\$17,552	2.55	2.25	0.30
871: Septicemia or severe sepsis w/o MV 96+ hours w MCC	23.7%	\$39,662	1.9%	5.68	3.67	2.01	\$18,319	1.7%	2.50	1.46	1.04	\$21,343	3.18	2.21	0.97
291: Heart failure & shock w MCC	35.0%	\$34,198	2.3%	5.87	3.66	2.21	\$14,784	1.2%	2.75	1.49	1.26	\$19,414	3.12	2.17	0.95
003: ECMO or trach w MV 96+ hrs or PDX exc face, mouth & neck w maj O.R.	24.8%	\$206,455	0.2%	5.37	4.30	1.07	\$174,085	0.2%	2.60	1.98	0.62	\$32,370	2.77	2.32	0.45
194: Simple pneumonia & pleurisy w CC	22.6%	\$27,129	2.1%	5.53	3.46	2.07	\$10,441	2.1%	2.70	1.42	1.28	\$16,687	2.83	2.04	0.79
481: Hip & femur procedures except major joint w CC	19.1%	\$45,136	0.7%	5.76	4.52	1.24	\$29,980	0.8%	3.53	2.48	1.05	\$15,156	2.23	2.04	0.19
292: Heart failure & shock w CC	33.9%	\$28,093	2.4%	5.66	3.54	2.12	\$10,922	1.3%	2.79	1.46	1.33	\$17,171	2.87	2.08	0.79
065: Intracranial hemorrhage or cerebral infarction w CC	20.2%	\$38,814	0.9%	5.87	4.22	1.65	\$20,899	1.1%	3.32	1.99	1.33	\$17,915	2.55	2.23	0.32
392: Esophagitis, gastroent & misc digest disorders w/o MCC	21.0%	\$22,831	2.4%	5.51	3.12	2.39	\$6,611	2.6%	2.54	1.18	1.36	\$16,220	2.97	1.94	1.03
690: Kidney & urinary tract infections w/o MCC	22.5%	\$25,032	1.9%	5.60	3.57	2.03	\$9,963	1.9%	2.86	1.52	1.34	\$15,069	2.74	2.05	0.69
247: Perc cardiovasc proc w drug-eluting stent w/o MCC	16.6%	\$30,758	1.0%	4.68	2.55	2.13	\$15,306	1.5%	2.26	1.05	1.21	\$15,451	2.42	1.50	0.92

Episode Type 1: Post-Acute Episodes

Exhibit 1.10 (continued): Average Sequence Stops by Presence of Acute Care Hospital Readmission by Top 20 MS-DRGs (Ranked by Total Medicare Episode Paid) for 60-day Fixed-Length Post-Acute Episode (2007-2009)

MS-DRG	Percent of Episodes that Contain Readmission	Episode Contains Readmission					Episode Does Not Contain Readmission					Difference			
		Average Medicare Episode Paid	Percent of Total Readmission Episodes	Average Sequence Stops	Average Facility-based Sequence Stops	Average Ambulatory-based Sequence Stops	Average Medicare Episode Paid	Percent of Total No Readmission Episodes	Average Sequence Stops	Average Facility-based Sequence Stops	Average Ambulatory-based Sequence Stops	Average Medicare Episode Paid	Average Sequence Stops	Average Facility-based Sequence Stops	Average Ambulatory-based Sequence Stops
641: Nutritional & misc metabolic disorders w/o MCC	23.4%	\$24,547	1.8%	5.63	3.49	2.14	\$8,761	1.7%	2.78	1.44	1.34	\$15,786	2.85	2.05	0.80
329: Major small & large bowel procedures w MCC	24.4%	\$64,378	0.5%	6.15	4.37	1.78	\$42,454	0.4%	2.84	1.82	1.02	\$21,924	3.31	2.55	0.76
460: Spinal fusion except cervical w/o MCC	11.1%	\$51,430	0.3%	5.98	3.93	2.05	\$30,917	0.7%	3.10	1.68	1.42	\$20,513	2.88	2.25	0.63
287: Circulatory disorders except AMI, w card cath w/o MCC	21.1%	\$34,791	1.2%	5.27	3.00	2.27	\$10,486	1.3%	2.37	1.11	1.26	\$24,305	2.90	1.89	1.01
293: Heart failure & shock w/o CC/MCC	30.0%	\$25,445	1.8%	5.66	3.42	2.24	\$8,608	1.2%	2.66	1.35	1.31	\$16,838	3.00	2.07	0.93
683: Renal failure w CC	28.7%	\$30,855	1.3%	5.69	3.58	2.11	\$12,928	0.9%	2.79	1.47	1.32	\$17,927	2.90	2.11	0.79
193: Simple pneumonia & pleurisy w MCC	26.4%	\$33,474	1.1%	5.70	3.61	2.09	\$13,994	0.9%	2.70	1.48	1.22	\$19,480	3.00	2.13	0.87
312: Syncope & collapse	16.9%	\$24,439	1.2%	5.54	3.38	2.16	\$7,850	1.8%	2.62	1.33	1.29	\$16,589	2.92	2.05	0.87
280: Acute myocardial infarction, discharged alive w MCC	33.7%	\$40,975	0.9%	5.81	3.81	2.00	\$21,610	0.5%	2.91	1.64	1.27	\$19,365	2.90	2.17	0.73
Subtotal-Top 20 MS-DRGs	21.5%	\$32,836	27.7%	5.68	3.59	2.09	\$15,875	29.2%	2.95	1.59	1.36	\$16,961	2.73	2.00	0.73
Other	22.8%	\$34,344	72.3%	5.68	3.47	2.21	\$15,113	70.8%	2.72	1.42	1.30	\$19,231	2.96	2.05	0.91
Overall Average	28.9%	\$33,926	100.0%	5.68	3.50	2.18	\$15,335	100.0%	2.79	1.47	1.32	\$18,590	2.89	2.03	0.86

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 Paid includes care from all facility-based and ambulatory care settings and excludes beneficiary co-payments.

Episode Type 1: Post-Acute Episodes

Exhibit 1.11: Average Sequence Stops by Beneficiary Living Arrangement by Top 20 MS-DRGs (Ranked by Total Medicare Episode Paid) for 60-day Fixed-Length Post-Acute Episode (2007-2009)

MS-DRG	Percent of Episodes for People Who Live Alone	Lives Alone					Does Not Live Alone					Difference			
		Average Medicare Episode Paid	Percent of Total Live Alone Episodes	Average Sequence Stops	Average Facility-based Sequence Stops	Average Ambulatory-based Sequence Stops	Average Medicare Episode Paid	Percent of Total Live Alone Episodes	Average Sequence Stops	Average Facility-based Sequence Stops	Average Ambulatory-based Sequence Stops	Average Medicare Episode Paid	Average Sequence Stops	Average Facility-based Sequence Stops	Average Ambulatory-based Sequence Stops
470: Major joint replacement or reattachment of lower extremity w/o MCC	29.5%	\$26,613	6.1%	4.42	2.85	1.57	\$21,469	4.2%	4.13	2.23	1.90	\$5,144	0.29	0.62	-0.33
871: Septicemia or severe sepsis w/o MV 96+ hours w MCC	19.9%	\$26,100	1.5%	3.73	2.41	1.32	\$22,708	1.8%	3.13	1.88	1.25	\$3,392	0.60	0.53	0.07
291: Heart failure & shock w MCC	27.1%	\$23,433	1.8%	4.34	2.69	1.65	\$20,880	1.4%	3.66	2.08	1.58	\$2,552	0.68	0.61	0.07
003: ECMO or trach w MV 96+ hrs or PDX exc face, mouth & neck w maj O.R.	16.3%	\$187,450	0.1%	3.91	3.10	0.81	\$181,076	0.2%	3.16	2.45	0.71	\$6,374	0.75	0.65	0.10
194: Simple pneumonia & pleurisy w CC	22.6%	\$16,680	2.1%	3.91	2.39	1.52	\$13,488	2.1%	3.17	1.73	1.44	\$3,192	0.74	0.66	0.08
481: Hip & femur procedures except major joint w CC	41.0%	\$34,365	1.5%	3.99	3.01	0.98	\$31,829	0.6%	3.94	2.78	1.16	\$2,537	0.05	0.23	-0.18
292: Heart failure & shock w CC	30.7%	\$18,400	2.1%	4.23	2.60	1.63	\$16,012	1.4%	3.56	1.98	1.58	\$2,388	0.67	0.62	0.05
065: Intracranial hemorrhage or cerebral infarction w CC	28.5%	\$27,729	1.3%	4.10	2.85	1.25	\$23,243	1.0%	3.73	2.28	1.45	\$4,486	0.37	0.57	-0.20
392: Esophagitis, gastroent & misc digest disorders w/o MCC	20.2%	\$12,951	2.3%	3.81	2.10	1.71	\$9,273	2.6%	3.00	1.46	1.54	\$3,678	0.81	0.64	0.17
690: Kidney & urinary tract infections w/o MCC	26.0%	\$15,529	2.2%	3.91	2.41	1.50	\$12,590	1.8%	3.33	1.83	1.50	\$2,940	0.58	0.58	0.00
247: Perc cardiovasc proc w drug-eluting stent w/o MCC	9.2%	\$21,968	0.6%	3.50	1.89	1.61	\$17,465	1.6%	2.58	1.24	1.34	\$4,503	0.92	0.65	0.27

Episode Type 1: Post-Acute Episodes

Exhibit 1.11 (continued): Average Sequence Stops by Beneficiary Living Arrangement by Top 20 MS-DRGs (Ranked by Total Medicare Episode Paid) for 60-day Fixed-Length Post-Acute Episode (2007-2009)

MS-DRG	Percent of Episodes for People Who Live Alone	Lives Alone					Does Not Live Alone					Difference			
		Average Medicare Episode Paid	Percent of Total Live Alone Episodes	Average Sequence Stops	Average Facility-based Sequence Stops	Average Ambulatory-based Sequence Stops	Average Medicare Episode Paid	Percent of Total Live Alone Episodes	Average Sequence Stops	Average Facility-based Sequence Stops	Average Ambulatory-based Sequence Stops	Average Medicare Episode Paid	Average Sequence Stops	Average Facility-based Sequence Stops	Average Ambulatory-based Sequence Stops
641: Nutritional & misc metabolic disorders w/o MCC	26.7%	\$15,353	2.0%	3.98	2.42	1.56	\$11,405	1.6%	3.25	1.73	1.52	\$3,947	0.73	0.69	0.04
329: Major small & large bowel procedures w MCC	25.7%	\$50,748	0.5%	4.32	3.01	1.31	\$46,790	0.4%	3.42	2.24	1.18	\$3,958	0.90	0.77	0.13
460: Spinal fusion except cervical w/o MCC	18.2%	\$39,528	0.5%	4.29	2.81	1.48	\$31,788	0.6%	3.23	1.74	1.49	\$7,739	1.06	1.07	-0.01
287: Circulatory disorders except AMI, w card cath w/o MCC	14.3%	\$20,988	0.8%	3.88	2.16	1.72	\$14,707	1.4%	2.83	1.40	1.43	\$6,280	1.05	0.76	0.29
293: Heart failure & shock w/o CC/MCC	29.4%	\$15,349	1.7%	4.07	2.41	1.66	\$12,951	1.2%	3.35	1.79	1.56	\$2,398	0.72	0.62	0.10
683: Renal failure w CC	25.5%	\$20,898	1.1%	4.15	2.58	1.57	\$17,107	0.9%	3.44	1.90	1.54	\$3,791	0.71	0.68	0.03
193: Simple pneumonia & pleurisy w MCC	22.5%	\$21,667	0.9%	4.07	2.58	1.49	\$18,402	0.9%	3.32	1.88	1.44	\$3,265	0.75	0.70	0.05
312: Syncope & collapse	23.9%	\$13,935	1.7%	3.81	2.27	1.54	\$9,620	1.6%	2.89	1.49	1.40	\$4,315	0.92	0.78	0.14
280: Acute myocardial infarction, discharged alive w MCC	29.0%	\$29,748	0.8%	4.29	2.82	1.47	\$27,478	0.6%	3.72	2.20	1.52	\$2,270	0.57	0.62	-0.05
Subtotal-Top 20 MS-DRGs	24.7%	\$22,532	31.7%	4.08	2.56	1.52	\$7,405	28.1%	3.36	1.84	1.52	\$15,126	0.72	0.72	0.00
Other	27.7%	\$23,025	68.3%	4.05	2.49	1.56	\$22,862	71.9%	3.21	1.71	1.49	\$164	0.84	0.77	0.07
Overall Average	29.1%	\$22,869	100.0%	4.06	2.51	1.55	\$18,526	100.0%	3.25	1.75	1.50	\$4,343	0.81	0.76	0.05

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 Paid includes care from all facility-based and ambulatory care settings and excludes beneficiary co-payments.

Episode Type 1: Post-Acute Episodes

Distribution of Episodes and Average Number of Sequence Stops for Select MS-DRGs

In the remainder of the chapter we present the findings from our analysis of the post-acute care episode sequence stops for select MS-DRGs in more detail. These sections contain descriptive statistics on the distribution of sequence stops by facility- and ambulatory-based settings.

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

As presented above, MS-DRG 470 represents 4.7 percent of all post-acute episodes and has 4.22 average sequence stops including the index acute care hospitalization. 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 average sequence stops by first setting and chronic conditions. The ultimate goal of these analyses is to better understand how the patient pathways differ by patient demographic characteristic and first setting.

Exhibit 1.12 shows the number of episodes and total sequence stops by first setting for episodes with an index acute care hospitalization of MS-DRG 470. Overall, these episodes contain 2.41 facility-based sequence stops and 1.81 ambulatory-based sequence stops. By first setting, facility-based sequence stops range from 1.10 for OP Therapy first setting episodes to 3.50 for LTCH first setting episodes (excluding No Care episodes, which, by definition only have 1.0 stop per episode).

HHA first setting episodes, which represent 32.4 percent of all MS-DRG 470 episodes, have an average of 4.05 sequence stops per episode, which is the lowest average number of total and facility-based sequence stops compared to the other facility-based first settings (SNF, IRF, LTCH). HHA first setting episodes also have the highest average number of ambulatory-based sequence stops compared to the other facility-based settings. This suggests that physicians and other ambulatory-based providers (including outpatient hospitals and outpatient therapy) may have a larger role in providing care during HHA first setting episodes than during other first setting episodes.

OP Therapy and ER first setting episodes have the highest average number of ambulatory-based sequence stops (3.52 and 3.36, respectively), with minimal facility-based care beyond the index-acute care hospitalization.

Episode Type 1: Post-Acute Episodes

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

First Setting	Number of Episodes	Percent of Episodes	Total Medicare Episode Paid (in millions)	Average Medicare Episode Paid	Average Sequence Stops	Average Facility-based Sequence Stops	Average Ambulatory-based Sequence Stops
HHA	366,140	32.4%	\$6,615	\$18,068	4.05	2.22	1.83
SNF	430,240	38.0%	\$11,557	\$26,861	4.47	2.89	1.58
IRF	128,680	11.4%	\$4,316	\$33,538	4.83	3.05	1.78
LTCH	1,080	0.1%	\$63	\$57,896	4.44	3.50	0.94
STACH	2,580	0.2%	\$78	\$30,302	5.11	2.89	2.22
Community	134,240	11.9%	\$2,328	\$17,340	3.22	1.40	1.82
ER	6,460	0.6%	\$115	\$17,766	4.94	1.58	3.36
OP Therapy	53,980	4.8%	\$815	\$15,103	4.62	1.10	3.52
Hospice	1,200	0.1%	\$31	\$25,569	4.07	1.45	2.62
Other IP	460	0.0%	\$14	\$30,574	4.74	1.83	2.91
No Care ^a	5,980	0.5%	\$68	\$11,290	1.00	1.00	0.00
Overall Average	1,131,040	100.0%	\$25,999	\$22,986	4.22	2.41	1.81

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 Paid includes care from all facility-based and ambulatory care settings and excludes beneficiary co-payments.

^a Episodes include deaths during index admission.

To better understand the role clinical characteristics play in the average number of sequence stops by first setting, we investigate the distribution of sequence stops by chronic condition and patient demographic characteristics.

Exhibit 1.13 and Exhibit 1.14 show the percent of episodes, average Medicare episode paid, and average number of sequence stops by the number of chronic conditions per episode for MS-DRG 470. On average, there are 4.2 chronic conditions represented per episode (data not shown). The average number of sequence stops per episode increases as the number of chronic conditions per episode increases. Episodes with no chronic conditions have an average number of sequence stop of 3.70, of which 1.92 are facility-based and 1.78 are ambulatory-based. Episodes with 13 chronic conditions have an average of 5.26 sequence stops, of which 3.77 are facility-based and 1.49 are ambulatory-based.

Episode Type 1: Post-Acute Episodes

While the average number of facility-based sequence stops increases with the number of chronic conditions, the average number of ambulatory sequence stops **decreases** slightly as the number of chronic conditions increases. The average number of ambulatory-based sequence stops ranges from 1.40 for episodes with 10 chronic conditions to 1.87 for episodes with three chronic conditions.

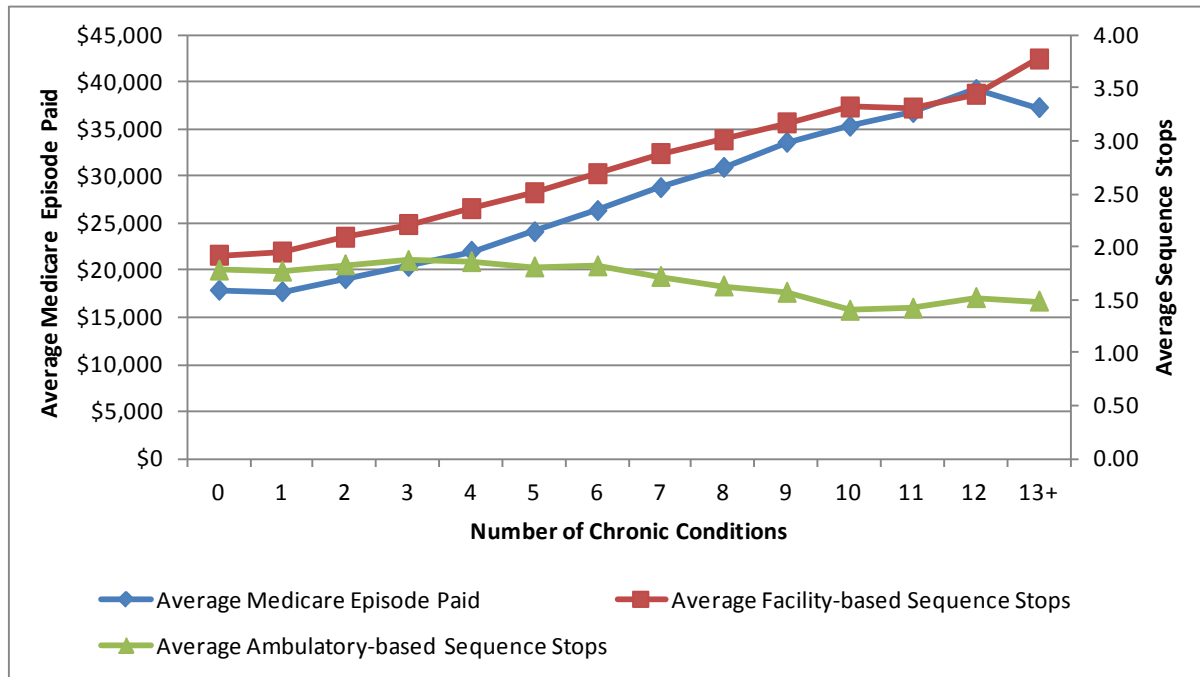
Exhibit 1.13: Average Medicare Episode Paid and Average Sequence Stops by Number of Chronic Conditions for MS-DRG 470 for 60-day Fixed-Length Post-Acute Episode (2007-2009)

Number of Chronic Conditions	Percent of Episodes	Average Medicare Episode Paid	Average Sequence Stops	Average Facility-based Sequence Stops	Average Ambulatory-based Sequence Stops
0	1.0%	\$17,880	3.70	1.92	1.78
1	6.1%	\$17,724	3.72	1.95	1.77
2	15.0%	\$19,109	3.92	2.09	1.83
3	20.1%	\$20,411	4.08	2.21	1.87
4	18.9%	\$22,022	4.22	2.36	1.86
5	14.1%	\$24,092	4.32	2.51	1.81
6	10.4%	\$26,344	4.51	2.69	1.82
7	6.5%	\$28,780	4.60	2.88	1.72
8	4.0%	\$30,934	4.64	3.01	1.63
9	2.2%	\$33,598	4.74	3.17	1.57
10	1.1%	\$35,307	4.72	3.32	1.40
11	0.4%	\$36,765	4.73	3.31	1.42
12	0.1%	\$39,207	4.96	3.44	1.52
13+	0.1%	\$37,286	5.26	3.77	1.49
Overall Average	100.0%	\$22,986	4.22	2.41	1.81

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 Paid includes care from all facility-based and ambulatory care settings and excludes beneficiary co-payments.

Episode Type 1: Post-Acute Episodes

Exhibit 1.14: Average Medicare Episode Paid and Average Facility-based and Ambulatory-based Sequence Stops by Number of Chronic Conditions for MS-DRG 470 for 60-day Fixed-Length Post-Acute Episode (2007-2009)



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

Patient demographic characteristics can be a determinant of the average number of sequence stops in a patient’s fixed-length episode. Exhibit 1.15 shows the distribution of episodes with an index acute care hospitalization of MS-DRG 470 by select patient demographic characteristics. Consistent with the trend across all MS-DRGs, MS-DRG 470 episodes that contain an acute care rehospitalization have significantly more sequence stops during the episode compared to episodes that do not contain a readmission (total sequence stops of 6.53 compared to 3.98). Episodes that include a hospital readmission contain, on average, 2.55 more stops, of which 2.25 are facility-based and 0.30 are ambulatory-based.

Whether a patient lives alone or not is also correlated with the number of sequence stops contained in an episode. In MS-DRG 470, episodes for patients who live alone have 0.29 more sequence stops than for those who live with a spouse or caregiver (total sequence stops of 4.42 compared to 4.13). Episodes for patients who live alone have 0.62 more facility-based sequence stops than episodes for those who do not live alone, and 0.33 fewer ambulatory-based sequence stops. The reduction in ambulatory-based sequence stops may be due to the physician services that are received in the facility-based care settings.

Episode Type 1: Post-Acute Episodes

Episodes for patients who die during the episode have 0.19 higher average sequence stops than those who did not die. Those who did die during the episode had 0.63 more facility-based sequence stops but 0.44 fewer ambulatory-based sequence stops than those who did not die.

Episodes for dual eligibles have 0.17 higher average sequence stops than episodes for non-dual eligibles. Dual eligibles have 0.29 more facility-based sequence stops and 0.12 fewer ambulatory-based sequence stops.

Exhibit 1.15: Average Sequence Stops by Beneficiary Demographic Characteristics for MS-DRG 470 for 60-Day Fixed-Length Post-Acute Episode (2007-2009)

Beneficiary Demographic Characteristics	Percent of Episodes for "Yes"	Yes			No			Difference		
		Average Sequence Stops	Average Facility-based Sequence Stops	Average Ambulatory-based Sequence Stops	Average Sequence Stops	Average Facility-based Sequence Stops	Average Ambulatory-based Sequence Stops	Average Sequence Stops	Average Facility-based Sequence Stops	Average Ambulatory-based Sequence Stops
Live Alone	29.5%	4.42	2.85	1.57	4.13	2.23	1.90	0.29	0.62	-0.33
Died during Episode	5.3%	4.40	3.01	1.39	4.21	2.38	1.83	0.19	0.63	-0.44
Dual Eligible	11.7%	4.37	2.67	1.70	4.20	2.38	1.82	0.17	0.29	-0.12
Female	70.2%	4.26	2.49	1.77	4.13	2.23	1.90	0.13	2.26	-0.13
Non-white Race	8.5%	4.27	2.51	1.76	4.22	2.40	1.82	0.05	0.11	-0.06
Resides in Rural Area	28.4%	4.21	2.28	1.93	4.22	2.47	1.75	-0.01	-0.19	0.18
Older than 84 Years	11.1%	4.26	2.90	1.36	4.21	2.35	1.86	0.05	0.55	-0.50
Episode Contains Readmission	9.5%	6.53	4.45	2.08	3.98	2.20	1.78	2.55	2.25	0.30

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.

Episode Type 1: Post-Acute Episodes

Exhibit 1.16 shows the average number of sequence stops by first setting for episodes that contain, and do not contain, an acute care rehospitalization. The largest difference in the average number of sequence stops by setting is for Community first setting episodes. Community first setting episodes that include an acute care rehospitalization have 3.33 more average sequence stops than episodes that do not (6.30 stops compared to 2.98). The majority of these additional stops (2.06) are facility-based while 1.27 stops are ambulatory-based. Community first setting episodes with a readmission have average sequence stops that are similar to SNF first setting episodes that contain a readmission. However, almost one-half of the care in Community first setting episodes with readmissions is ambulatory-based, compared to less than one-third of the care being ambulatory in the SNF first setting episodes. Across HHA first setting episodes, episodes with a readmission contain 3.04 more sequence stops than HHA first setting episodes that do not contain a hospital readmission (6.91 versus 3.86). About 2.30 of these additional stops are facility-based and 0.74 are ambulatory-based.

Exhibit 1.16: Average Sequence Stops by Presence of Acute Care Hospital Readmission for MS-DRG 470 by First Setting for 60-day Fixed-Length Post-Acute Episode (2007-2009)

First Setting	Percent of Episodes with Readmission	Episode Contains Readmission				Episode Does Not Contain Readmission				Difference		
		Percent of Episodes	Average Sequence Stops	Average Facility-based Sequence Stops	Average Ambulatory-based Sequence Stops	Percent of Episodes	Average Sequence Stops	Average Facility-based Sequence Stops	Average Ambulatory-based Sequence Stops	Average Sequence Stops	Average Facility-based Sequence Stops	Average Ambulatory-based Sequence Stops
HHA	6.2%	21.0%	6.91	4.38	2.53	33.6%	3.86	2.08	1.78	3.04	2.30	0.74
SNF	12.2%	48.7%	6.35	4.70	1.65	36.9%	4.21	2.64	1.57	2.13	2.06	0.08
IRF	12.4%	14.9%	6.93	5.11	1.82	11.0%	4.54	2.76	1.77	2.40	2.35	0.04
LTCH	27.8%	0.3%	5.80	4.73	1.07	0.1%	3.92	3.03	0.90	1.88	1.71	0.17
STACH	100.0%	2.4%	5.11	2.89	2.22	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Community	7.3%	9.1%	6.30	3.31	2.99	12.2%	2.98	1.25	1.72	3.33	2.06	1.27
ER	10.5%	0.6%	7.38	3.03	4.35	0.6%	4.65	1.41	3.25	2.73	1.62	1.11
OP Therapy	5.6%	2.8%	6.53	2.40	4.14	5.0%	4.51	1.02	3.49	2.02	1.38	0.65
Hospice	*	*	*	*	*	0.1%	3.67	1.13	2.54	*	*	*
Other IP	*	*	*	*	*	0.0%	4.47	1.53	2.95	*	*	*
No Care ^a	N/A	N/A	N/A	N/A	N/A	0.6%	1.00	1.00	0.00	N/A	N/A	N/A
Overall Average	9.5%	100.0%	6.53	4.45	2.08	100.0%	3.98	2.20	1.78	2.55	2.25	0.30

Source: Dobson | DaVanzo analysis of research-identifiable 5% SAF for all sites of service, 2007-2009, wage index adjusted by setting and geographic region. All episodes have been extrapolated to reflect the universe of Medicare beneficiaries. ^a Episodes include deaths during index admissions. * Indicates cell size with less than 11 observations.

Episode Type 1: Post-Acute Episodes

Exhibit 1.17 shows the average sequence stops by first setting for episodes based on whether or not the beneficiary lives alone. Overall, episodes for beneficiaries that live alone have a higher average sequence stops by 0.29. Due to the caregiver support often needed for proper rehabilitation, episodes for patients who live alone have 0.62 more facility-based stops and 0.33 fewer ambulatory stops. Community first setting episodes have the largest difference in average number of sequence stops with episodes for beneficiaries that live alone having 1.86 more sequence stops than episodes for beneficiaries who live with caregiver support. On average, these episodes have 1.28 more facility-based sequence stops, which indicates that a portion of patients rely on other facility-based care settings following the rehospitalization. LTCH first setting episodes for beneficiaries who live alone have a lower average number of sequence stops than those who live with caregiver support (3.87 compared to 4.67). Additionally, HHA, SNF, and IRF first setting episodes do not appear to have a substantially different total average number of sequence stops for beneficiaries who live alone, but episodes for beneficiaries who live alone in these settings have a higher reliance on facility-based care settings and lower reliance on ambulatory care.

Exhibit 1.17: Average Sequence Stops by Beneficiary Living Arrangement for MS-DRG 470 by First Setting for 60-day Fixed-Length Post-Acute Episode (2007-2009)

First Setting	Percent of Episodes that Live Alone	Beneficiary Lives Alone				Beneficiary Does Not Live Alone				Difference		
		Percent of Episodes	Average Sequence Stops	Average Facility-based Sequence Stops	Average Ambulatory-based Sequence Stops	Percent of Episodes	Average Sequence Stops	Average Facility-based Sequence Stops	Average Ambulatory-based Sequence Stops	Average Sequence Stops	Average Facility-based Sequence Stops	Average Ambulatory-based Sequence Stops
HHA	20.6%	22.6%	3.99	2.26	1.74	36.4%	4.07	2.21	1.86	-0.07	0.05	-0.12
SNF	44.0%	56.7%	4.45	3.01	1.43	30.2%	4.49	2.80	1.69	-0.04	0.22	-0.26
IRF	40.2%	15.5%	4.84	3.23	1.61	9.6%	4.83	2.93	1.89	0.01	0.30	-0.28
LTCH	27.8%	0.1%	3.87	3.33	0.53	0.1%	4.67	3.56	1.10	-0.80	-0.23	-0.57
STACH	20.2%	0.2%	5.69	3.46	2.23	0.3%	4.96	2.75	2.21	0.73	0.71	0.02
Community	9.4%	3.8%	4.90	2.56	2.34	15.3%	3.04	1.28	1.76	1.86	1.28	0.58
ER	10.2%	0.2%	5.30	2.33	2.97	0.7%	4.90	1.49	3.41	0.41	0.84	-0.44
OP Therapy	3.8%	0.6%	4.90	1.59	3.31	6.5%	4.61	1.08	3.53	0.29	0.51	-0.22
Hospice	*	*	*	*	*	0.1%	4.04	1.40	2.64	*	*	*
Other IP	*	*	*	*	*	0.0%	4.73	1.60	3.13	*	*	*
No Care ^a	8.0%	0.1%	1.00	1.00	0.00	0.7%	1.00	1.00	0.00	0.00	0.00	0.00
Overall Average	29.5%	100.0%	4.42	2.85	1.58	100.0%	4.13	2.23	1.91	0.29	0.62	-0.33

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

^a Episodes include deaths during index admissions. * Indicates cell size with less than 11 observations.

Episode Type 1: Post-Acute Episodes

MS-DRG 291 – Heart Failure and Shock with MCC

MS-DRG 291 is the top medical MS-DRG by Medicare episode paid overall and represents 1.5 percent of all episodes. MS-DRG 291 has 3.84 average sequence stops (including the index acute care hospitalization). In this section, we further analyze these post-acute episodes to better understand the distribution of average sequence stops by first setting and chronic condition for MS-DRG 291. The ultimate goal of these analyses is to better understand how patient pathways differ by patient demographic characteristics and first setting.

Exhibit 1.18 shows the number of episodes and total sequence stops by first setting for episodes with an index acute care hospitalization of MS-DRG 291. OP Therapy first setting episodes have the highest overall average number of sequence stops (5.51) while Hospice first setting episodes have the lowest average number of sequence stops (3.00). Across first settings, the average episode contains 2.25 facility-based sequence stops and 1.60 ambulatory-based sequence stops. By first setting, facility-based sequence stops range from 1.09 for Hospice first setting episodes to 3.84 for IRF first setting episodes (excluding No Care episodes, which, by definition only have 1.0 stop per episode). We hypothesize that the low number of facility-based sequence stops for Hospice is because facility-based care is generally not appropriate for those patients who are at the end of their lives.

HHA first setting episodes, which represent 15.2 percent of all MS-DRG 291 episodes, have the same number of average facility-based sequence stops as SNF first setting episodes (3.17), but HHA first setting episodes have a higher number of ambulatory facility-based sequence stops such as physician visits (1.58 compared to 1.09). This again suggests that physicians may have a larger role in the HHA first setting care than other facility-based first settings.

Episode Type 1: Post-Acute Episodes

Exhibit 1.18: Distribution of Episodes and Average Sequence Stops by First Setting for MS-DRG 291 for 60-Day Fixed-Length Post-Acute Episode (2007-2009)

First Setting	Number of Episodes	Percent of Episodes	Total Medicare Episode Paid (in millions)	Average Medicare Episode Paid	Average Sequence Stops	Average Facility-based Sequence Stops	Average Ambulatory-based Sequence Stops
HHA	54,640	15.2%	\$1,104	\$20,211	4.75	3.17	1.58
SNF	64,200	17.8%	\$1,833	\$28,551	4.26	3.17	1.09
IRF	3,460	1.0%	\$157	\$45,426	5.12	3.84	1.28
LTCH	2,480	0.7%	\$154	\$62,123	4.07	3.15	0.93
STACH	12,840	3.6%	\$450	\$35,030	4.79	3.27	1.53
Community	172,700	48.0%	\$3,303	\$19,127	3.66	1.77	1.89
ER	8,200	2.3%	\$181	\$22,124	5.15	2.09	3.06
OP Therapy	3,780	1.1%	\$76	\$20,004	5.51	1.79	3.72
Hospice	13,780	3.8%	\$212	\$15,412	3.00	1.09	1.91
Other IP	240	0.1%	\$10	\$41,459	4.75	2.33	2.42
No Care ^a	23,660	6.6%	\$284	\$12,024	1.00	1.00	0.00
Overall Average	359,980	100.0%	\$7,765	\$21,572	3.84	2.25	1.60

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 Paid includes care from all facility-based and ambulatory care settings and excludes beneficiary co-payments.

^a Episodes include deaths during index admission.

To better understand the role clinical characteristics play in the average number of sequence stops by first setting, we investigate the distribution of sequence stops by chronic condition and patient demographic characteristics.

Exhibit 1.19 and Exhibit 1.20 show the percent of episodes, average Medicare episode paid, and average number of sequence stops by the number of chronic conditions per episode for MS-DRG 291. On average, there are 6.61 chronic conditions represented per episode (data not shown). The average number of sequence stops per episode increases as the number of chronic conditions per episode increases, with the exception of episodes that do not include any chronic conditions. Episodes with no chronic conditions have 4.77 sequence stops on average, of which 2.52 are facility-based and 2.25 are ambulatory-based. The spike in the average number of sequence stops for episodes with no chronic conditions is likely capturing care for patients who have not received the requisite care to trigger the chronic condition flag. That is, the chronic condition designations are based on CMS' historical utilization algorithms. Patients who do not receive care for their chronic conditions are not identified in the claims as having a chronic condition, despite having a clinical diagnosis.

Episodes with one chronic condition have a total of 2.00 sequence stops with an average of 1.22 facility-based sequence stops and 0.78 ambulatory-based sequence stops. Episodes with 15 or more chronic conditions have an average of 4.95 sequence stops, of

Episode Type 1: Post-Acute Episodes

which 2.97 are facility-based and 1.98 are ambulatory-based. The average number of both facility-based sequence stops and ambulatory-based sequence stops increases with the number of chronic conditions for episodes with MS-DRG 291.

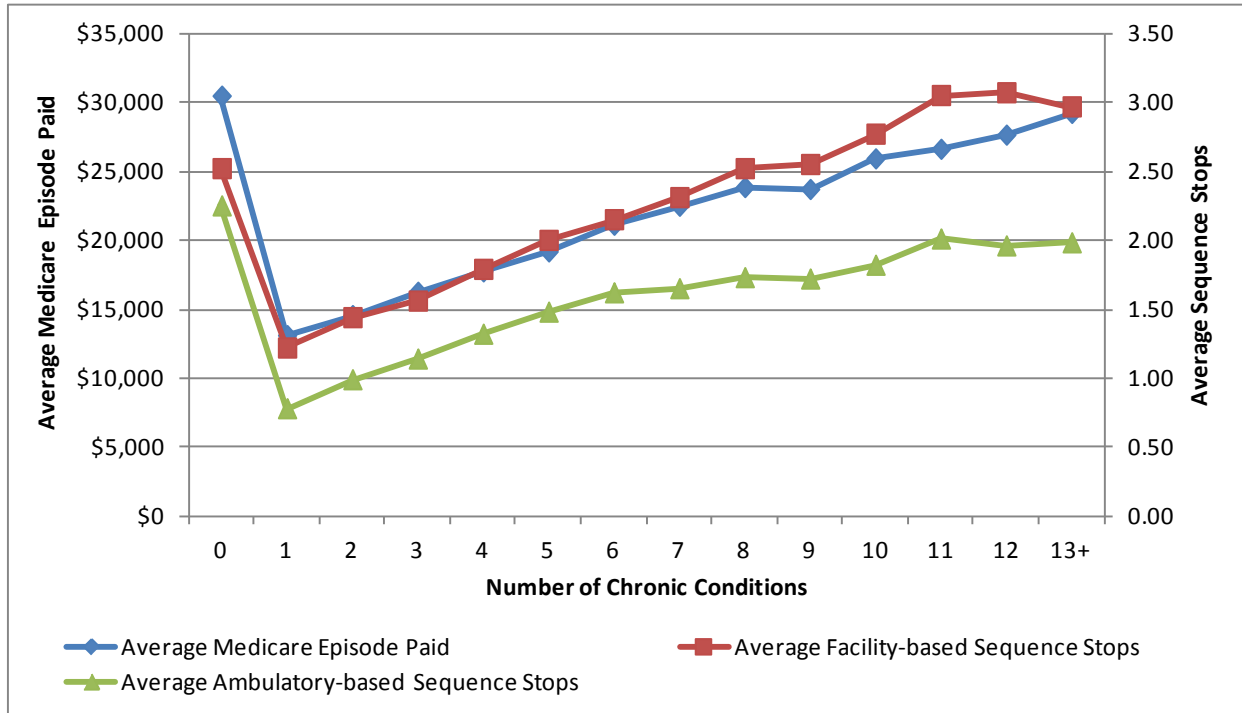
Exhibit 1.19: Average Medicare Episode Paid and Average Sequence Stops by Number of Chronic Conditions for MS-DRG 291 for 60-day Fixed-Length Post-Acute Episode (2007-2009)

Number of Chronic Conditions	Percent of Episodes	Average Medicare Episode Paid	Average Sequence Stops	Average Facility-based Sequence Stops	Average Ambulatory-based Sequence Stops
0	0.3%	\$30,454	4.77	2.52	2.25
1	0.1%	\$13,097	2.00	1.22	0.78
2	1.2%	\$14,549	2.43	1.44	0.99
3	3.7%	\$16,241	2.70	1.56	1.14
4	9.4%	\$17,719	3.11	1.79	1.32
5	15.9%	\$19,164	3.48	2.00	1.48
6	18.9%	\$21,097	3.77	2.15	1.62
7	18.4%	\$22,473	3.96	2.31	1.65
8	14.2%	\$23,829	4.25	2.52	1.73
9	9.3%	\$23,688	4.27	2.55	1.72
10	5.1%	\$25,908	4.59	2.77	1.82
11	2.3%	\$26,601	5.06	3.05	2.01
12	0.8%	\$27,628	5.03	3.07	1.96
13+	0.3%	\$29,204	4.95	2.97	1.98
Overall Average	100.0%	\$21,572	3.84	2.24	1.60

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 Paid includes care from all facility-based and ambulatory care settings and excludes beneficiary co-payments.

Episode Type 1: Post-Acute Episodes

Exhibit 1.20: Average Medicare Episode Paid and Average Facility-based and Ambulatory-based Sequence Stops by Number of Chronic Conditions for MS-DRG 291 for 60-day Fixed-Length Post-Acute Episode (2007-2009)



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

Patient demographic characteristics can be a determinant of the average number of sequence stops in a patient’s fixed-length episode. Exhibit 1.21 shows the distribution of episodes with an index acute care hospitalization of MS-DRG 291 by select patient demographic characteristics. Consistent with the trend across all MS-DRGs, MS-DRG 291 episodes that contain an acute care rehospitalization have significantly more sequence stops during the episode compared to episodes that do not contain a readmission (total sequence stops of 5.87 compared to 2.75). Episodes that contain a hospital readmission have, on average, 3.12 more stops, of which 2.17 are facility-based and 0.95 are ambulatory-based.

Whether a beneficiary lives alone or lives with others has an impact on the number of sequence stops contained in an episode. In MS-DRG 291, episodes for beneficiaries who live alone have 0.68 more sequence stops than those who live with a spouse or caregiver (total sequence stops of 4.34 compared to 3.66). Episodes for patients who live alone have 0.61 more facility-based sequence stops than episodes for those who do not live alone, and 0.07 more ambulatory-based sequence stops.

Episode Type 1: Post-Acute Episodes

Episodes for patients who are dual eligible have 0.42 higher average sequence stops than those who are not. Those who are dual eligible have 0.12 more facility-based sequence stops and 0.30 more ambulatory-based sequence stops than those who are not dual eligible.

Exhibit 1.21: Average Sequence Stops by Beneficiary Demographic Characteristics for MS-DRG 291 for 60-Day Fixed-Length Post-Acute Episode (2007-2009)

Beneficiary Demographic Characteristics	Percent of Episodes for "Yes"	Yes			No			Difference		
		Average Sequence Stops	Average Facility-based Sequence Stops	Average Ambulatory-based Sequence Stops	Average Sequence Stops	Average Facility-based Sequence Stops	Average Ambulatory-based Sequence Stops	Average Sequence Stops	Average Facility-based Sequence Stops	Average Ambulatory-based Sequence Stops
Live Alone	27.1%	4.34	2.69	1.65	3.66	2.08	1.58	0.68	0.61	0.07
Died during Episode	46.9%	3.93	2.39	1.54	3.77	2.12	1.65	0.16	0.27	-0.11
Dual Eligible	28.7%	4.14	2.33	1.81	3.72	2.21	1.51	0.42	0.12	0.30
Female	57.0%	3.87	2.31	1.56	3.81	2.16	1.65	0.06	0.15	-0.09
Non-white Race	22.6%	3.99	2.20	1.79	3.80	2.26	1.54	0.19	-0.06	0.25
Resides in Rural Area	23.5%	3.77	2.15	1.62	3.86	2.27	1.59	-0.09	-0.12	0.03
Older than 84 Years	30.9%	3.74	2.34	1.40	3.89	2.20	1.69	-0.15	0.14	-0.29
Episode Contains Readmission	35.0%	5.87	3.66	2.21	2.75	1.49	1.26	3.12	2.17	0.95

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.

Episode Type 1: Post-Acute Episodes

Exhibit 1.22 shows the average number of sequence stops by first setting for episodes that contain, and do not contain, an acute care rehospitalization. The largest difference in the average number of sequence stops by setting is for HHA first setting episodes. HHA first setting episodes that include an acute care rehospitalization have 3.39 more average sequence stops than episodes that do not (6.88 stops compared to 3.49). The majority of these additional sequence stops are facility-based (2.69) with 0.71 additional ambulatory-based sequence stops. ER first setting episodes have the highest overall sequence stops, and have the second largest difference in sequence stops for episodes that contain readmissions and those that do not (7.02 compared to 3.65). More than half of the care in ER first setting episodes with readmissions is ambulatory-based.

Exhibit 1.22: Average Sequence Stops by Presence of Acute Care Hospital Readmission for MS-DRG 291 by First Setting for 60-day Fixed-Length Post-Acute Episode (2007-2009)

First Setting	Percent of Episodes with Readmission	Episode Contains Readmission				Episode Does Not Contain Readmission				Difference		
		Percent of Episodes	Average Sequence Stops	Average Facility-based Sequence Stops	Average Ambulatory-based Sequence Stops	Percent of Episodes	Average Sequence Stops	Average Facility-based Sequence Stops	Average Ambulatory-based Sequence Stops	Average Sequence Stops	Average Facility-based Sequence Stops	Average Ambulatory-based Sequence Stops
HHA	37.2%	16.1%	6.88	4.86	2.03	14.7%	3.49	2.17	1.32	3.39	2.69	0.71
SNF	37.7%	19.2%	5.77	4.51	1.26	17.1%	3.35	2.36	0.99	2.42	2.16	0.27
IRF	45.7%	1.3%	6.37	5.00	1.37	0.8%	4.07	2.87	1.20	2.29	2.13	0.17
LTCH	29.8%	0.6%	5.62	4.43	1.19	0.7%	3.41	2.60	0.82	2.21	1.83	0.37
STACH	100.0%	10.2%	4.79	3.27	1.53	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Community	34.8%	47.7%	5.70	3.01	2.69	48.1%	2.57	1.11	1.46	3.13	1.91	1.23
ER	44.6%	2.9%	7.02	3.21	3.81	1.9%	3.65	1.19	2.46	3.37	2.02	1.36
OP Therapy	43.4%	1.3%	6.71	2.78	3.93	0.9%	4.59	1.04	3.55	2.12	1.74	0.38
Hospice	*	*	*	*	*	*	*	*	*	*	*	*
Other IP	*	*	*	*	*	*	*	*	*	*	*	*
No Care ^a	N/A	N/A	N/A	N/A	N/A	10.1%	1.00	1.00	0.00	N/A	N/A	N/A
Overall Average	35.0%	100.0%	5.87	3.66	2.22	100.0%	2.75	1.49	1.27	3.12	2.17	0.95

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

^a Episodes include deaths during index admissions.

* Indicates cell size with less than 11 observations.

Episode Type 1: Post-Acute Episodes

Exhibit 1.23 shows the average sequence stops by first setting for episodes based on whether the beneficiary lives alone. Overall, episodes for beneficiaries who live alone have higher average sequence stops by 0.68, with 0.62 additional facility-based sequence stops and 0.06 additional ambulatory-based sequence stops. ER first setting episodes have the largest difference in average number of sequence stops with episodes for beneficiaries who live alone having 0.92 more sequence stops than episodes for beneficiaries that live with caregiver support. On average, these episodes have 0.61 more facility-based sequence stops and 0.32 more ambulatory-based sequence stops.

IRF first setting episodes for beneficiaries who live alone have a lower average number of sequence stops than those who live with caregiver support (5.06 compared to 5.15). Additionally, HHA first setting episodes do not appear to have a substantially different total average number of sequence stops for beneficiaries who live alone, with little difference in the distribution of facility-based and ambulatory-based sequence stops.

Exhibit 1.23: Average Sequence Stops by Beneficiary Living Arrangement for MS-DRG 291 by First Setting for 60-day Fixed-Length Post-Acute Episode (2007-2009)

First Setting	Percent of Episodes that Live Alone	Beneficiary Lives Alone				Beneficiary Does Not Live Alone				Difference		
		Percent of Episodes	Average Sequence Stops	Average Facility-based Sequence Stops	Average Ambulatory-based Sequence Stops	Percent of Episodes	Average Sequence Stops	Average Facility-based Sequence Stops	Average Ambulatory-based Sequence Stops	Average Sequence Stops	Average Facility-based Sequence Stops	Average Ambulatory-based Sequence Stops
HHA	40.0%	22.4%	4.79	3.21	1.58	12.5%	4.73	3.14	1.59	0.06	0.07	-0.01
SNF	40.8%	26.9%	4.38	3.26	1.12	14.5%	4.18	3.11	1.07	0.20	0.15	0.05
IRF	30.1%	1.1%	5.06	3.81	1.25	0.9%	5.15	3.86	1.29	-0.09	-0.05	-0.04
LTCH	21.0%	0.5%	4.23	3.39	0.85	0.7%	4.03	3.08	0.95	0.20	0.30	-0.10
STACH	23.1%	3.0%	5.22	3.68	1.54	3.8%	4.67	3.14	1.52	0.55	0.53	0.02
Community	20.5%	36.4%	4.23	2.15	2.07	52.3%	3.51	1.67	1.84	0.72	0.49	0.23
ER	26.3%	2.2%	5.83	2.54	3.30	2.3%	4.91	1.93	2.98	0.92	0.61	0.32
OP Therapy	*	*	*	*	*	*	*	*	*	*	*	*
Hospice	17.9%	2.5%	3.02	1.07	1.95	4.3%	3.00	1.09	1.91	0.03	-0.02	0.04
Other IP	*	*	*	*	*	*	*	*	*	*	*	*
No Care ^a	15.4%	3.7%	1.00	1.00	0.00	7.6%	1.00	1.00	0.00	0.00	0.00	0.00
Overall Average	27.1%	100.0%	4.34	2.69	1.64	100.0%	3.66	2.08	1.58	0.68	0.62	0.06

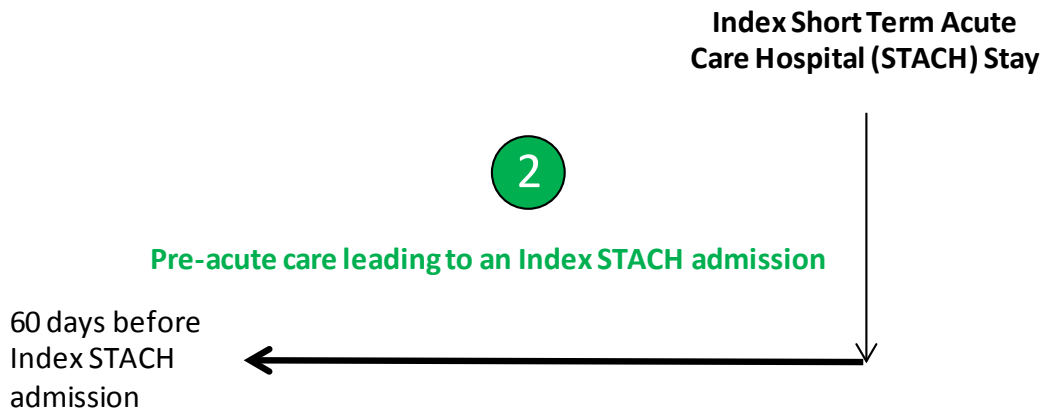
Source: Dobson | DaVanzo analysis of research-identifiable 5% SAF for all sites of service, 2007-2009, wage index adjusted by setting and geographic region. All episodes have been extrapolated to reflect the universe of Medicare beneficiaries. ^a Episodes include deaths during index admissions. * Indicates cell size with less than 11 observations.

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

Brief Review of Episode Definition¹³

Initiated by an index acute care hospital stay, the Type 2 episode captures all pre-acute care (facility-based, and ambulatory care) that patients receive *preceding* the index acute care hospitalization. This episode type was constructed to include all care within the 60 days prior to the index acute care hospital admission (Exhibit 2.1). This episode type will be used to understand the type of care beneficiaries received prior to 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

¹³ For a complete review of the episode definition, see *Working Paper #1: Creating and Benchmarking Episodes: Baseline Statistics of Episode Frequency and Patient Diagnoses*.

Episode Type 2: Pre-Acute Episodes

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 were ranked with a higher severity index score than single conditions (CHF*COPD). The other two interacted conditions include diabetes and CHF (DIABETES*CHF), and CHF and renal failure (CHF*RENAL).

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

The patient pathways presented for the pre-acute care episodes include both the index acute care hospitalization and all prior care settings. That is, every episode contains at least one sequence stop to represent the index acute care hospitalization. In the analysis below, we present the average total number of sequence stops in the episode, and separately present the average number of facility-based and ambulatory-based sequence stops. Additionally, in order to control the length of the pathways, consecutive physician or outpatient procedures without the presence of other care settings in-between are represented as one stop. For example, a pathway that includes a series of physician visits and then admission to the SNF represents two sequence stops, regardless of the number of physician visits that occurred while the patient was in the community.

In order to better determine which variables are significant predictors of the complexity of patient pathways, we conducted a multivariate regression analysis. The regression equation attempts to explain the number of sequence stops within a pathway through a series of independent variables, such as patient clinical and demographic characteristics. In this report, we limit our descriptive statistics to the independent variables that have the most significant result on patient pathways ($p < 0.05$).

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.

Episode Type 2: Pre-Acute Episodes

Across all three years (2007-2009), there are 25,664,640 Type 2 episodes that represent \$344.2 billion in Medicare payments.^{14,15} In 2008, the pre-acute care episodes represent about 37 percent of total Medicare fee-for-service spending.¹⁶

Descriptive Statistics across All Pre-Acute Care Episodes

Descriptive Statistics by Primary Chronic Condition

Exhibit 2.2 shows the average number of sequence stops 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 Medicare payments.

As the community-risk decreases, so does the average total number of sequence stops and the number of ambulatory-based sequence stops. CHF* COPD episodes contain the greatest number of overall sequence stops (3.16), and facility-based sequence stops (1.31). Facility-based sequence stops remain relatively stable between 1.04 for glaucoma and 1.31 for CHF* COPD episodes. Depression has the highest number of ambulatory-based sequence stops (1.86).

¹⁴ 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”.

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. Episodes have been extrapolated to reflect the universe of Medicare beneficiaries.

¹⁶ 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

Exhibit 2.2: Total Medicare Episode Paid, Number of Episodes, and Average Sequence Stops by Primary Chronic Conditions^a for 60-day Fixed-Length Pre-Acute Episode (2007-2009)

Primary Chronic Conditions	Number of Episodes	Percent of Episodes	Total Medicare Episode Paid (in millions)	Average Medicare Episode Paid	Average Sequence Stops	Average Facility-based Sequence Stops	Average Ambulatory-based Sequence Stops
CHF* COPD	6,383,860	24.9%	\$93,949	\$14,717	3.16	1.31	1.85
DIABETES* CHF	3,423,060	13.3%	\$52,601	\$15,367	3.00	1.24	1.76
CHF* RENAL	1,436,720	5.6%	\$21,638	\$15,060	2.93	1.22	1.71
Lung Cancer	516,480	2.0%	\$8,599	\$16,649	2.86	1.21	1.65
Osteoporosis	3,858,860	15.0%	\$44,045	\$11,414	2.71	1.13	1.58
COPD	1,974,880	7.7%	\$24,335	\$12,322	2.83	1.16	1.67
Rheumatoid Arthritis/Osteoarthritis	2,820,200	11.0%	\$34,294	\$12,160	2.65	1.11	1.54
Hip/Pelvic Fracture	149,120	0.6%	\$2,011	\$13,488	2.66	1.12	1.54
Heart Failure	669,660	2.6%	\$8,893	\$13,279	2.68	1.13	1.55
Alzheimer's Disease	340,860	1.3%	\$3,297	\$9,672	2.75	1.12	1.63
Alzheimer's Disease and Related Disorders	361,020	1.4%	\$4,070	\$11,274	2.79	1.14	1.65
Stroke/Transient Ischemic Attack	443,100	1.7%	\$5,503	\$12,419	2.68	1.12	1.56
Colorectal Cancer	132,200	0.5%	\$2,413	\$18,249	2.59	1.18	1.41
Depression	802,560	3.1%	\$9,287	\$11,571	3.01	1.15	1.86
Acute Myocardial Infarction	104,440	0.4%	\$1,699	\$16,264	2.50	1.08	1.42
Ischemic Heart Disease	862,120	3.4%	\$11,189	\$12,978	2.45	1.09	1.36
Atrial Fibrillation	81,500	0.3%	\$909	\$11,156	2.41	1.08	1.33
Chronic Kidney Disease	277,320	1.1%	\$4,179	\$15,070	2.62	1.14	1.48
Female Breast Cancer	34,940	0.1%	\$419	\$11,999	2.38	1.08	1.30
Prostate Cancer	52,040	0.2%	\$547	\$10,509	2.33	1.05	1.28
Endometrial Cancer	10,080	0.0%	\$128	\$12,734	2.49	1.14	1.35
Diabetes	182,840	0.7%	\$1,801	\$9,849	2.39	1.06	1.33
Glaucoma	55,520	0.2%	\$539	\$9,713	2.37	1.04	1.33
Cataract	136,860	0.5%	\$1,354	\$9,894	2.40	1.05	1.35
None	554,400	2.2%	\$6,486	\$11,698	2.55	1.10	1.45
Overall Average	25,664,640	100.0%	\$344,183	\$13,411	2.87	1.19	1.68

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 Paid 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 2.3A and Exhibit 2.3B present the 10 most frequent patient pathways for pre-acute care episodes overall and the top five most frequent patient pathways for the four most prevalent primary chronic conditions. As a function of the way the episodes are designed, all Episode Type 2 patient pathways end with the index acute care hospitalization. The top 10 patient pathways represent 78.3 percent of all pre-acute care episode patient pathways, and have an average Medicare episode payment of \$12,335, which is only slightly lower than the overall average of \$13,411 (Exhibit 2.3A). The most frequent patient pathway, represented by 56.5 percent of all episodes, is “C-A,” which means that the patient was only receiving physician or outpatient visits prior to the index acute care hospitalization. The second most frequent patient pathway represents 6.8 percent of all episodes and includes Community care, but also includes an ER visit (“C-E-C-A”). This indicates that the patient may have been slightly unstable prior to the index, as indicated by an ER visit (but not a prior hospital admission). It is important to note that since our pre-acute care episodes contain a 15 day clean period free of facility-based care (including home health), any prior hospital admission reflected in the pathway is preceded by facility-based care.

Exhibit 2.3A: Distribution of Episodes and Medicare Episode Payments for Most Frequent Patient Pathways by First Setting for 60-Day Fixed-Length Pre-Acute Episode (2007-2009)

Pathway	Percent of Episodes	Average Medicare Episode Paid
C-A	56.5%	\$11,603
C-E-C-A	6.8%	\$12,488
C-A-C-A	5.8%	\$23,797
E-C-A	2.1%	\$11,195
C-E-A	1.5%	\$12,863
H-C-A	1.5%	\$12,630
A-C-A	2.3%	\$20,801
C-P-C-A	0.9%	\$12,504
C-E-C-E-C-A	0.7%	\$13,216
A	0.3%	\$7,565
Subtotal	78.3%	\$12,335
Other	21.7%	\$19,577
Grand Total	100.0%	\$13,411

Facility-based Sequence Stops:	
A	STACH (Index or Readmission)
H	HHA
I	IRF
L	LTCH
S	SNF
Ambulatory-based Sequence Stops	
C	Community (Physician and Outpatient Visits)
E	ER
P	OP Therapy
T	Hospice
Z	Other IP

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 Paid includes care from all facility-based and ambulatory care settings and excludes beneficiary co-payments.

Exhibit 2.3B presents the top five patient pathways for the four most prevalent primary chronic conditions. Within each of the primary chronic conditions, the most frequent patient pathway is “C-A,” which represents more than one-half of all episodes. This

Episode Type 2: Pre-Acute Episodes

indicates that these primary chronic conditions may result in acute or planned events that result in the index acute care hospitalization, as opposed to conditions that require ongoing facility-based care. The second most frequent patient pathway is also consistent across all primary chronic conditions, and consists of Community care and an ER visit. This could be an indicator of patient instability or an exacerbation of the chronic condition that ultimately results in the index acute care hospitalization.

Exhibit 2.3A: Distribution of Episodes and Medicare Episode Payments for Most Frequent Patient Pathways by Primary Chronic Condition for 60-Day Fixed-Length Pre-Acute Episode (2007-2009)

Primary Chronic Condition	Pathway Patterns	Percent of Episodes	Average Medicare Episode Paid
CHF* COPD	C-A	56.5%	\$11,933
	C-E-C-A	7.6%	\$12,786
	C-A-C-A	4.7%	\$23,118
	H-C-A	2.5%	\$12,727
	A-C-A	2.2%	\$20,259
	Subtotal	73.4%	\$13,011
	Other	26.6%	\$19,428
	Total	100.0%	\$14,717
Rheumatoid Arthritis/ Osteoarthritis	C-A	72.1%	\$11,322
	C-E-C-A	6.4%	\$11,293
	E-C-A	2.3%	\$10,483
	C-A-C-A	1.9%	\$22,117
	C-P-C-A	1.6%	\$13,078
	Subtotal	84.2%	\$11,573
	Other	15.8%	\$15,298
	Total	100.0%	\$12,160
DIABETES*CHF	C-A	61.3%	\$12,872
	C-E-C-A	7.9%	\$14,192
	C-A-C-A	4.0%	\$26,261
	H-C-A	1.9%	\$13,833
	E-C-A	1.8%	\$12,359
	Subtotal	76.9%	\$13,716
	Other	23.1%	\$20,861
	Total	100.0%	\$15,367
CHF*RENAL	C-A	61.6%	\$12,983
	C-E-C-A	7.8%	\$13,902
	C-A-C-A	3.8%	\$26,306
	E-C-A	2.2%	\$12,758
	H-C-A	2.0%	\$12,741
	Subtotal	77.4%	\$13,713
	Other	22.6%	\$19,675
	Total	100.0%	\$15,060

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 Paid includes care from all facility-based and ambulatory care settings and excludes beneficiary co-payments.

Episode Type 2: Pre-Acute Episodes

Exhibit 2.4 and Exhibit 2.5 show the average Medicare episode payments and average sequence stops by the number of chronic conditions per episode. The number of chronic conditions per episode is normally distributed, with an average of 5.1 chronic conditions represented per episode (data not shown). As the number of chronic conditions per episode increases, the average Medicare episode payment increases, as well as the average number of sequence stops. However, ambulatory-based sequence stops increase faster than facility-based sequence stops as the number of chronic conditions increases. Episodes with no chronic conditions contain, on average, 2.55 total sequence stops (1.55 before the index acute care hospitalization), while episodes with 15 chronic conditions have on average 4.65 total sequence stops.

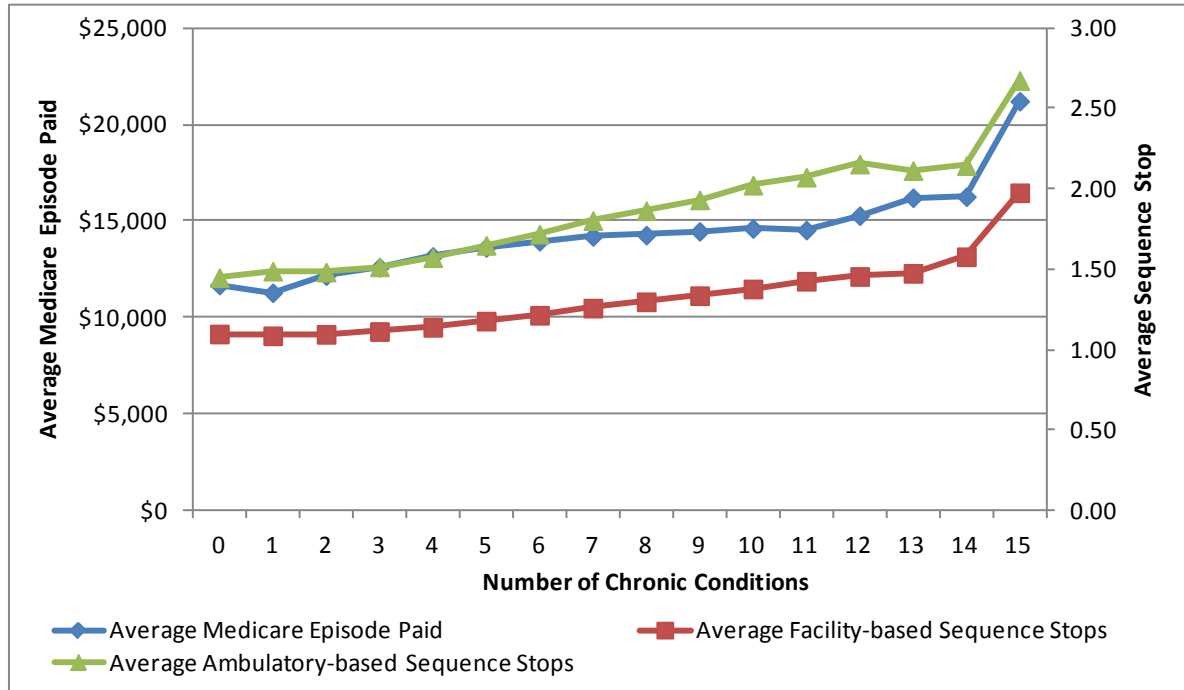
Exhibit 2.4: Average Medicare Episode Paid and Average Sequence Stops by Number of Chronic Conditions for 60-day Fixed-Length Pre-Acute Episode (2007-2009)

Number of Chronic Conditions	Percent of Episodes	Average Medicare Episode Paid	Average Sequence Stops	Average Facility-based Sequence Stops	Average Ambulatory-based Sequence Stops
0	2.2%	\$11,698	2.55	1.10	1.45
1	5.0%	\$11,298	2.58	1.09	1.49
2	8.8%	\$12,183	2.58	1.10	1.48
3	12.3%	\$12,612	2.63	1.11	1.52
4	14.4%	\$13,178	2.71	1.14	1.57
5	14.9%	\$13,642	2.83	1.18	1.65
6	13.9%	\$13,966	2.94	1.22	1.72
7	11.3%	\$14,213	3.06	1.26	1.80
8	8.0%	\$14,280	3.16	1.30	1.87
9	4.9%	\$14,477	3.27	1.34	1.93
10	2.6%	\$14,623	3.40	1.38	2.02
11	1.2%	\$14,543	3.50	1.43	2.07
12	0.4%	\$15,287	3.61	1.46	2.16
13	0.1%	\$16,217	3.59	1.48	2.11
14	0.0%	\$16,270	3.73	1.58	2.15
15	0.0%	\$21,215	4.65	1.98	2.67
Overall Average	100.0%	\$13,411	2.87	1.19	1.67

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 Paid includes care from all facility-based and ambulatory care settings and excludes beneficiary co-payments.

Episode Type 2: Pre-Acute Episodes

Exhibit 2.5: Average Medicare Episode Paid and Average Facility-based and Ambulatory-based Sequence Stops by Number of Chronic Conditions for 60-day Fixed-Length Pre-Acute Episode (2007-2009)



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

Descriptive Statistics by Patient Demographic Characteristics

Patient demographic characteristics can be correlated with the amount of care they receive and whether care is facility-based or ambulatory-based care. Exhibit 2.6 shows the total average sequence stops, and facility- and ambulatory- sequence stops by select beneficiary demographic characteristics. Episodes that contain a hospital admission (prior to the index acute care hospitalization) have more than twice as many sequence stops during the episode compared to episodes that do not contain a hospitalization (total sequence stops of 5.20 compared to 2.59). Episodes that contain a hospital admission contain, on average, 2.61 more sequence stops, of which 1.38 are facility-based and 1.23 are ambulatory-based.

Whether an episode is for a dual eligible patient is correlated with the number of sequence stops. Across all chronic conditions, episodes for dual eligible patients have 0.53 more sequence stops than those who are not dual eligible (total sequence stops of 3.26 compared to 2.73). Episodes for dual eligibles have only 0.09 more facility-based sequence stops but have 0.44 more ambulatory-based sequence stops than episodes for non-dual eligibles.

There is almost no difference in the average number of sequence stops during the 60-day episode by sex or age band.

Episode Type 2: Pre-Acute Episodes

Exhibit 2.6: Average Sequence Stops by Demographic Characteristics for 60-day Fixed-Length Pre-Acute Episode (2007-2009)

Beneficiary Demographic Characteristics	Percent of Episodes for "Yes"	Yes			No			Difference		
		Average Sequence Stops	Average Facility-based Sequence Stops	Average Ambulatory-based Sequence Stops	Average Sequence Stops	Average Facility-based Sequence Stops	Average Ambulatory-based Sequence Stops	Average Sequence Stops	Average Facility-based Sequence Stops	Average Ambulatory-based Sequence Stops
Live Alone	22.5%	2.99	1.26	1.73	2.83	1.17	1.66	0.16	0.09	0.07
Died during Episode	23.6%	3.13	1.29	1.84	2.78	1.16	1.62	0.35	0.13	0.22
Dual Eligible	25.5%	3.26	1.26	2.00	2.73	1.17	1.56	0.53	0.09	0.44
Female	60.4%	2.86	1.19	1.67	2.87	1.20	1.67	-0.01	-0.01	0.00
Non-white Race	26.9%	3.05	1.26	1.79	2.83	1.18	1.65	0.22	0.08	0.14
Resides in Rural Area	10.6%	3.02	1.18	1.84	2.81	1.20	1.61	0.21	-0.02	0.23
Older than 84 Years	20.7%	2.83	1.19	1.64	2.87	1.20	1.67	-0.04	-0.01	-0.03
Episode Contains Hospital Admission	15.6%	5.20	2.43	2.77	2.59	1.05	1.54	2.61	1.38	1.23

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.

Episode Type 2: Pre-Acute Episodes

Exhibit 2.7 and 2.8 show the average number of sequence stops by chronic condition for episodes that contain a hospital admission prior to the index acute care hospitalization and episodes for patients who are dual eligible. According to our regression analysis, these beneficiary demographic characteristics are associated with longer patient pathways.

As shown in Exhibit 2.7, in general, episodes that contain an acute care admission prior to the index admission have an average Medicare episode payment that is \$13,522 higher than episodes that do not contain an admission, and contain 2.61 more sequence stops. Episodes with a primary chronic condition of depression have the largest difference in the average number of sequence stops for episodes that contain an acute care hospital admission compared to episodes that do not. Episodes with an acute care hospitalization contain 2.81 more sequence stops, of which 1.32 are facility-based and 1.49 are ambulatory-based. Acute myocardial infarction shows the smallest difference in the average number of sequence stops for episodes that contain a hospital admission compared to those that do not. Acute myocardial infarction episodes that contain a hospital admission have 1.94 more sequence stops than those that do not contain a readmission (4.30 versus 2.36).

Exhibit 2.8 shows that, on average, episodes for beneficiaries who are dual eligible have an average Medicare episode payment that is \$284 higher than episodes for beneficiaries who are not dual eligible, and contain 0.53 more sequence stops. Episodes for patients with Depression have the largest difference in the average number of sequence stops for dual eligible episodes. Episodes for patients with depression have 0.69 more sequence stops, of which 0.07 are facility-based, and 0.62 are ambulatory-based. Episodes for patients with acute myocardial infarction have the smallest difference in the average number of sequence stop for episodes with only a difference of 0.19 sequence stops for episodes for patients who are dual eligible. Across all primary chronic conditions, the average number of facility-based sequence stops is fairly consistent regardless of dual eligibility. Dual eligibles average 1.26 facility-based sequence stops per episodes while those who are not dual eligible average 1.17 sequence stops.

Episode Type 2: Pre-Acute Episodes

Exhibit 2.7: Average Sequence Stops by Presence of Acute Care Hospital Admission by Primary Chronic Conditions for 60-day Fixed-Length Pre-Acute Episode (2007-2009)

Primary Chronic Condition	Percent of Episodes Contain Hospitalization	Episode Contains Hospitalization					Episode Does not Contain Hospitalization					Difference			
		Average Medicare Episode Paid	Percent of Episodes	Average Sequence Stops	Average Facility-based Sequence Stops	Average Ambulatory-based Sequence Stops	Average Medicare Episode Paid	Percent of Episodes	Average Sequence Stops	Average Facility-based Sequence Stops	Average Ambulatory-based Sequence Stops	Average Medicare Episode Paid	Average Sequence Stops	Average Facility-based Sequence Stops	Average Ambulatory-based Sequence Stops
CHF*COPD	16.5%	\$25,578	38.6%	5.35	2.50	2.85	\$12,571	23.2%	2.73	1.08	1.65	\$13,007	2.62	1.42	1.20
DIABETES*CHF	12.6%	\$28,509	15.8%	5.33	2.47	2.86	\$13,470	13.0%	2.66	1.06	1.60	\$15,039	2.67	1.41	1.26
CHF*RENAL	11.7%	\$27,493	6.1%	5.15	2.43	2.72	\$13,419	5.5%	2.64	1.06	1.58	\$14,074	2.51	1.37	1.14
Lung Cancer	13.9%	\$28,339	2.6%	4.87	2.32	2.55	\$14,767	1.9%	2.54	1.03	1.51	\$13,572	2.33	1.29	1.04
Osteoporosis	6.6%	\$22,056	9.3%	5.03	2.38	2.65	\$10,668	15.7%	2.55	1.04	1.51	\$11,388	2.48	1.34	1.14
COPD	10.1%	\$22,716	7.3%	5.11	2.34	2.77	\$11,155	7.7%	2.58	1.03	1.55	\$11,561	2.53	1.31	1.22
Rheumatoid Arthritis/ Osteoarthritis	5.8%	\$23,150	6.0%	5.06	2.35	2.71	\$11,486	11.6%	2.50	1.03	1.47	\$11,664	2.56	1.32	1.24
Hip/Pelvic Fracture	4.4%	\$25,767	0.2%	5.20	2.63	2.57	\$12,918	0.6%	2.54	1.05	1.49	\$12,850	2.66	1.58	1.08
Heart Failure	8.0%	\$25,406	2.0%	4.85	2.31	2.54	\$12,229	2.7%	2.49	1.03	1.46	\$13,177	2.36	1.28	1.08
Alzheimer's Disease	5.3%	\$20,514	0.7%	5.06	2.44	2.62	\$9,068	1.4%	2.62	1.05	1.57	\$11,446	2.44	1.39	1.05
Alzheimer's Disease and Related Disorders	7.5%	\$23,529	1.0%	5.09	2.39	2.70	\$10,287	1.5%	2.61	1.04	1.57	\$13,242	2.48	1.35	1.13
Stroke/Transient Ischemic Attack	7.7%	\$26,516	1.2%	5.01	2.32	2.69	\$11,246	1.8%	2.48	1.02	1.46	\$15,270	2.53	1.30	1.23
Colorectal Cancer	11.4%	\$30,090	0.6%	4.71	2.36	2.35	\$16,729	0.5%	2.32	1.03	1.29	\$13,361	2.39	1.33	1.06
Depression	10.4%	\$22,284	3.1%	5.53	2.33	3.20	\$10,323	3.1%	2.72	1.01	1.71	\$11,961	2.81	1.32	1.49
Acute Myocardial Infarction	7.1%	\$30,203	0.3%	4.30	2.13	2.17	\$15,198	0.4%	2.36	1.01	1.35	\$15,005	1.94	1.12	0.82

Episode Type 2: Pre-Acute Episodes

Exhibit 2.7 (continued): Average Sequence Stops by Presence of Acute Care Hospital Admission by Primary Chronic Conditions for 60-day Fixed-Length Pre-Acute Episode (2007-2009)

Primary Chronic Condition	Percent of Episodes Contain Hospitalization	Episode Contains Hospitalization					Episode Does not Contain Hospitalization					Difference			
		Average Medicare Episode Paid	Percent of Episodes	Average Sequence Stops	Average Facility-based Sequence Stops	Average Ambulatory-based Sequence Stops	Average Medicare Episode Paid	Percent of Episodes	Average Sequence Stops	Average Facility-based Sequence Stops	Average Ambulatory-based Sequence Stops	Average Medicare Episode Paid	Average Sequence Stops	Average Facility-based Sequence Stops	Average Ambulatory-based Sequence Stops
Ischemic Heart Disease	6.6%	\$26,405	2.1%	4.52	2.21	2.31	\$12,034	3.5%	2.31	1.01	1.30	\$14,371	2.21	1.20	1.01
Atrial Fibrillation	5.5%	\$25,823	0.2%	4.64	2.30	2.34	\$10,299	0.3%	2.28	1.00	1.28	\$15,524	2.36	1.30	1.06
Chronic Kidney Disease	9.9%	\$29,597	1.0%	4.84	2.30	2.54	\$13,478	1.1%	2.38	1.01	1.37	\$16,119	2.46	1.29	1.17
Female Breast Cancer	5.2%	\$26,191	0.1%	4.63	2.23	2.40	\$11,228	0.1%	2.26	1.01	1.25	\$14,963	2.37	1.22	1.15
Prostate Cancer	3.7%	\$21,574	0.1%	4.53	2.15	2.38	\$10,080	0.2%	2.25	1.01	1.24	\$11,493	2.28	1.14	1.14
Endometrial Cancer	9.3%	\$23,775	0.0%	4.85	2.45	2.40	\$11,598	0.0%	2.25	1.00	1.25	\$12,177	2.60	1.45	1.15
Diabetes	4.6%	\$22,785	0.3%	4.47	2.19	2.28	\$9,218	0.8%	2.29	1.01	1.28	\$13,567	2.18	1.18	1.00
Glaucoma	2.8%	\$24,732	0.1%	4.74	2.27	2.47	\$9,285	0.2%	2.30	1.01	1.29	\$15,447	2.44	1.26	1.18
Cataract	3.6%	\$24,267	0.2%	4.74	2.24	2.50	\$9,358	0.6%	2.31	1.00	1.31	\$14,909	2.43	1.24	1.19
None	6.9%	\$26,180	1.4%	5.00	2.33	2.67	\$10,629	2.3%	2.37	1.01	1.36	\$15,551	2.63	1.32	1.31
Overall Average	10.6%	\$25,494	100.0%	5.20	2.43	2.77	\$11,972	100.0%	2.59	1.05	1.54	\$13,522	2.61	1.38	1.23

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 Paid includes care from all facility-based and ambulatory care settings and excludes beneficiary co-payments.

Episode Type 2: Pre-Acute Episodes

Exhibit 2.8: Average Sequence Stops by Dual Eligibility Status by Primary Chronic Condition for 60-day Fixed-Length Pre-Acute Episode (2007-2009)

Primary Chronic Condition	Percent of Episodes for Dual Eligibles	Dual Eligible					Not Dual Eligible					Difference			
		Average Medicare Episode Paid	Percent of Episodes	Average Sequence Stops	Average Facility-based Sequence Stops	Average Ambulatory-based Sequence Stops	Average Medicare Episode Paid	Percent of Episodes	Average Sequence Stops	Average Facility-based Sequence Stops	Average Ambulatory-based Sequence Stops	Average Medicare Episode Paid	Average Sequence Stops	Average Facility-based Sequence Stops	Average Ambulatory-based Sequence Stops
CHF*COPD	31.2%	\$15,048	30.5%	3.53	1.38	2.15	\$14,566	23.0%	2.99	1.28	1.71	\$482	0.54	0.10	0.44
DIABETES*CHF	30.4%	\$15,729	15.9%	3.32	1.30	2.02	\$15,208	12.5%	2.85	1.21	1.64	\$522	0.47	0.09	0.38
CHF*RENAL	21.1%	\$15,576	4.6%	3.22	1.26	1.96	\$14,923	5.9%	2.85	1.21	1.64	\$653	0.37	0.05	0.32
Lung Cancer	15.8%	\$16,021	1.2%	3.15	1.26	1.89	\$16,766	2.3%	2.81	1.20	1.61	-\$745	0.34	0.06	0.28
Osteoporosis	19.2%	\$11,376	11.3%	3.04	1.17	1.87	\$11,423	16.3%	2.63	1.12	1.51	-\$47	0.41	0.05	0.36
COPD	30.1%	\$12,084	9.1%	3.26	1.22	2.04	\$12,425	7.2%	2.65	1.14	1.51	-\$341	0.61	0.08	0.53
Rheumatoid Arthritis/ Osteoarthritis	18.3%	\$11,484	7.9%	3.02	1.15	1.87	\$12,312	12.0%	2.56	1.10	1.46	-\$828	0.46	0.05	0.41
Hip/Pelvic Fracture	19.6%	\$14,236	0.4%	2.90	1.15	1.75	\$13,305	0.6%	2.60	1.11	1.49	\$931	0.30	0.04	0.26
Heart Failure	19.1%	\$12,281	2.0%	3.00	1.17	1.83	\$13,515	2.8%	2.60	1.12	1.48	-\$1,234	0.40	0.05	0.35
Alzheimer's Disease	25.7%	\$10,024	1.3%	2.95	1.14	1.81	\$9,551	1.3%	2.68	1.11	1.57	\$473	0.27	0.03	0.24
Alzheimer's Disease and Related Disorders	29.4%	\$11,853	1.6%	3.09	1.17	1.92	\$11,032	1.3%	2.67	1.13	1.54	\$821	0.42	0.04	0.38
Stroke/Transient Ischemic Attack	19.5%	\$13,270	1.3%	3.03	1.19	1.84	\$12,213	1.9%	2.59	1.10	1.49	\$1,058	0.44	0.09	0.35
Colorectal Cancer	13.1%	\$19,063	0.3%	3.06	1.33	1.73	\$18,126	0.6%	2.52	1.16	1.36	\$937	0.54	0.17	0.37
Depression	45.0%	\$10,979	5.5%	3.39	1.19	2.20	\$12,056	2.3%	2.70	1.12	1.58	-\$1,077	0.69	0.07	0.62

Exhibit 2.8 (continued): Average Sequence Stops by Dual Eligibility Status by Primary Chronic Condition for 60-day Fixed-Length Pre-Acute Episode (2007-2009)

Episode Type 2: Pre-Acute Episodes

Primary Chronic Condition	Percent of Episodes for Dual Eligibles	Dual Eligible					Not Dual Eligible					Difference			
		Average Medicare Episode Paid	Percent of Episodes	Average Sequence Stops	Average Facility-based Sequence Stops	Average Ambulatory-based Sequence Stops	Average Medicare Episode Paid	Percent of Episodes	Average Sequence Stops	Average Facility-based Sequence Stops	Average Ambulatory-based Sequence Stops	Average Medicare Episode Paid	Average Sequence Stops	Average Facility-based Sequence Stops	Average Ambulatory-based Sequence Stops
Acute Myocardial Infarction	10.7%	\$16,017	0.2%	2.67	1.12	1.55	\$16,294	0.5%	2.48	1.08	1.40	-\$277	0.19	0.04	0.15
Ischemic Heart Disease	13.0%	\$12,845	1.7%	2.70	1.12	1.58	\$12,998	3.9%	2.42	1.08	1.34	-\$153	0.28	0.04	0.24
Atrial Fibrillation	8.0%	\$11,425	0.1%	2.61	1.11	1.50	\$11,133	0.4%	2.39	1.07	1.32	\$292	0.22	0.04	0.18
Chronic Kidney Disease	26.8%	\$16,145	1.1%	2.87	1.18	1.69	\$14,675	1.1%	2.53	1.12	1.41	\$1,470	0.34	0.06	0.28
Female Breast Cancer	11.4%	\$12,928	0.1%	2.72	1.17	1.55	\$11,879	0.2%	2.34	1.06	1.28	\$1,049	0.38	0.11	0.27
Prostate Cancer	6.0%	\$10,456	0.0%	2.82	1.08	1.74	\$10,512	0.3%	2.30	1.05	1.25	-\$57	0.52	0.03	0.49
Endometrial Cancer	15.5%	\$14,614	0.0%	2.95	1.17	1.78	\$12,389	0.0%	2.41	1.13	1.28	\$2,225	0.54	0.04	0.50
Diabetes	25.3%	\$9,669	0.7%	2.58	1.08	1.50	\$9,910	0.7%	2.32	1.05	1.27	-\$242	0.26	0.03	0.23
Glaucoma	14.4%	\$9,321	0.1%	2.56	1.05	1.51	\$9,779	0.2%	2.34	1.04	1.30	-\$458	0.22	0.01	0.21
Cataract	11.0%	\$9,864	0.2%	2.70	1.10	1.60	\$9,898	0.6%	2.36	1.04	1.32	-\$34	0.34	0.06	0.28
None	31.6%	\$11,198	2.7%	2.81	1.14	1.67	\$11,930	2.0%	2.43	1.08	1.35	-\$733	0.38	0.06	0.32
Overall Average	25.5%	\$13,623	100.0%	3.26	1.26	2.00	\$13,338	100.0%	2.73	1.17	1.56	\$284	0.53	0.09	0.44

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 Paid includes care from all facility-based and ambulatory care settings and excludes beneficiary co-payments.

Episode Type 2: Pre-Acute Episodes

Distribution of Episodes and Average Number of Sequence Stops for Select Primary Chronic Conditions

In the remainder of this chapter, we analyze the pre-acute care episode payments for select primary chronic conditions in greater detail. These sections contain descriptive statistics on the average number of sequence stops and average Medicare episode payments.

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 (Exhibit 2.2). CHF*COPD episodes have an average Medicare episode payments of \$14,717 per episode and an average of 7.1 chronic conditions per episode (data not shown). On average, CHF*COPD episodes have 3.16 sequence stops, of which 1.31 are facility-based and 1.84 sequence stops are ambulatory-based.

As the number of chronic conditions per episode increases, the average Medicare episode payment increases, as well as the average number of sequence stops. Episodes with two chronic conditions contain, on average, 2.61 total sequence stops (1.61 before the index acute care hospitalization), while episodes with 15 chronic conditions have on average 4.65 total sequence stops. The average number of ambulatory-based sequence stops increases faster than the average number of facility-based sequence stops as the number of chronic conditions increases. Facility-based sequence stops range from 1.13 for episodes with two chronic conditions to 1.98 for episodes with 15 chronic conditions while ambulatory-based sequence stops range from 1.48 (two chronic conditions) to 2.67 (15 chronic conditions).

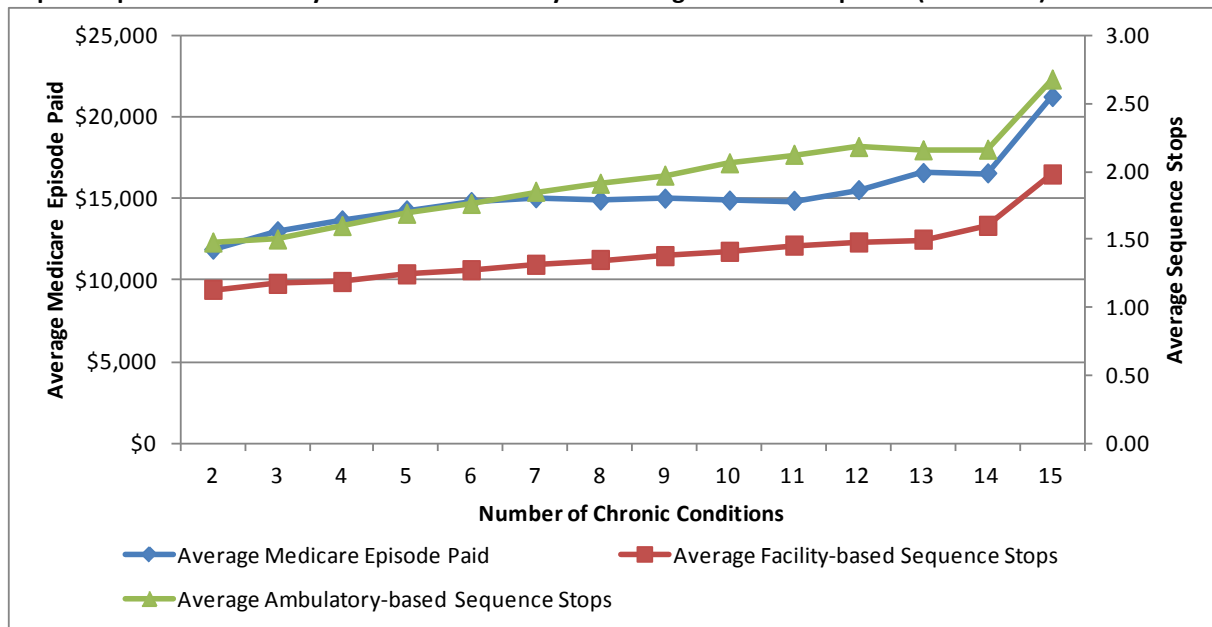
Episode Type 2: Pre-Acute Episodes

Exhibit 2.9: Average Medicare Episode Paid and Average Sequence Stops for Episodes Defined by CHF* COPD for 60-day Fixed-Length Pre-Acute Episode (2007-2009)

Number of Chronic Conditions	Percent of Episodes	Average Medicare Episode Paid	Average Sequence Stops	Average Facility-based Sequence Stops	Average Ambulatory-based Sequence Stops
2	0.4%	\$11,870	2.61	1.13	1.48
3	2.1%	\$12,996	2.67	1.17	1.50
4	6.2%	\$13,663	2.78	1.19	1.60
5	12.6%	\$14,273	2.93	1.24	1.69
6	18.0%	\$14,782	3.03	1.27	1.76
7	19.4%	\$15,016	3.16	1.31	1.85
8	16.7%	\$14,877	3.26	1.35	1.91
9	11.9%	\$14,993	3.35	1.38	1.97
10	7.3%	\$14,874	3.47	1.41	2.06
11	3.6%	\$14,859	3.58	1.45	2.12
12	1.4%	\$15,512	3.66	1.48	2.18
13	0.4%	\$16,562	3.65	1.50	2.15
14	0.1%	\$16,541	3.76	1.60	2.16
15	0.0%	\$21,215	4.65	1.98	2.67
Overall Average	100.0%	\$14,717	3.16	1.31	1.84

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 Paid includes care from all facility-based and ambulatory care settings and excludes beneficiary co-payments.

Exhibit 2.10: Average Medicare Episode Paid and Average Facility-based and Ambulatory-based Sequence Stops for Episodes Defined by CHF* COPD for 60-day Fixed-Length Pre-Acute Episode (2007-2009)



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

Episode Type 2: Pre-Acute Episodes

Patient demographic characteristics can be a determinant of the amount of care a beneficiary receives and whether care is facility-based or ambulatory. Exhibit 2.11 shows the total average sequence stops, and facility- and ambulatory-based sequence stops by select beneficiary demographic characteristics for episodes defined by CHF*COPD. Episodes that contain a hospital admission (prior to the index acute care hospitalization) have more than twice as many sequence stops during the episode compared to episodes that do not contain a hospitalization (total sequence stops of 5.35 compared to 2.73). Episodes that contain a hospital admission have, on average, 2.62 more sequence stops, of which 1.42 are facility-based and 1.20 are ambulatory-based.

Dual eligible status is correlated with the number of sequence stops. Within CHF*COPD episodes, dual eligible patients have 0.54 more sequence stops than those who are not dual eligible (total sequence stops of 3.53 compared to 2.99). Episodes for dual eligibles have 0.10 more facility based sequence stops and 0.44 more ambulatory-based sequence stops than episodes for non-dual eligibles.

Beneficiary race and geographic location (urban/rural) appear to have an impact on the average number of sequences stops as well. Episodes for beneficiaries who are non-white have an average of 0.31 more sequence stops per episode compared to episodes for white beneficiaries, of which 0.11 are facility-based and 0.20 are ambulatory-based. Additionally, episodes for beneficiaries who reside in rural areas have 0.25 more average sequence stops compared to episodes for beneficiaries who reside in urban areas. Episodes for beneficiaries in rural areas have 0.02 fewer facility-based sequence stops but have 0.27 more ambulatory-based sequence stops.

Episode Type 2: Pre-Acute Episodes

Exhibit 2.11: Average Sequence Stops by Demographic Characteristics for Episodes Defined by CHF* COPD for 60-day Fixed-Length Pre-Acute Episode (2007-2009)

Beneficiary Demographic Characteristics	Percent of Episodes for "Yes"	Yes			No			Difference		
		Average Sequence Stops	Average Facility-based Sequence Stops	Average Ambulatory-based Sequence Stops	Average Sequence Stops	Average Facility-based Sequence Stops	Average Ambulatory-based Sequence Stops	Average Sequence Stops	Average Facility-based Sequence Stops	Average Ambulatory-based Sequence Stops
Live Alone	29.5%	3.25	1.37	1.88	3.12	1.29	1.83	0.13	0.08	0.05
Died during Episode	34.2%	3.31	1.38	1.93	3.08	1.28	1.80	0.23	0.10	0.13
Dual Eligible	31.2%	3.53	1.38	2.15	2.99	1.28	1.71	0.54	0.10	0.44
Female	57.6%	3.16	1.31	1.85	3.16	1.32	1.84	0.00	-0.01	0.01
Non-white Race	14.7%	3.42	1.41	2.01	3.11	1.30	1.81	0.31	0.11	0.20
Resides in Rural Area	28.3%	3.34	1.30	2.04	3.09	1.32	1.77	0.25	-0.02	0.27
Older than 84 Years	22.6%	3.03	1.28	1.75	3.20	1.33	1.87	-0.17	-0.05	-0.12
Episode Contains Hospital Admission	16.5%	5.35	2.50	2.85	2.73	1.08	1.65	2.62	1.42	1.20

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.

Episode Type 2: Pre-Acute Episodes

Osteoporosis

Osteoporosis is the second most common primary chronic condition, and defines 15.0 percent of all pre-acute care episodes (Exhibit 2.2). 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. Osteoporosis episodes have an average Medicare episode payment of \$11,414 per episode (Exhibit 2.12) and an average of 5.0 chronic conditions (data not shown). On average, osteoporosis episodes have 2.71 sequence stops (Exhibit 2.12), of which 1.13 stops are facility-based and 1.58 are ambulatory-based.

Episodes with one chronic condition contain, on average, 2.41 total sequence stops (1.41 before the index acute care hospitalization), while episodes with more than 12 chronic conditions have on average 3.18 total sequence stops. As the number of chronic conditions per episode increases, the average Medicare episode payment and the average number of facility-based sequence stops increases proportionately (Exhibit 2.13). Facility-based sequence stops range from 1.07 for episodes with one chronic condition to 1.28 for episodes with 11 chronic conditions. The average number of ambulatory-based sequence stops increases faster as the number of chronic conditions increase, and ranges from 1.34 for episodes with one chronic condition to 2.02 for episodes with more than 12 chronic conditions.

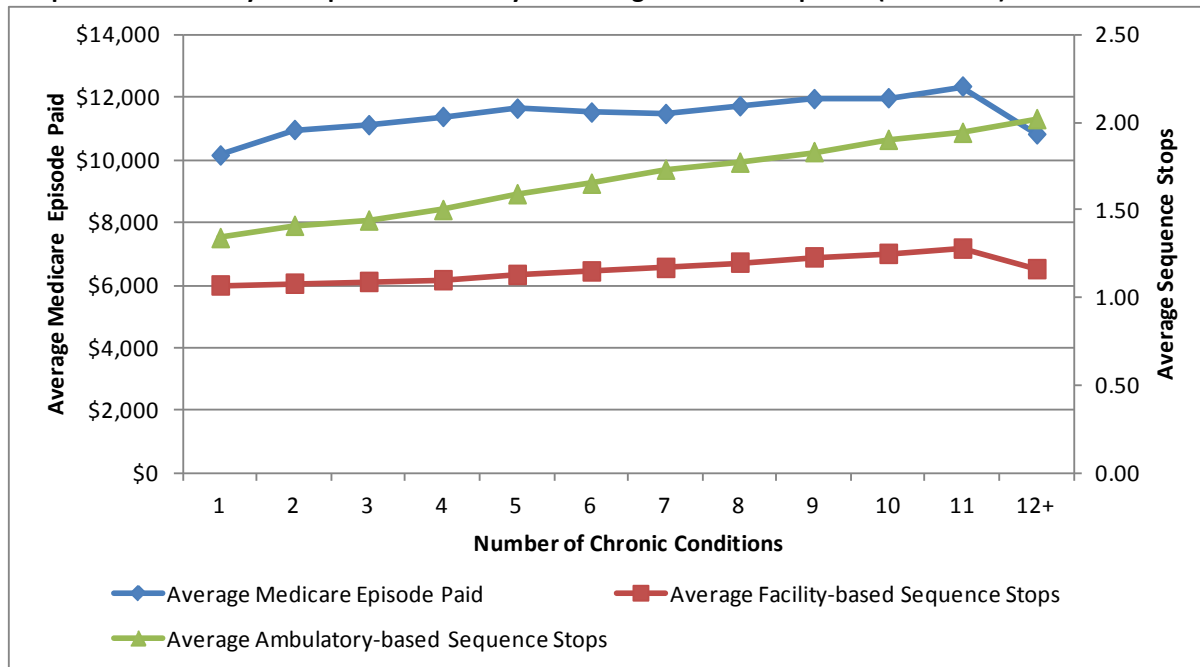
Episode Type 2: Pre-Acute Episodes

Exhibit 2.12: Average Medicare Episode Paid and Average Sequence Stops for Episodes Defined by Osteoporosis for 60-day Fixed-Length Pre-Acute Episode (2007-2009)

Number of Chronic Conditions	Percent of Episodes	Average Medicare Episode Paid	Average Sequence Stops	Average Facility-based Sequence Stops	Average Ambulatory-based Sequence Stops
1	1.5%	\$10,140	2.41	1.07	1.34
2	6.9%	\$10,954	2.49	1.08	1.41
3	14.7%	\$11,107	2.53	1.09	1.44
4	19.9%	\$11,370	2.60	1.10	1.50
5	20.2%	\$11,634	2.72	1.13	1.59
6	16.3%	\$11,510	2.80	1.15	1.65
7	10.7%	\$11,464	2.90	1.17	1.73
8	6.0%	\$11,711	2.97	1.20	1.77
9	2.7%	\$11,939	3.06	1.23	1.83
10	0.9%	\$11,968	3.15	1.25	1.90
11	0.3%	\$12,341	3.22	1.28	1.94
12+	0.1%	\$10,814	3.18	1.16	2.02
Overall Average	100.0%	\$11,414	2.71	1.13	1.58

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 Paid includes care from all facility-based and ambulatory care settings and excludes beneficiary co-payments.

Exhibit 2.13: Average Medicare Episode Paid and Average Facility-based and Ambulatory-based Sequence Stops for Episodes Defined by Osteoporosis for 60-day Fixed-Length Pre-Acute Episode (2007-2009)



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

Episode Type 2: Pre-Acute Episodes

Patient demographic characteristics can be correlated with the amount of care a beneficiary receives and whether care is facility-based or ambulatory care. Exhibit 2.14 shows the total average number of sequence stops, and facility- and ambulatory-based stops by select beneficiary demographic characteristics for episodes defined by osteoporosis. Consistent with CHF* COPD episodes, osteoporosis episodes that contain a hospital admission (prior to the index acute care hospitalization) have more than twice as many sequence stops during the episode compared to episodes that do not contain a hospitalization (total sequence stops of 5.03 compared to 2.55). Episodes that contain a hospital admission have, on average, 2.48 more sequence stops, of which 1.34 are facility-based and 1.14 are ambulatory-based.

Dual eligible status has an impact on the number of sequence stops. Within Osteoporosis episodes, dual eligible patients have 0.41 more sequence stops than those who are not dual eligible (total sequence stops of 3.04 compared to 2.63). Episodes for dual eligibles have 0.05 more facility-based sequence stops and 0.36 more ambulatory-based sequence stops than episodes for non-dual eligibles.

Whether a patient died during the episode appears to have an impact on the average number of sequence stops as well. Episodes for beneficiaries who died during the episode have 0.33 more sequence stops than those who did not. On average, 0.10 of these stops are facility-based while 0.23 are ambulatory-based sequence stops.

Episodes for patients who reside in rural areas have 0.21 more average sequence stops compared to episodes for beneficiaries who reside in urban areas. Episodes for beneficiaries in rural areas have slightly fewer (0.01) facility-based sequence stops but have 0.22 more ambulatory-based sequence stops.

Episode Type 2: Pre-Acute Episodes

Exhibit 2.14: Average Sequence Stops by Demographic Characteristics for Episodes Defined by Osteoporosis for 60-day Fixed-Length Pre-Acute Episode (2007-2009)

Beneficiary Demographic Characteristics	Percent of Episodes for "Yes"	Yes			No			Difference		
		Average Sequence Stops	Average Facility-based Sequence Stops	Average Ambulatory-based Sequence Stops	Average Sequence Stops	Average Facility-based Sequence Stops	Average Ambulatory-based Sequence Stops	Average Sequence Stops	Average Facility-based Sequence Stops	Average Ambulatory-based Sequence Stops
Live Alone	27.0%	2.78	1.17	1.61	2.68	1.11	1.57	0.10	0.06	0.04
Died during Episode	13.2%	3.00	1.21	1.79	2.67	1.11	1.56	0.33	0.10	0.23
Dual Eligible	19.2%	3.04	1.17	1.87	2.63	1.12	1.51	0.41	0.05	0.36
Female	87.8%	2.69	1.12	1.57	2.84	1.16	1.68	-0.15	-0.04	-0.11
Non-white Race	9.4%	2.78	1.15	1.63	2.70	1.12	1.58	0.08	0.03	0.05
Resides in Rural Area	24.4%	2.87	1.12	1.75	2.66	1.13	1.53	0.21	-0.01	0.22
Older than 84 Years	25.4%	2.73	1.13	1.60	2.70	1.13	1.57	0.03	0.00	0.03
Episode Contains Hospital Admission	6.6%	5.03	2.38	2.65	2.55	1.04	1.51	2.48	1.34	1.14

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.

Episode Type 2: Pre-Acute Episodes

DIABETES*CHF

About 13.3 percent of pre-acute episodes are defined by a primary chronic condition of DIABETES*CHF (Exhibit 2.2). DIABETES*CHF episodes averaged Medicare episode payment of \$15,367 and an average of 6.4 chronic conditions per episode (data not shown). On average, DIABETES*CHF episodes have 3.00 sequence stops, of which 1.24 are facility-based and 1.76 are ambulatory-based.

Episodes with two chronic conditions contain, on average, 2.57 total sequence stops (1.57 before the index acute care hospitalization), while episodes with twelve chronic conditions have on average 3.47 total sequence stops. As the number of chronic conditions per episode increases, the average number of sequence stops – both facility- and ambulatory-based – increases (Exhibit 2.16). Ambulatory-based sequence stops, however, increase faster than the rate of facility-based sequence stops as the number of chronic conditions increases. Facility-based sequence stops range from 1.12 for episodes with three chronic conditions to 1.41 for episodes with 12 chronic conditions. The average number of ambulatory-sequence stops range from 1.44 for episodes with two chronic conditions to 2.06 for episodes with 12 chronic conditions.

The average Medicare payment does not appear to increase proportionately to the number of chronic conditions in the episode. The highest average Medicare episode payment occurs when there are five chronic conditions (\$15,857).

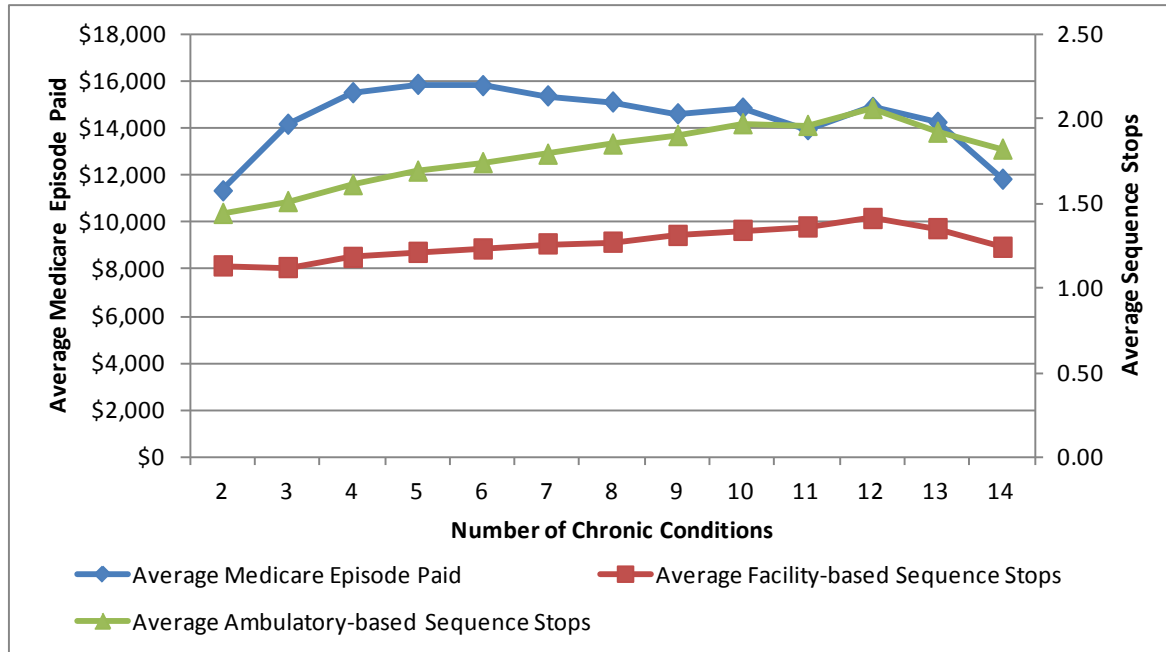
Episode Type 2: Pre-Acute Episodes

Exhibit 2.15: Average Medicare Episode Paid and Average Sequence Stops for Episodes Defined by DIABETES*CHF for 60-day Fixed-Length Pre-Acute Episode (2007-2009)

Number of Chronic Conditions	Percent of Episodes	Average Medicare Episode Paid	Average Sequence Stops	Average Facility-based Sequence Stops	Average Ambulatory-based Sequence Stops
2	0.4%	\$11,328	2.57	1.13	1.44
3	3.7%	\$14,161	2.63	1.12	1.51
4	11.4%	\$15,503	2.79	1.18	1.61
5	18.7%	\$15,857	2.90	1.21	1.69
6	20.9%	\$15,802	2.97	1.23	1.74
7	18.6%	\$15,367	3.05	1.26	1.79
8	12.8%	\$15,107	3.12	1.27	1.85
9	7.7%	\$14,605	3.21	1.31	1.90
10	3.7%	\$14,848	3.31	1.34	1.97
11	1.5%	\$13,931	3.32	1.36	1.96
12	0.5%	\$14,876	3.47	1.41	2.06
13	0.1%	\$14,241	3.27	1.35	1.92
14	0.0%	\$11,823	3.06	1.24	1.82
Overall Average	100.0%	\$15,367	3.00	1.24	1.76

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 Paid includes care from all facility-based and ambulatory care settings and excludes beneficiary co-payments.

Exhibit 2.16: Average Medicare Episode Paid and Average Facility-based and Ambulatory-based Sequence Stops for Episodes Defined by DIABETES*CHF for 60-day Fixed-Length Pre-Acute Episode (2007-2009)



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

Episode Type 2: Pre-Acute Episodes

Patient demographic characteristics can be a determinant of the amount of care a beneficiary receives and whether care is facility-based or ambulatory. Exhibit 2.17 shows the total average number of sequence stops, and facility- and ambulatory-based stops by select beneficiary demographic characteristics for episodes defined by DIABETES*CHF. Consistent with other primary chronic conditions, DIABETES*CHF episodes that contain a hospital admission (prior to the index acute care hospitalization) continue to have more than twice as many sequence stops during the episode compared to episodes that do not contain a hospitalization (total sequence stops of 5.33 compared to 2.66). Episodes that contain a hospital admission have, on average, 2.67 more stops, of which 1.41 stops are facility-based and 1.26 stops are ambulatory-based.

Episodes for dual eligible patients have a different average number and mix of sequence stops. Within DIABETES*CHF episodes, dual eligible patients have 0.47 more sequence stops than those who are not dual eligible (total sequence stops of 3.32 compared to 2.85). Episodes for dual eligibles have 0.09 more facility-based sequence stops and 0.38 more ambulatory-based sequence stops than episodes for non-dual eligibles.

Beneficiary race and whether or not a beneficiary lives in a rural area appear to be correlated to the average number of sequences stops, as well. Episodes for beneficiaries who are non-white have an average of 0.26 more sequence stops per episode compared to episodes for white beneficiaries, of which 0.08 are facility-based and 0.18 are ambulatory-based. Additionally, episodes for beneficiaries who reside in rural areas have 0.26 more average sequence stops compared to episodes for beneficiaries who reside in urban areas. Episodes for beneficiaries in rural areas have 0.03 fewer facility-based sequence stops but have 0.29 more ambulatory-based sequence stops.

Episode Type 2: Pre-Acute Episodes

Exhibit 2.17: Average Sequence Stops for Beneficiary Demographic Characteristics for Episodes Defined by DIABETES*CHF for 60-day Fixed-Length Pre-Acute Episode (2007-2009)

Beneficiary Demographic Characteristics	Percent of Episodes for "Yes"	Yes			No			Difference		
		Average Sequence Stops	Average Facility-based Sequence Stops	Average Ambulatory-based Sequence Stops	Average Sequence Stops	Average Facility-based Sequence Stops	Average Ambulatory-based Sequence Stops	Average Sequence Stops	Average Facility-based Sequence Stops	Average Ambulatory-based Sequence Stops
Live Alone	24.4%	3.07	1.29	1.78	2.97	1.22	1.75	0.10	0.07	0.03
Died during Episode	27.9%	3.21	1.30	1.91	2.91	1.21	1.70	0.30	0.09	0.21
Dual Eligible	30.4%	3.32	1.30	2.02	2.85	1.21	1.64	0.47	0.09	0.38
Female	60.2%	3.00	1.24	1.76	2.98	1.24	1.74	0.02	0.00	0.02
Non-white Race	24.7%	3.19	1.30	1.89	2.93	1.22	1.71	0.26	0.08	0.18
Resides in Rural Area	24.2%	3.19	1.22	1.97	2.93	1.25	1.68	0.26	-0.03	0.29
Older than 84 Years	22.1%	2.90	1.21	1.69	3.02	1.25	1.77	-0.12	-0.04	-0.08
Episode Contains Hospital Admission	12.6%	5.33	2.47	2.86	2.66	1.06	1.60	2.67	1.41	1.26

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.

Episode Type 2: Pre-Acute Episodes

CHF*RENAL

More than five percent (5.6 percent) of pre-acute episodes have a primary chronic condition of CHF*RENAL (Exhibit 2.2). CHF*RENAL episodes have an average Medicare episode payment of \$15,060 (Exhibit 2.18) and an average of 5.8 chronic conditions per episode (data not shown). On average, CHF*RENAL episodes have 2.93 sequence stops, of which 1.22 are facility-based and 1.71 are ambulatory-based.

In contrast to the three chronic conditions presented previously, the average Medicare eligible payment for the pre-acute care services for CHF*RENAL episodes decreases as the number of chronic conditions included in the episode increases and the average number of sequence stops rises and falls (Exhibit 2.19). The total average number of sequence stops for CHF*RENAL episodes decreases from 2.95 average sequence stops for episode with two chronic conditions to 2.87 for episodes with six chronic conditions. The average number of sequence stops then increases to 3.31 for episodes with 12 chronic conditions. Episodes with 13 or more chronic conditions have an average of 2.38 sequence stops. The decrease in the average Medicare episode payment may be due to the receipt of hospice and palliative care in the pre-service period, which ultimately leads to an index acute care hospitalization and death.

However, the average number of facility-based sequence stops remains relatively stable regardless of the number of chronic conditions. Facility-based sequence stops range from 1.15 for episodes with thirteen chronic conditions to 1.35 for episodes with 11 chronic conditions. Ambulatory-based sequence stops range from 1.64 for episodes for patients with four chronic conditions to 1.99 for patients with 12 chronic conditions.

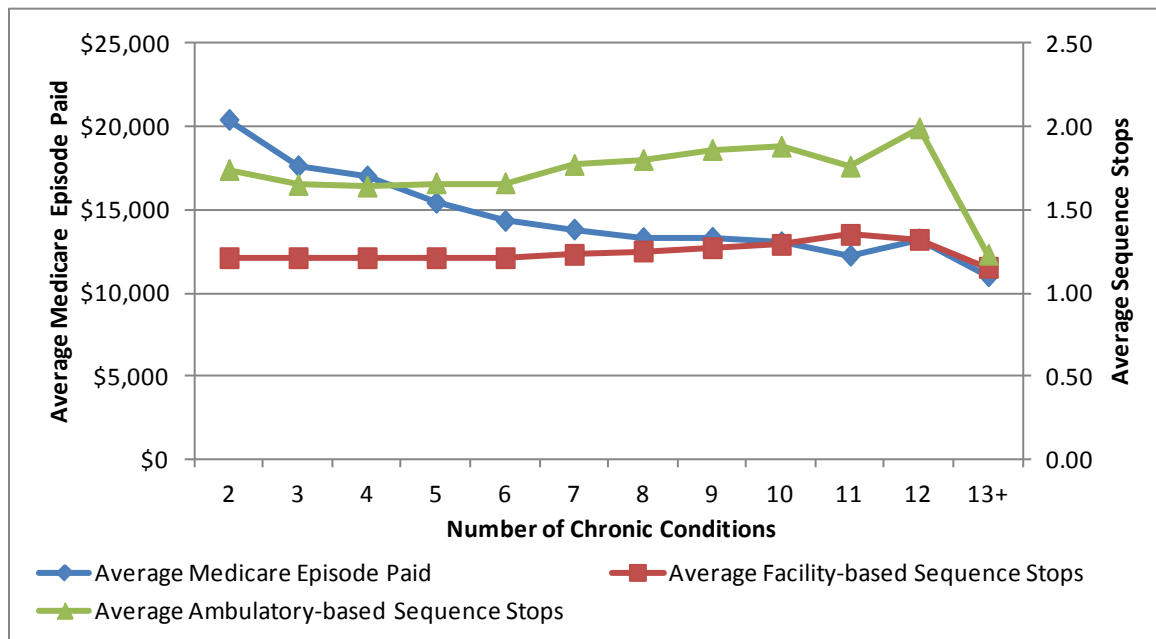
Episode Type 2: Pre-Acute Episodes

Exhibit 2.18: Average Medicare Episode Paid and Average Sequence Stops for Episodes Defined by CHF*RENAL for 60-day Fixed-Length Pre-Acute Episode (2007-2009)

Number of Chronic Conditions	Percent of Episodes	Average Medicare Episode Paid	Average Sequence Stops	Average Facility-based Sequence Stops	Average Ambulatory-based Sequence Stops
2	2.3%	\$20,407	2.95	1.21	1.74
3	7.9%	\$17,630	2.86	1.21	1.65
4	15.0%	\$17,011	2.85	1.21	1.64
5	19.9%	\$15,427	2.87	1.21	1.66
6	20.0%	\$14,335	2.87	1.21	1.66
7	16.0%	\$13,818	3.00	1.23	1.77
8	10.3%	\$13,308	3.05	1.25	1.80
9	5.6%	\$13,323	3.13	1.27	1.86
10	2.3%	\$13,059	3.17	1.29	1.88
11	0.7%	\$12,247	3.11	1.35	1.76
12	0.2%	\$13,226	3.31	1.32	1.99
13+	0.0%	\$11,013	2.38	1.15	1.23
Overall Average	100.0%	\$15,060	2.93	1.22	1.71

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 Paid includes care from all facility-based and ambulatory care settings and excludes beneficiary co-payments.

Exhibit 2.19: Average Medicare Episode Paid and Average Facility-based and Ambulatory-based Sequence Stops for Episodes Defined by DIABETES*CHF for 60-day Fixed-Length Pre-Acute Episode (2007-2009)



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

Episode Type 2: Pre-Acute Episodes

Patient demographic characteristics can be correlated with the amount of care a beneficiary receives and whether care is facility-based or ambulatory. Exhibit 2.20 shows the total average number of sequence stops, and facility- and ambulatory-based sequence stops by select beneficiary demographic characteristics for episodes defined by CHF*RENAL. Episodes that contain a hospital admission (prior to the index acute care hospitalization) have slightly less than double as many sequence stops during the episode compared to episodes that do not contain a hospitalization (total sequence stops of 5.15 compared to 2.64). Episodes that contain a hospital admission have, on average, 2.51 more sequence stops, of which 1.37 are facility-based and 1.14 are ambulatory-based.

Episodes for dual eligible patients have a different average number and mix of sequence stops. Within CHF*RENAL episodes, dual eligible patients have 0.37 more sequence stops than those who are not dual eligible (total sequence stops of 3.22 compared to 2.85). Episodes for dual eligibles have 0.05 more facility based sequence stops and 0.32 more ambulatory-based sequence stops than episodes for non-dual eligibles.

Whether or not an episode is for a beneficiary that lives a rural area appears to be correlated with the average number of sequence stops, as well. Episodes for beneficiaries who reside in rural areas have 0.26 more average sequence stops compared to episodes for beneficiaries who reside in urban areas. Episodes for beneficiaries in urban areas have 0.02 more facility-based sequence stops but have 0.28 fewer ambulatory-based sequence stops.

Episode Type 2: Pre-Acute Episodes

Exhibit 2.20: Average Sequence Stops for Beneficiary Demographic Characteristics for Episodes Defined by CHF*RENAL for 60-day Fixed-Length Pre-Acute Episode (2007-2009)

Beneficiary Demographic Characteristics	Percent of Episodes for "Yes"	Yes			No			Difference		
		Average Sequence Stops	Average Facility-based Sequence Stops	Average Ambulatory-based Sequence Stops	Average Sequence Stops	Average Facility-based Sequence Stops	Average Ambulatory-based Sequence Stops	Average Sequence Stops	Average Facility-based Sequence Stops	Average Ambulatory-based Sequence Stops
Live Alone	27.5%	2.97	1.26	1.71	2.92	1.21	1.71	0.05	0.05	0.00
Died during Episode	39.0%	3.04	1.26	1.78	2.86	1.20	1.66	0.18	0.06	0.12
Dual Eligible	21.1%	3.22	1.26	1.96	2.85	1.21	1.64	0.37	0.05	0.32
Female	60.7%	2.94	1.22	1.72	2.92	1.22	1.70	0.02	0.00	0.02
Non-white Race	15.7%	3.10	1.28	1.82	2.90	1.21	1.69	0.20	0.07	0.13
Resides in Rural Area	23.9%	3.13	1.21	1.92	2.87	1.23	1.64	0.26	-0.02	0.28
Older than 84 Years	42.3%	2.89	1.21	1.68	2.96	1.23	1.73	-0.07	-0.02	-0.05
Episode Contains Hospital Admission	11.7%	5.15	2.43	2.72	2.64	1.06	1.58	2.51	1.37	1.14

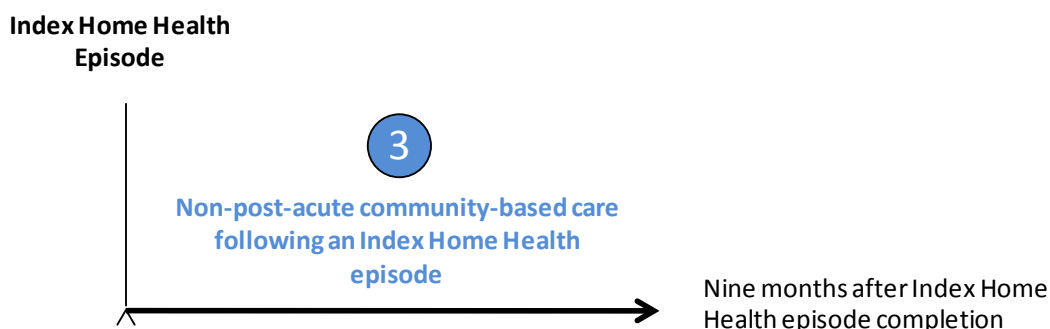
Source: Dobson | DaVanzo analysis of research-identifiable 5% SAF for all sites of service, 2007-2009, wage index adjusted by setting and geographic region. All episodes have been extrapolated to reflect the universe of Medicare beneficiaries. Average Medicare Episode Paid includes care from all facility-based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

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

Brief Review of Episode Definition¹⁷

This is the only episode type that is not anchored to an index acute care hospital stay. This episode type is initiated by a community admission to home health, and captures all non-post-acute care (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 expenditures over an extended 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



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*.

Episode Type 3: Non-Post-Acute Episodes

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

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

The patient pathways presented for the non-post-acute care community-based episodes include all care following a community admission to home health. That is, every episode contains at least one home health admission and nine-months of care following discharge. In the analysis presented below, we present the average total number of sequence stops in the episode, and separately present the average number of facility-based and ambulatory-based sequence stops. Additionally, in order to control the length of the pathways, consecutive physician or outpatient procedures without the presence of other care settings are represented as a single sequence stop. For example, a pathway that includes a series of physician visits then admission to the SNF represents two sequence stops, regardless of the number of physician visits that occurred while the patient was in the community "sequence stop." As noted in the Methods in Brief section of this report, home health segments interrupted by a community visit (e.g., an "H-C-H" pathway) are considered multiple HHA "stops," and one community "stop." This structure gives us a clear picture of how home health care interacts with community care.

In order to better determine which variables are significant predictors of the number of patient pathways, we conducted a multivariate regression analysis. The regression equation attempts to explain the number of sequence stops within a pathway through a series of independent variables, such as patient clinical and demographic characteristics. In this report, we limit our descriptive statistics to the independent variables that have the most significant influence on patient pathways.

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

Episode Type 3: Non-Post-Acute Episodes

Across all three years (2007-2009), there are 2,990,540 Type 3 episodes that represent \$73.1 billion in Medicare payments.^{18,19} In 2008, the non-post-acute-care community-based episodes represent about 11 percent of total Medicare fee-for-service spending.²⁰

Descriptive Statistics across All Non-Post-Acute Care Community-based Episodes

Distribution of Episodes by Primary Chronic Condition

Exhibit 3.2 shows the average number of sequence stops for non-post-acute care community-based episodes by primary chronic condition, sorted from highest to lowest community risk score. The episode is assigned the most severe chronic condition based on the community-risk score used in the Medicare Advantage program, (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 Medicare payments.

Across all chronic conditions, non-post-acute care community-based episodes have an average of 8.62 sequence stops, of which 4.17 are facility-based and 4.45 are ambulatory-based. Since this episode type is triggered by the community admission to home health and is nine-months long, these episodes can include both pre- and post-acute care episodes. Therefore, it is expected that the average number of sequence stops would be considerably higher than the results presented in both the pre- and post-acute care episodes.

As with Episode Type 2, CHF*COPD is the most prevalent primary chronic condition, representing 23.4 percent of episodes and 11.07 average sequence stops. Osteoporosis (18.9 percent) and DIABETES*CHF (15.5 percent) remain the second and third most prevalent primary chronic conditions, representing an average of 7.69 and 9.54 sequence stops per episode, respectively. As the community-risk decreases, so does the average total number of sequence stops. The total number of sequence stops ranges from 11.07 for CHF*COPD episodes to 4.18 for Cataract episodes. CHF*COPD episodes have the highest number both of average facility-based sequence stops (5.63) and ambulatory-based sequence stops (5.44). Prostate cancer episodes have the fewest number of average facility-based sequence stops (1.74) and diabetes episodes have the fewest number of ambulatory-based sequence stops (2.24).

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 3: Non-Post-Acute Episodes

Exhibit 3.2: Total Medicare Episode Paid, Number of Episodes, and Average Sequence Stops by Primary Chronic Conditions^a for Nine-Month Fixed-Length Non-Post-Acute Community-based Episode (2007-2009)

Primary Chronic Condition	Number of Episodes	Percent of Episodes	Total Medicare Episode Paid (in millions)	Average Medicare Episode Paid	Average Sequence Stops	Average Facility-based Sequence Stops	Average Ambulatory-based Sequence Stops
CHF* COPD	699,540	23.4%	\$24,663	\$35,256	11.07	5.63	5.44
DIABETES* CHF	463,620	15.5%	\$13,868	\$29,913	9.54	4.74	4.80
CHF* RENAL	159,960	5.3%	\$4,493	\$28,088	9.15	4.62	4.53
Lung Cancer	38,400	1.3%	\$1,030	\$26,814	7.90	3.68	4.22
Osteoporosis	563,980	18.9%	\$10,709	\$18,988	7.69	3.47	4.22
COPD	186,140	6.2%	\$3,937	\$21,151	8.17	3.82	4.35
Rheumatoid Arthritis/Osteoarthritis	384,560	12.9%	\$6,659	\$17,316	7.40	3.44	3.96
Hip/Pelvic Fracture	14,080	0.5%	\$360	\$25,598	7.56	3.75	3.81
Heart Failure	72,580	2.4%	\$1,199	\$16,519	6.91	3.17	3.74
Alzheimer's Disease	90,800	3.0%	\$1,494	\$16,458	6.98	3.13	3.85
Alzheimer's Disease and Related Disorders	62,760	2.1%	\$1,061	\$16,898	6.85	3.12	3.73
Stroke/Transient Ischemic Attack	27,820	0.9%	\$503	\$18,094	7.00	3.18	3.82
Colorectal Cancer	7,140	0.2%	\$212	\$29,712	6.62	3.28	3.34
Depression	62,820	2.1%	\$1,060	\$16,868	7.12	3.14	3.98
Acute Myocardial Infarction	1,180	0.0%	\$22	\$18,266	6.69	3.63	3.06
Ischemic Heart Disease	50,320	1.7%	\$671	\$13,337	5.24	2.50	2.74
Atrial Fibrillation	3,740	0.1%	\$58	\$15,415	5.52	2.70	2.82
Chronic Kidney Disease	15,820	0.5%	\$279	\$17,634	6.02	2.91	3.11
Female Breast Cancer	3,720	0.1%	\$67	\$18,144	4.97	1.95	3.02
Prostate Cancer	2,400	0.1%	\$23	\$9,718	4.09	1.74	2.35
Endometrial Cancer	300	0.0%	\$5	\$17,579	8.20	2.93	5.27
Diabetes	24,500	0.8%	\$206	\$8,389	4.49	2.25	2.24
Glaucoma	4,680	0.2%	\$34	\$7,293	4.41	2.03	2.38
Cataract	8,840	0.3%	\$70	\$7,969	4.18	1.86	2.32
None	40,840	1.4%	\$417	\$10,210	4.96	2.38	2.58
Overall Average	2,990,540	100.0%	\$73,101	\$24,444	8.62	4.17	4.45

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 Paid 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 3.3A and Exhibit 3.3B present the 10 most frequent patient pathways for pre-acute care episodes overall and the top five most frequent patient pathways for the four most prevalent primary chronic conditions. Unlike the post-acute and pre-acute care episodes, the distribution of patient pathways is less concentrated among the most frequent pathways. This is likely a function of the extended episode length for which patient pathways are more likely to vary. The top 10 patient pathways represent slightly more than one-third (34.7 percent) of all episodes. These top frequency patient pathways have a significantly lower average Medicare episode payment than the non-post-acute care community-based episodes overall (\$9,096 compared to \$24,444). The most frequent patient pathway, represented by 16.8 percent of all episodes, is “H-C,” which indicates that following the index home health admission, the patient returns to the community and receives care from a physician or outpatient department.

The presence of a community sequence stop in between the home health sequence stops warrants further investigation. Initial analysis indicates that patients with care pathways intertwined between home health and physician care have a higher proportion of high-severity primary chronic conditions than other non-post-acute care community-based episodes. This suggests that home health providers, in coordination with physicians, are often able to keep patients safe at home and out of facility-based care thus reducing Medicare episode payments.

Exhibit 3.3A: Distribution of Episodes and Medicare Episode Payments for Most Frequent Patient Pathways for Nine-Month Fixed-Length Non-Post-Acute Community-based Care Episode (2007-2009)

Pathway Pattern	Percent of Episodes	Average Medicare Episode Paid
H-C	16.8%	\$5,273
H-C-H-C	5.1%	\$8,915
H-C-E-C	2.4%	\$6,794
H-C-H-C-H-C	2.4%	\$12,710
H-C-H-C-H-C-H-C-H-C-H-C	1.9%	\$23,792
H-C-H-C-H-C-H-C	1.6%	\$15,930
H-C-H-C-H-C-H-C-H-C	1.4%	\$20,182
H-C-A-C	1.2%	\$15,087
H	1.0%	\$2,192
H-C-A-H-C	0.9%	\$17,030
Subtotal	34.7%	\$9,096
Other	65.3%	\$32,617
Grand Total	100.0%	\$24,444

Facility-based Sequence Stops:	
A	STACH (Index or Readmission)
H	HHA
I	IRF
L	LTCH
S	SNF
Ambulatory-based Sequence Stops	
C	Community (Physician and Outpatient Visits)
E	ER
P	OP Therapy
T	Hospice
Z	Other IP

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 Paid includes care from all facility-based and ambulatory care settings and excludes beneficiary co-payments.

Episode Type 3: Non-Post-Acute Episodes

Exhibit 3.3B presents the top five patient pathways for the four most prevalent primary chronic conditions. Within each of the primary chronic conditions, the most frequent patient pathway is “H-C.” The second most frequent patient pathway is also consistent across all primary chronic conditions, and consists of two home health segments or stops interrupted by community care (“H-C-H-C”). This could be an indicator of patient severity and the ongoing burden of being homebound. Consistent with the overall trend, the top five patient pathways in each of the primary chronic conditions have an average Medicare episode payment that is significantly less than the overall average Medicare episode payment. This emphasizes the possibility that care coordination to streamline patient pathways and reduce facility-based care as clinically appropriate could reduce overall Medicare payments.

Episode Type 3: Non-Post-Acute Episodes

Exhibit 3.3B: Distribution of Episodes and Medicare Episode Payments for Most Frequent Patient Pathways by First Setting for Nine-Month Fixed-Length Non-Post-Acute Community-based Care Episode (2007-2009)

Primary Chronic Condition	Pathway Patterns	Percent of Episodes	Average Medicare Episode Paid
CHF*COPD	H-C	8.6%	\$5,853
	H-C-H-C	3.4%	\$9,535
	H-C-H-C-H-C	1.9%	\$13,245
	H-C-H-C-H-C-H-C-H-C	1.9%	\$27,498
	H-C-E-C	1.6%	\$7,170
	Subtotal	17.5%	\$9,892
	Other	82.5%	\$40,630
	Total	100.0%	\$35,256
Rheumatoid Arthritis/ Osteoarthritis	H-C	21.0%	\$4,924
	H-C-H-C	6.6%	\$8,462
	H-C-H-C-H-C	3.4%	\$11,761
	H-C-E-C	2.6%	\$6,543
	H-C-H-C-H-C-H-C-H-C	2.4%	\$18,996
	Subtotal	36.0%	\$7,287
	Other	64.0%	\$22,968
	Total	100.0%	\$17,316
DIABETES*CHF	H-C	12.8%	\$6,144
	H-C-H-C	4.8%	\$10,009
	H-C-H-C-H-C	2.7%	\$13,337
	H-C-H-C-H-C-H-C-H-C	2.4%	\$24,267
	H-C-E-C	2.1%	\$8,068
	Subtotal	24.8%	\$9,593
	Other	75.2%	\$36,611
	Total	100.0%	\$29,913
CHF*RENAL	H-C	11.8%	\$5,534
	H-C-H-C	3.8%	\$8,418
	H-C-E-C	1.8%	\$8,517
	H-C-H-C-H-C	1.7%	\$12,382
	H-C-A	1.5%	\$22,391
	Subtotal	20.5%	\$8,129
	Other	79.5%	\$33,248
	Total	100.0%	\$28,088

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 Paid includes care from all facility-based and ambulatory care settings and excludes beneficiary co-payments.

Exhibit 3.4 and Exhibit 3.5 show the average Medicare episode payments and average number of sequence stops by the number of chronic conditions per episode. The number of chronic conditions per episode is normally distributed, with an average of 5.53 chronic conditions represented per episode (data not shown). As the number of chronic conditions per episode increases, both the average Medicare episode payment, and the average

Episode Type 3: Non-Post-Acute Episodes

number of sequence stops increase significantly. Total average number of sequence stops range from 4.96 for episodes with no chronic conditions (which represent 2.38 facility-based and 2.58 ambulatory-based sequence stops) to 16.04 for episodes with 14 or more chronic conditions (which represent 9.06 facility-based and 6.98 ambulatory-based sequence stops).

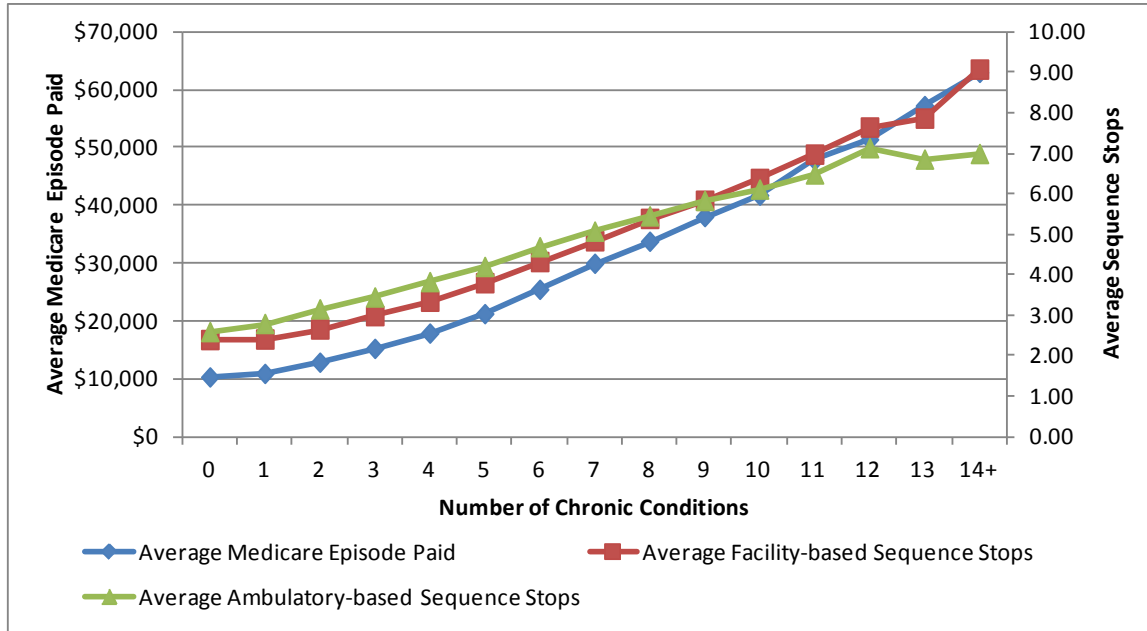
Exhibit 3.4: Average Medicare Episode Paid and Average Sequence Stops by Number of Chronic Conditions for Nine-Month Fixed-Length Non-Post-Acute Community-based Episode (2007-2009)

Number of Chronic Conditions	Percent of Episodes	Average Medicare Episode Paid	Average Sequence Stops	Average Facility-based Sequence Stops	Average Ambulatory-based Sequence Stops
0	1.4%	\$10,210	4.96	2.38	2.58
1	3.6%	\$10,815	5.18	2.40	2.78
2	6.7%	\$12,757	5.78	2.64	3.14
3	10.1%	\$15,146	6.41	2.97	3.43
4	13.3%	\$17,791	7.14	3.33	3.81
5	15.2%	\$21,156	7.98	3.79	4.19
6	14.9%	\$25,361	8.98	4.31	4.68
7	12.9%	\$29,865	9.88	4.82	5.06
8	9.9%	\$33,676	10.81	5.38	5.44
9	6.2%	\$37,944	11.64	5.82	5.82
10	3.5%	\$41,646	12.46	6.36	6.10
11	1.6%	\$47,753	13.44	6.96	6.47
12	0.6%	\$51,296	14.75	7.63	7.12
13	0.2%	\$57,141	14.69	7.85	6.84
14+	0.0%	\$62,884	16.04	9.06	6.98
Overall Average	100.0%	\$24,444	8.62	4.17	4.46

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 Paid includes care from all facility-based and ambulatory care settings and excludes beneficiary co-payments.

Episode Type 3: Non-Post-Acute Episodes

Exhibit 3.5: Average Medicare Episode Paid and Average Facility-based and Ambulatory-based Sequence Stops by Number of Chronic Conditions for Nine-Month Fixed-Length Non-Post-Acute Community-based Episode (2007-2009)



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

Patient demographic characteristics can be a determinant of the amount of care a beneficiary receives and whether care is facility-based or ambulatory. Exhibit 3.6 shows the total average number of sequence stops, and facility- and ambulatory-based sequence stops by select beneficiary demographic characteristics. Episodes that contain a hospital admission have almost twice as many sequence stops during the episode compared to episodes that do not contain a hospitalization (total sequence stops of 12.04 compared to 6.03). While the average number of sequence stops almost doubled with the presence of an acute care (re)hospitalization in the pre- and post-acute care episodes as well, doubling of the average number of sequence stops adds an additional 6.01 sequence stops (in comparison to an additional two to three sequence stops). On average, 3.86 of these additional stops are facility-based while 2.15 are ambulatory-based.

Dual eligible status is correlated with the number of sequence stops as well. Across all chronic conditions, episodes for dual eligible patients have 1.56 more sequence stops than those who are not dual eligible (total sequence stops of 9.69 compared to 8.13). Episodes for dual eligibles have only 0.69 more facility based sequence stops but have 0.87 more ambulatory-based sequence stops than episodes for non-dual eligibles.

Episode Type 3: Non-Post-Acute Episodes

Beneficiary death during an episode also contributes to the average number of sequence stops. Episodes for beneficiaries who died had 0.97 more sequence stops than those who did not. The majority of the additional sequence stops are facility-based (0.77), while 0.20 are ambulatory-based.

Exhibit 3.6: Average Sequence Stops for Beneficiary Demographic Characteristics for Nine-Month Fixed-Length Non-Post-Acute Community-based Episode (2007-2009)

Beneficiary Demographic Characteristics	Percent of Episodes for "Yes"	Yes			No			Difference		
		Average Sequence Stops	Average Facility-based Sequence Stops	Average Ambulatory-based Sequence Stops	Average Sequence Stops	Average Facility-based Sequence Stops	Average Ambulatory-based Sequence Stops	Average Sequence Stops	Average Facility-based Sequence Stops	Average Ambulatory-based Sequence Stops
Live Alone	46.8%	8.99	4.37	4.62	8.30	3.98	4.32	0.69	0.39	0.30
Died during Episode	27.1%	9.33	4.73	4.60	8.36	3.96	4.40	0.97	0.77	0.20
Dual Eligible	31.4%	9.69	4.64	5.05	8.13	3.95	4.18	1.56	0.69	0.87
Female	70.4%	8.63	4.15	4.48	8.61	4.21	4.40	0.02	-0.06	0.08
Non-white Race	22.3%	9.29	4.58	4.71	8.43	4.05	4.38	0.86	0.53	0.33
Resides in Rural Area	19.9%	9.19	4.45	4.74	8.48	4.10	4.38	0.71	0.35	0.36
Older than 84 Years	34.2%	8.20	4.00	4.20	8.84	4.25	4.59	-0.64	-0.25	-0.39
Episode Contains Hospital Admission	43.2%	12.04	6.36	5.68	6.03	2.50	3.53	6.01	3.86	2.15

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.

Episode Type 3: Non-Post-Acute Episodes

Exhibit 3.7 and 3.8 show the average number of sequence stops by primary chronic condition for episodes that contain a hospital admission and episodes for patients who are dual eligible. According to our regression analysis, these beneficiary demographic characteristics are associated with longer patient pathways.

On average, episodes that contain an acute care admission have an average Medicare episode payment that is \$30,771 higher than episodes that do not contain an admission, and contain 6.01 more sequence stops (Exhibit 3.7). Episodes with no chronic conditions have the largest difference in the average number of sequence stops for episodes containing an acute care hospitalization compared to episodes that do not. Episodes with no chronic conditions that have an acute care hospitalization have 6.93 more sequence stops on average than episodes with no acute care hospitalization.

Episodes with a primary chronic condition of acute myocardial Infarction have the second largest difference in the average number of sequence stops for episodes containing an acute care hospital admission compared to episodes that do not. Episodes with an acute care hospitalization contain 6.42 more sequence stops, of which 4.05 are facility-based and 2.37 are ambulatory-based. Acute myocardial infarction episodes that have a hospitalization average 9.74 sequence stops over the nine-month episode. Episodes with glaucoma show the smallest difference in the average number of sequence stops for episodes containing a hospital admission compared to those that do not. Glaucoma episodes containing a hospital admission have 2.53 more sequence stops than those that do not.

On average, episodes for beneficiaries who are dual eligible have an average Medicare episode payment that is \$3,584 higher than episodes for beneficiaries who are not dual eligible, and contain 1.56 more sequence stops (Exhibit 3.8). Episodes for patients with Colorectal cancer episodes have the largest difference in the average number of sequence stops for dual eligible episodes. Episodes for patients with colorectal cancer have 2.75 more sequence stops, of which 1.68 are facility-based, and 1.07 are ambulatory-based. Episodes for patients with acute myocardial infarction do not reflect these trends, in that episodes for dual eligibles have an average of 2.73 fewer sequence stops.

Episode Type 3: Non-Post-Acute Episodes

Exhibit 3.7: Average Sequence Stops by Presence of Acute Care Hospital Admission by Primary Chronic Condition for Nine-Month Fixed-Length Non-Post-Acute Community-based Episode (2007-2009)

Primary Chronic Condition	Percent of Episodes that Contain Hospitalization	Episode Contains Admission					Episode Does Not Contain Admission					Difference			
		Average Medicare Episode Paid	Percent of Episodes	Average Sequence Stops	Average Facility-based Sequence Stops	Average Ambulatory-based Sequence Stops	Average Medicare Episode Paid	Percent of Episodes	Average Sequence Stops	Average Facility-based Sequence Stops	Average Ambulatory-based Sequence Stops	Average Medicare Episode Paid	Average Sequence Stops	Average Facility-based Sequence Stops	Average Ambulatory-based Sequence Stops
CHF*COPD	61.4%	\$48,691	33.3%	13.53	7.32	6.21	\$13,849	15.9%	7.14	2.93	4.21	\$34,842	6.39	4.39	2.00
DIABETES*CHF	49.9%	\$47,031	17.9%	12.48	6.66	5.82	\$12,897	13.7%	6.61	2.83	3.78	\$34,134	5.87	3.83	2.04
CHF*RENAL	59.5%	\$39,914	7.4%	11.30	6.11	5.19	\$10,711	3.8%	6.00	2.44	3.56	\$29,203	5.30	3.67	1.63
Lung Cancer	54.6%	\$37,171	1.6%	9.91	5.07	4.84	\$14,366	1.0%	5.48	2.00	3.48	\$22,805	4.43	3.07	1.36
Osteoporosis	34.4%	\$35,176	15.0%	11.12	5.67	5.45	\$10,496	21.8%	5.89	2.32	3.57	\$24,680	5.23	3.35	1.88
COPD	37.3%	\$36,857	5.4%	11.47	5.87	5.60	\$11,814	6.9%	6.20	2.59	3.61	\$25,043	5.27	3.28	1.99
Rheumatoid Arthritis/ Osteoarthritis	29.6%	\$33,856	8.8%	10.83	5.57	5.26	\$10,347	15.9%	5.95	2.55	3.40	\$23,509	4.88	3.02	1.86
Hip/Pelvic Fracture	54.1%	\$39,111	0.6%	9.73	5.27	4.46	\$9,658	0.4%	4.99	1.97	3.02	\$29,453	4.74	3.30	1.44
Heart Failure	34.2%	\$30,033	1.9%	9.61	4.98	4.63	\$9,505	2.8%	5.52	2.23	3.29	\$20,528	4.09	2.75	1.34
Alzheimer's Disease	32.3%	\$30,514	2.3%	9.90	5.02	4.88	\$9,755	3.6%	5.59	2.22	3.37	\$20,759	4.31	2.80	1.51
Alzheimer's Disease and Related Disorders	30.9%	\$33,939	1.5%	10.32	5.24	5.08	\$9,274	2.6%	5.29	2.17	3.12	\$24,665	5.03	3.07	1.96
Stroke/Transient Ischemic Attack	34.4%	\$34,518	0.7%	10.28	5.19	5.09	\$9,495	1.1%	5.29	2.13	3.16	\$25,023	4.99	3.06	1.93
Colorectal Cancer	40.3%	\$44,494	0.2%	9.59	5.21	4.38	\$19,720	0.3%	4.62	1.97	2.65	\$24,774	4.97	3.24	1.73

Episode Type 3: Non-Post-Acute Episodes

Exhibit 3.7 (continued): Average Sequence Stops by Presence of Acute Care Hospital Admission by Primary Chronic Condition for Nine-Month Fixed-Length Non-Post-Acute Community-based Episode (2007-2009)

Primary Chronic Condition	Percent of Episodes that Contain Hospitalization	Episode Contains Admission					Episode Does Not Contain Admission					Difference			
		Average Medicare Episode Paid	Percent of Episodes	Average Sequence Stops	Average Facility-based Sequence Stops	Average Ambulatory-based Sequence Stops	Average Medicare Episode Paid	Percent of Episodes	Average Sequence Stops	Average Facility-based Sequence Stops	Average Ambulatory-based Sequence Stops	Average Medicare Episode Paid	Average Sequence Stops	Average Facility-based Sequence Stops	Average Ambulatory-based Sequence Stops
Depression	26.2%	\$37,381	1.3%	11.44	5.51	5.93	\$9,585	2.7%	5.59	2.31	3.28	\$27,796	5.85	3.20	2.65
Acute Myocardial Infarction	52.5%	\$28,544	0.0%	9.74	5.55	4.19	\$6,888	0.0%	3.32	1.50	1.82	\$21,656	6.42	4.05	2.37
Ischemic Heart Disease	20.0%	\$32,011	0.8%	9.01	4.74	4.27	\$8,671	2.4%	4.30	1.94	2.36	\$23,341	4.71	2.80	1.91
Atrial Fibrillation	23.0%	\$38,105	0.1%	9.93	5.35	4.58	\$8,639	0.2%	4.21	1.91	2.30	\$29,466	5.72	3.44	2.28
Chronic Kidney Disease	32.5%	\$32,480	0.4%	9.06	4.71	4.35	\$10,489	0.6%	4.56	2.04	2.52	\$21,991	4.50	2.67	1.83
Female Breast Cancer	21.5%	\$32,998	0.1%	7.93	3.83	4.10	\$14,075	0.2%	4.16	1.44	2.72	\$18,923	3.77	2.39	1.38
Prostate Cancer	12.5%	\$22,715	0.0%	7.47	3.60	3.87	\$7,861	0.1%	3.61	1.48	2.13	\$14,854	3.86	2.12	1.74
Endometrial Cancer	26.7%	\$31,020	0.0%	12.75	4.75	8.00	\$12,691	0.0%	6.55	2.27	4.28	\$18,329	6.20	2.48	3.72
Diabetes	8.5%	\$28,588	0.2%	9.95	5.31	4.64	\$6,515	1.3%	3.98	1.97	2.01	\$22,073	5.97	3.34	2.63
Glaucoma	8.1%	\$17,084	0.0%	6.74	3.68	3.06	\$6,428	0.3%	4.21	1.88	2.33	\$10,656	2.53	1.80	0.73
Cataract	7.2%	\$31,262	0.0%	7.78	4.19	3.59	\$6,151	0.5%	3.90	1.67	2.23	\$25,111	3.88	2.52	1.36
None	13.0%	\$33,692	0.4%	10.99	5.54	5.45	\$6,708	2.1%	4.06	1.91	2.15	\$26,984	6.93	3.63	3.30
Overall Average	43.2%	\$41,933	100.0%	12.04	6.36	5.68	\$11,162	100.0%	6.03	2.50	3.53	\$30,771	6.01	3.86	2.15

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 Paid includes care from all facility-based and ambulatory care settings and excludes beneficiary co-payments.

Episode Type 3: Non-Post-Acute Episodes

Exhibit 3.8: Average Sequence Stops by Dual Eligible Status by Primary Chronic Condition for Nine-Month Fixed-Length Non-Post-Acute Community-based Episode (2007-2009)

Primary Chronic Condition	Percent of Episodes that is Dual Eligible	Dual Eligible					Not Dual Eligible					Difference			
		Average Medicare Episode Paid	Percent of Episodes	Average Sequence Stops	Average Facility-based Sequence Stops	Average Ambulatory-based Sequence Stops	Average Medicare Episode Paid	Percent of Episodes	Average Sequence Stops	Average Facility-based Sequence Stops	Average Ambulatory-based Sequence Stops	Average Medicare Episode Paid	Average Sequence Stops	Average Facility-based Sequence Stops	Average Ambulatory-based Sequence Stops
CHF*COPD	36.8%	\$37,947	27.4%	12.21	6.04	6.17	\$33,692	21.6%	10.40	5.39	5.01	\$4,255	1.81	0.65	1.16
DIABETES*CHF	36.2%	\$31,815	17.9%	10.29	5.07	5.22	\$28,832	14.4%	9.11	4.55	4.56	\$2,983	1.18	0.52	0.66
CHF*RENAL	20.8%	\$30,218	3.6%	9.88	4.98	4.90	\$27,527	6.2%	8.96	4.53	4.43	\$2,691	0.92	0.45	0.47
Lung Cancer	21.0%	\$30,809	0.9%	9.67	4.53	5.14	\$25,749	1.5%	7.43	3.45	3.98	\$5,060	2.24	1.08	1.16
Osteoporosis	26.4%	\$19,559	15.8%	8.35	3.77	4.58	\$18,784	20.2%	7.45	3.37	4.08	\$775	0.90	0.40	0.50
COPD	37.8%	\$23,340	7.5%	9.35	4.22	5.13	\$19,822	5.6%	7.45	3.57	3.88	\$3,518	1.90	0.65	1.25
Rheumatoid Arthritis/ Osteoarthritis	30.8%	\$17,064	12.6%	7.91	3.72	4.19	\$17,428	13.0%	7.17	3.32	3.85	-\$364	0.74	0.40	0.34
Hip/Pelvic Fracture	16.5%	\$28,385	0.2%	7.44	3.79	3.65	\$25,048	0.6%	7.58	3.74	3.84	\$3,336	-0.14	0.05	-0.19
Heart Failure	20.7%	\$17,485	1.6%	7.34	3.46	3.88	\$16,267	2.8%	6.80	3.10	3.70	\$1,218	0.54	0.36	0.18
Alzheimer's Disease	20.2%	\$18,949	2.0%	7.67	3.61	4.06	\$15,829	3.5%	6.81	3.00	3.81	\$3,120	0.86	0.61	0.25
Alzheimer's Disease and Related Disorders	26.4%	\$18,010	1.8%	7.45	3.41	4.04	\$16,500	2.3%	6.63	3.02	3.61	\$1,510	0.82	0.39	0.43
Stroke/Transient Ischemic Attack	29.9%	\$23,256	0.9%	8.54	3.93	4.61	\$15,891	1.0%	6.35	2.86	3.49	\$7,365	2.19	1.07	1.12
Colorectal Cancer	15.1%	\$38,297	0.1%	8.96	4.70	4.26	\$28,183	0.3%	6.21	3.02	3.19	\$10,114	2.75	1.68	1.07
Depression	43.2%	\$18,295	2.9%	8.38	3.56	4.82	\$15,784	1.7%	6.17	2.83	3.34	\$2,511	2.21	0.73	1.48

Episode Type 3: Non-Post-Acute Episodes

Exhibit 3.8 (continued): Average Sequence Stops by Dual Eligible Status by Primary Chronic Condition for Nine-Month Fixed-Length Non-Post-Acute Community-based Episode (2007-2009)

Primary Chronic Condition	Percent of Episodes that is Dual Eligible	Dual Eligible					Not Dual Eligible					Difference			
		Average Medicare Episode Paid	Percent of Episodes	Average Sequence Stops	Average Facility-based Sequence Stops	Average Ambulatory-based Sequence Stops	Average Medicare Episode Paid	Percent of Episodes	Average Sequence Stops	Average Facility-based Sequence Stops	Average Ambulatory-based Sequence Stops	Average Medicare Episode Paid	Average Sequence Stops	Average Facility-based Sequence Stops	Average Ambulatory-based Sequence Stops
Acute Myocardial Infarction	8.5%	\$10,382	0.0%	4.20	2.00	2.20	\$18,996	0.1%	6.93	3.78	3.15	-\$8,614	-2.73	-1.78	-0.95
Ischemic Heart Disease	24.7%	\$15,488	1.3%	6.66	3.22	3.44	\$12,631	1.8%	4.78	2.26	2.52	\$2,857	1.88	0.96	0.92
Atrial Fibrillation	13.4%	\$15,001	0.1%	6.60	3.40	3.20	\$15,479	0.2%	5.36	2.59	2.77	-\$478	1.24	0.81	0.43
Chronic Kidney Disease	31.2%	\$18,820	0.5%	7.36	3.37	3.99	\$17,095	0.5%	5.42	2.69	2.73	\$1,725	1.94	0.68	1.26
Female Breast Cancer	12.9%	\$26,033	0.1%	6.50	2.75	3.75	\$16,976	0.2%	4.74	1.83	2.91	\$9,057	1.76	0.92	0.84
Prostate Cancer	10.8%	\$14,712	0.0%	5.46	2.69	2.77	\$9,111	0.1%	3.93	1.63	2.30	\$5,601	1.53	1.06	0.47
Endometrial Cancer	20.0%	\$29,561	0.0%	10.00	5.33	4.67	\$14,583	0.0%	7.75	2.33	5.42	\$14,977	2.25	3.00	-0.75
Diabetes	35.2%	\$8,615	0.9%	5.32	2.55	2.77	\$8,266	0.8%	4.04	2.08	1.96	\$349	1.28	0.47	0.81
Glaucoma	21.4%	\$8,485	0.1%	5.84	2.78	3.06	\$6,969	0.2%	4.03	1.83	2.20	\$1,516	1.81	0.95	0.86
Cataract	21.7%	\$9,356	0.2%	4.18	2.25	1.93	\$7,584	0.3%	4.18	1.75	2.43	\$1,771	0.00	0.50	-0.50
None	36.9%	\$12,655	1.6%	6.22	2.98	3.24	\$8,778	1.3%	4.22	2.03	2.19	\$3,877	2.00	0.95	1.05
Overall Average	31.4%	\$26,904	100.0%	9.69	4.64	5.05	\$23,320	100.0%	8.13	3.95	4.18	\$3,584	1.56	0.69	0.87

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 Paid includes care from all facility-based and ambulatory care settings and excludes beneficiary co-payments.

Episode Type 3: Non-Post-Acute Episodes

Distribution of Episodes and Average Number of Sequence Stops for Select Primary Chronic Conditions

In the remainder of this chapter, we analyze the non-post-acute care community-based episode sequence stops for select primary chronic conditions in more detail. These sections contain descriptive statistics on the average number of sequence stops and average Medicare episode payments for individual conditions.

CHF*COPD

CHF*COPD is the most common and most severe primary chronic condition. This chronic condition represents almost one-quarter (23.4 percent) of all non-post-acute care community-based episodes (Exhibit 3.2). The average Medicare episode payment for CHF*COPD is \$35,256 (Exhibit 3.9) and there is an average of 7.8 chronic conditions per episode. On average, CHF*COPD episodes have 11.07 sequence stops, of which 5.63 are facility-based and 5.44 sequence stops are ambulatory-based.

As the number of chronic conditions per episode increases, the average Medicare episode payment increases, as well as the average number of sequence stops (Exhibit 3.10). Episodes with two chronic conditions contain, on average, 6.22 total sequence stops, while episodes with 14 or more chronic conditions have on average 15.78 total sequence stops. Facility-based sequence stops range from 2.88 for episodes with two chronic conditions to 8.87 for episodes with 14 or more chronic conditions, while ambulatory-based sequence stops range from 3.35 (two chronic conditions) to 7.25 (12 chronic conditions).

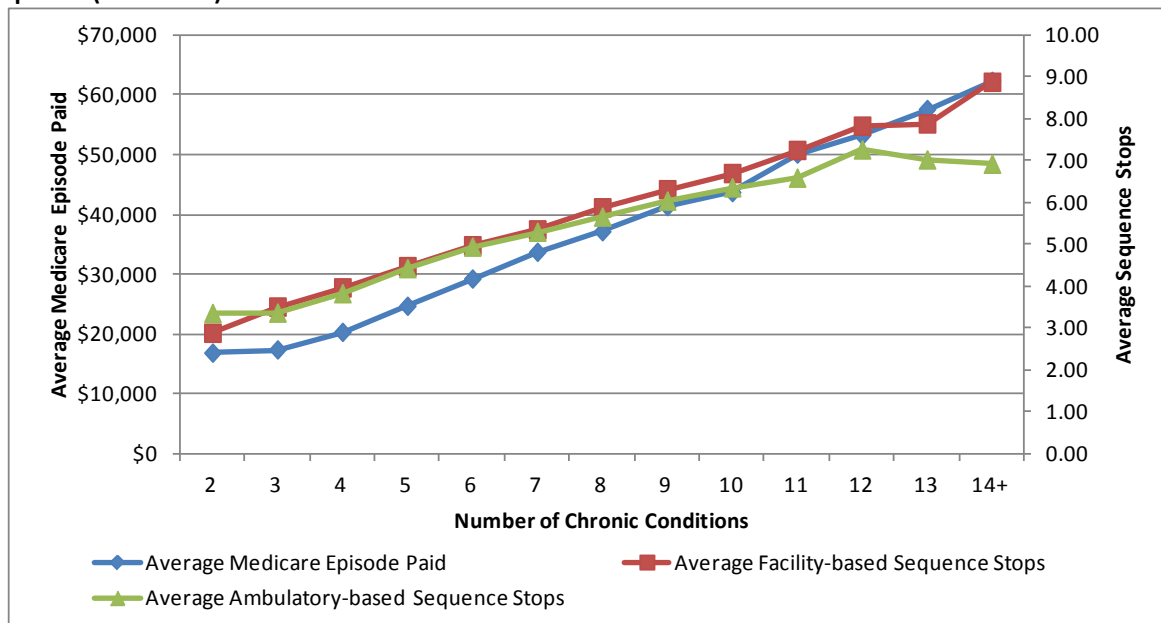
Episode Type 3: Non-Post-Acute Episodes

Exhibit 3.9: Average Medicare Episode Paid and Average Sequence Stops for Episodes Defined by CHF* COPD for Nine-Month Fixed-Length Non-Post-Acute Community-based Episode (2007-2009)

Number of Chronic Conditions	Percent of Episodes	Average Medicare Episode Paid	Average Sequence Stops	Average Facility-based Sequence Stops	Average Ambulatory-based Sequence Stops
2	0.3%	\$16,807	6.22	2.88	3.35
3	1.5%	\$17,347	6.86	3.50	3.36
4	4.3%	\$20,283	7.78	3.96	3.82
5	9.7%	\$24,644	8.89	4.47	4.42
6	15.5%	\$29,193	9.90	4.96	4.93
7	18.9%	\$33,661	10.63	5.34	5.29
8	18.9%	\$37,099	11.52	5.87	5.65
9	14.0%	\$41,298	12.33	6.30	6.03
10	9.5%	\$43,635	13.04	6.69	6.35
11	4.9%	\$50,069	13.82	7.24	6.58
12	1.8%	\$53,155	15.07	7.82	7.25
13	0.6%	\$57,519	14.89	7.87	7.01
14+	0.2%	\$62,223	15.78	8.87	6.91
Overall Average	100.0%	\$35,256	11.07	5.63	5.44

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 Paid includes care from all facility-based and ambulatory care settings and excludes beneficiary co-payments.

Exhibit 3.10: Average Medicare Episode Paid and Average Facility-based and Ambulatory-based Sequence Stops for Episodes Defined by CHF* COPD for Nine-Month Fixed-Length Non-Post-Acute Community-based Episode (2007-2009)



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

Episode Type 3: Non-Post-Acute Episodes

Patient demographic characteristics can be correlated with the amount of care a beneficiary receives and whether care is facility-based or ambulatory. Exhibit 3.11 shows the total average number of sequence stops, and facility- and ambulatory-based sequence stops by select beneficiary demographic characteristics for episodes defined by CHF*COPD.

Episodes containing a hospital admission have about twice as many sequence stops during the episode compared to episodes that do not contain a hospitalization (total sequence stops of 13.53 compared to 7.14). Episodes that contain a hospital admission have, on average, 6.39 more sequence stops, of which 4.39 are facility-based and 2.00 are ambulatory-based.

Dual eligibility status has an impact on the number of sequence stops. Within CHF*COPD episodes, dual eligible patients have 1.81 more sequence stops than those who are not dual eligible (total sequence stops of 12.21 compared to 10.40). Episodes for dual eligibles have 0.65 more facility-based sequence stops and 1.16 more ambulatory-based sequence stops than episodes for non-dual eligibles.

Beneficiary age appears to have an impact on the average number of sequence stops as well. Episodes for beneficiaries who are over the age of 84 years have an average of 1.28 fewer sequence stops per episode compared to episodes for beneficiaries aged 84 years or under, of which 0.55 are facility-based and 0.73 are ambulatory-based.

Episode Type 3: Non-Post-Acute Episodes

Exhibit 3.11: Average Sequence Stops for Beneficiary Demographic Characteristics for Episodes Defined by CHF* COPD for Nine-Month Fixed-Length Non-Post-Acute Community-based Episode (2007-2009)

Beneficiary Demographic Characteristics	Percent of Episodes for "Yes"	Yes			No			Difference		
		Average Sequence Stops	Average Facility-based Sequence Stops	Average Ambulatory-based Sequence Stops	Average Sequence Stops	Average Facility-based Sequence Stops	Average Ambulatory-based Sequence Stops	Average Sequence Stops	Average Facility-based Sequence Stops	Average Ambulatory-based Sequence Stops
Live Alone	51.0%	11.45	5.84	5.61	10.67	5.41	5.26	0.78	0.43	0.35
Died during Episode	34.9%	11.13	6.01	5.12	11.03	5.42	5.61	0.10	0.59	-0.49
Dual Eligible	36.8%	12.21	6.04	6.17	10.40	5.39	5.01	1.81	0.65	1.16
Female	66.4%	11.17	5.68	5.49	10.87	5.52	5.35	0.30	0.16	0.14
Non-white Race	22.2%	11.86	5.99	5.87	10.84	5.52	5.32	1.02	0.47	0.55
Resides in Rural Area	20.7%	11.77	5.96	5.81	10.88	5.54	5.34	0.89	0.42	0.47
Older than 84 Years	31.8%	10.19	5.25	4.94	11.47	5.80	5.67	-1.28	-0.55	-0.73
Episode Contains Hospital Admission	61.4%	13.53	7.32	6.21	7.14	2.93	4.21	6.39	4.39	2.00

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 Paid includes care from all facility-based and ambulatory care settings and excludes beneficiary co-payments.

Episode Type 3: Non-Post-Acute Episodes

Osteoporosis

Osteoporosis is the second most common primary community-referred chronic condition, and defines 18.9 percent of all non-post-acute care community-based episodes (Exhibit 3.2). Osteoporosis episodes have an average Medicare episode payment of \$18,988 per episode (Exhibit 3.12) and an average number of 5.7 chronic conditions per episode (data not shown). On average, Osteoporosis episodes have 7.69 sequence stops, of which 3.47 are facility-based and 4.22 sequence stops are ambulatory-based.

Episodes with one chronic condition contain, on average, 4.82 total sequence stops, while episodes with 12 chronic conditions have on average 13.56 total sequence stops. Similar to the trend evidenced in CHF*CPD episodes, the number of facility-based and ambulatory-based sequence stops increase proportionately as the number of chronic conditions increase (Exhibit 3.13). The total number of sequence stops is almost evenly divided between facility-based and ambulatory-based stops for episodes with 10 to 12 chronic conditions. Facility-based sequence stops range from 2.25 for episodes with one chronic condition to 6.69 for episodes with 12 chronic conditions. The average number of ambulatory-based sequence stops range from 2.57 for episodes with one chronic condition to 6.88 for episodes with more than 12 chronic conditions.

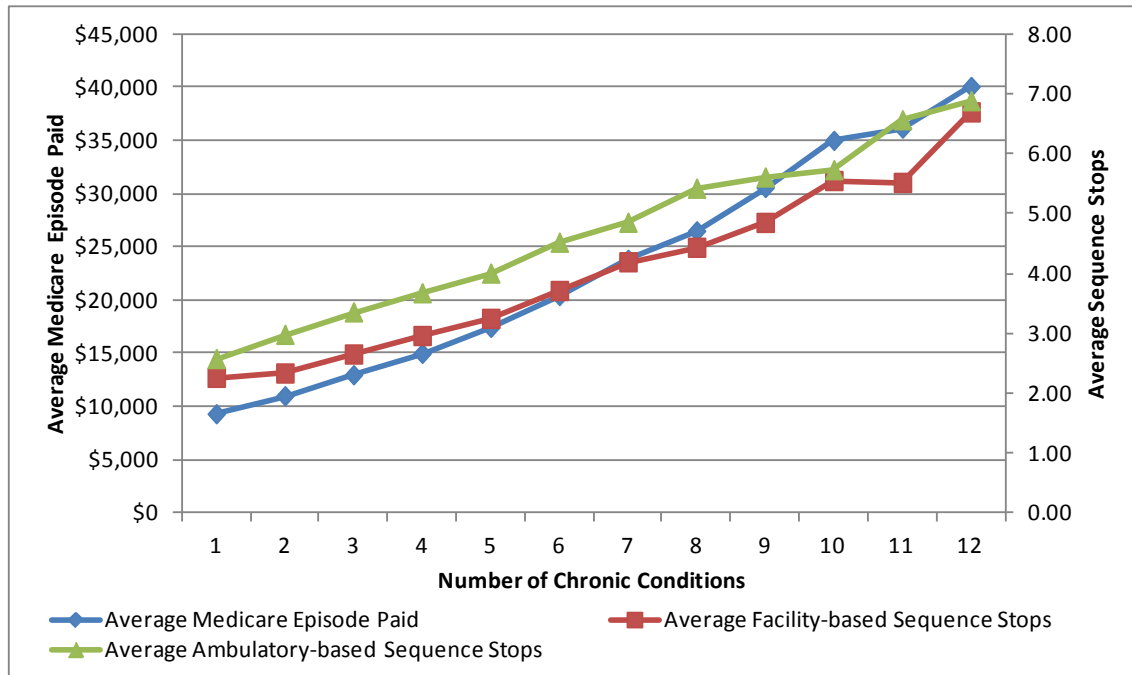
Exhibit 3.12: Average Medicare Episode Paid and Average Sequence Stops for Episodes Defined by Osteoporosis for Nine-Month Fixed-Length Non-Post-Acute Community-based Episode (2007-2009)

Number of Chronic Conditions	Percent of Episodes	Average Medicare Episode Paid	Average Sequence Stops	Average Facility-based Sequence Stops	Average Ambulatory-based Sequence Stops
1	1.1%	\$9,250	4.82	2.25	2.57
2	5.2%	\$10,945	5.30	2.33	2.97
3	10.9%	\$12,915	5.99	2.64	3.35
4	17.4%	\$14,925	6.62	2.95	3.67
5	20.2%	\$17,366	7.23	3.24	4.00
6	18.2%	\$20,360	8.21	3.70	4.51
7	13.1%	\$23,762	9.03	4.18	4.84
8	8.3%	\$26,440	9.84	4.43	5.41
9	3.9%	\$30,513	10.44	4.84	5.60
10	1.3%	\$34,937	11.26	5.54	5.72
11	0.4%	\$36,090	12.07	5.51	6.56
12	0.1%	\$40,004	13.56	6.69	6.88
Overall Average	100.0%	\$18,988	7.69	3.47	4.22

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 Paid includes care from all facility-based and ambulatory care settings and excludes beneficiary co-payments.

Episode Type 3: Non-Post-Acute Episodes

Exhibit 3.13: Average Medicare Episode Paid and Average Facility-based and Ambulatory-based Sequence Stops for Episodes Defined by Osteoporosis for Nine-Month Fixed-Length Non-Post-Acute Community-based Episode (2007-2009)



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

Patient demographic characteristics are correlated with the amount of care a beneficiary receives and whether care is facility-based or ambulatory. Exhibit 3.14 shows the total average number of sequence stops, and facility- and ambulatory-based stops by select beneficiary demographic characteristics for episodes defined by osteoporosis. Similar to CHF* COPD episodes, osteoporosis episodes that contain a hospital admission have nearly twice as many sequence stops during the episode compared to episodes that do not contain a hospitalization (total sequence stops of 11.12 compared to 5.89). Episodes that contain a hospital admission have, on average, 5.23 more sequence stops, of which 3.35 are facility-based and 1.88 are ambulatory-based.

Whether a patient died during the episode is correlated with the average number of sequence stops as well. Episodes for beneficiaries who died during the episode have 1.25 more sequence stops than those who did not die. On average, 0.67 of these sequence stops are facility-based while 0.58 are ambulatory-based.

Episode Type 3: Non-Post-Acute Episodes

The average number of sequence stops is also impacted by dual eligible status. Within Osteoporosis episodes, dual eligible patients have 0.90 more sequence stops than those who are not dual eligible (total sequence stops of 8.35 compared to 7.45). Episodes for dual eligibles have 0.40 more facility-based sequence stops and 0.50 more ambulatory-based sequence stops than episodes for non-dual eligibles.

Lastly, episodes for female beneficiaries have 0.70 fewer average sequence stops compared to episodes for male beneficiaries. Episodes for female beneficiaries have 0.38 fewer facility-based sequence stops and 0.32 fewer ambulatory-based sequence stops.

Exhibit 3.14: Average Sequence Stops for Beneficiary Demographic Characteristics for Episodes Defined by Osteoporosis for Nine-Month Fixed-Length Non-Post-Acute Community-based Episode (2007-2009)

Beneficiary Demographic Characteristics	Percent of Episodes for "Yes"	Yes			No			Difference		
		Average Sequence Stops	Average Facility-based Sequence Stops	Average Ambulatory-based Sequence Stops	Average Sequence Stops	Average Facility-based Sequence Stops	Average Ambulatory-based Sequence Stops	Average Sequence Stops	Average Facility-based Sequence Stops	Average Ambulatory-based Sequence Stops
Live Alone	52.4%	7.87	3.59	4.28	7.50	3.35	4.15	0.37	0.24	0.13
Died during Episode	16.9%	8.73	4.03	4.70	7.48	3.36	4.12	1.25	0.67	0.58
Dual Eligible	26.4%	8.35	3.77	4.58	7.45	3.37	4.08	0.90	0.40	0.50
Female	90.2%	7.62	3.44	4.18	8.32	3.82	4.50	-0.70	-0.38	-0.32
Non-white Race	15.9%	7.89	3.68	4.21	7.65	3.44	4.21	0.24	0.24	0.00
Resides in Rural Area	17.6%	8.22	3.76	4.46	7.58	3.41	4.17	0.64	0.35	0.29
Older than 84 Years	39.8%	7.54	3.46	4.08	7.79	3.49	4.30	-0.25	-0.03	-0.22
Episode Contains Hospital Admission	34.4%	11.12	5.67	5.45	5.89	2.32	3.57	5.23	3.35	1.88

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.

Episode Type 3: Non-Post-Acute Episodes

DIABETES*CHF

About 15.5 percent of non-post-acute care community-based episodes are defined by a primary chronic condition of DIABETES*CHF (Exhibit 3.2). DIABETES*CHF episodes have an average Medicare episode payment of \$29,913 (Exhibit 3.15) and an average of 6.8 chronic conditions per episode. On average, DIABETES*CHF episodes have 9.54 sequence stops, of which 4.74 are facility-based and 4.80 sequence stops are ambulatory-based.

Episodes with two chronic conditions contain, on average, 6.17 total sequence stops, while episodes with 13 or more chronic conditions average 14.35 total sequence stops. Regardless of the number of chronic conditions (with the exception of episodes with 13 or more chronic conditions) the average number of ambulatory- and facility-based sequence stops within episodes is similar (Exhibit 3.16). Facility-based sequence stops range from 3.07 for episodes with two chronic conditions to 8.39 for episodes with 13 or more chronic conditions. The average number of ambulatory-sequence stops ranges from 3.10 for episodes with two chronic conditions to 6.88 for episodes with 12 chronic conditions. The average Medicare episode payment increases in proportion to the number of chronic conditions in the episode.

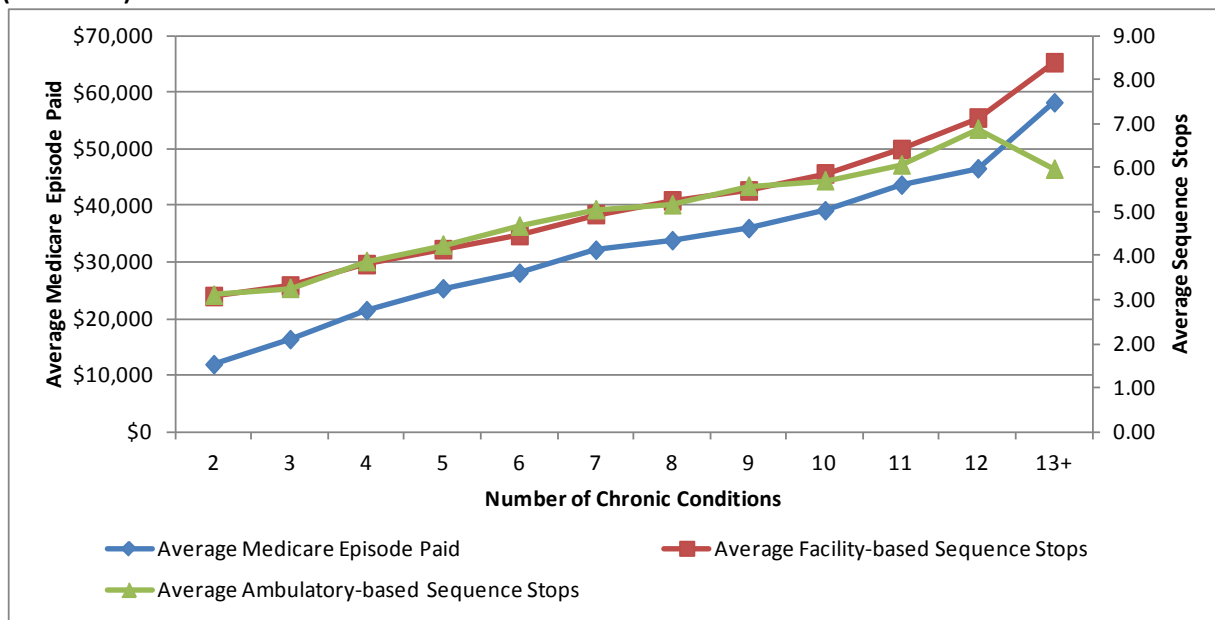
Episode Type 3: Non-Post-Acute Episodes

Exhibit 3.15: Average Medicare Episode Paid and Average Sequence Stops for Episodes Defined by DIABETES*CHF for Nine-Month Fixed-Length Non-Post-Acute Community-based Episode (2007-2009)

Number of Chronic Conditions	Percent of Episodes	Average Medicare Episode Paid	Average Sequence Stops	Average Facility-based Sequence Stops	Average Ambulatory-based Sequence Stops
2	0.2%	\$11,832	6.17	3.07	3.10
3	1.7%	\$16,259	6.57	3.31	3.26
4	6.4%	\$21,391	7.66	3.80	3.87
5	13.8%	\$25,258	8.38	4.14	4.24
6	18.6%	\$28,010	9.13	4.46	4.67
7	20.7%	\$32,076	9.98	4.93	5.05
8	16.8%	\$33,763	10.40	5.25	5.16
9	11.1%	\$35,895	11.05	5.47	5.58
10	6.7%	\$39,049	11.56	5.86	5.70
11	2.9%	\$43,582	12.48	6.41	6.06
12	0.9%	\$46,481	14.01	7.13	6.88
13+	0.3%	\$58,146	14.35	8.39	5.97
Overall Average	100.0%	\$29,913	9.54	4.74	4.80

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 Paid includes care from all facility-based and ambulatory care settings and excludes beneficiary co-payments.

Exhibit 3.16: Average Medicare Episode Paid and Average Facility-based and Ambulatory-based Sequence Stops for Episodes Defined by DIABETES*CHF for Nine-Month Fixed-Length Non-Post-Acute Community-based Episode (2007-2009)



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

Episode Type 3: Non-Post-Acute Episodes

Patient demographic characteristics can be correlated with the amount of care a beneficiary receives and whether care is facility-based or ambulatory. Exhibit 3.17 shows the total average number of sequence stops, and facility- and ambulatory-based sequence stops by select beneficiary demographic characteristics for episodes defined by DIABETES*CHF. Consistent with other primary chronic conditions, DIABETES*CHF episodes that contain a hospital admission have twice as many sequence stops during the episode compared to episodes that do not contain a hospitalization (total sequence stops of 12.48 compared to 6.61). Episodes that contain a hospital admission have, on average, 5.87 more stops, of which 3.83 are facility-based and 2.04 are ambulatory-based.

Episodes for dual eligible patients have a different average number and mix of sequence stops. Within DIABETES*CHF episodes, dual eligible patients have 1.18 more sequence stops than those who are not dual eligible (total sequence stops of 10.29 compared to 9.11). Episodes for dual eligibles have 0.52 more facility-based sequence stops and 0.66 more ambulatory-based sequence stops than episodes for non-dual eligibles.

Beneficiary race and whether or not a beneficiary lives in a rural area appear to be correlated with the average number of sequences stops as well. Episodes for beneficiaries who are non-white have an average of 1.06 more sequence stops per episode compared to episodes for white beneficiaries, of which 0.60 are facility-based and 0.46 are ambulatory-based. Additionally, episodes for beneficiaries who reside in rural areas have 1.04 more average sequence stops compared to episodes for beneficiaries who reside in urban areas. Episodes for beneficiaries in rural areas have 0.41 more facility-based sequence stops and 0.63 more ambulatory-based sequence stops.

Episode Type 3: Non-Post-Acute Episodes

Exhibit 3.17: Average Sequence Stops for Beneficiary Demographic Characteristics for Episodes Defined by DIABETES*CHF for Nine-Month Fixed-Length Non-Post-Acute Community-based Episode (2007-2009)

Beneficiary Demographic Characteristics	Percent of Episodes for "Yes"	Yes			No			Difference		
		Average Sequence Stops	Average Facility-based Sequence Stops	Average Ambulatory-based Sequence Stops	Average Sequence Stops	Average Facility-based Sequence Stops	Average Ambulatory-based Sequence Stops	Average Sequence Stops	Average Facility-based Sequence Stops	Average Ambulatory-based Sequence Stops
Live Alone	46.5%	9.81	4.86	4.95	9.31	4.63	4.68	0.50	0.23	0.27
Died during Episode	27.6%	9.97	5.22	4.75	9.37	4.55	4.82	0.60	0.67	-0.07
Dual Eligible	36.2%	10.29	5.07	5.22	9.11	4.55	4.56	1.18	0.52	0.66
Female	70.1%	9.61	4.75	4.86	9.38	4.70	4.68	0.23	0.05	0.18
Non-white Race	31.3%	10.27	5.15	5.12	9.21	4.55	4.66	1.06	0.60	0.46
Resides in Rural Area	18.8%	10.38	5.07	5.31	9.34	4.66	4.68	1.04	0.41	0.63
Older than 84 Years	31.3%	9.00	4.49	4.51	9.79	4.85	4.94	-0.79	-0.36	-0.43
Episode Contains Hospital Admission	49.9%	12.48	6.66	5.82	6.61	2.83	3.78	5.87	3.83	2.04

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

Episode Type 3: Non-Post-Acute Episodes

CHF*RENAL

More than five percent (5.3 percent) of non-post-acute care community-based episodes have a primary chronic condition of CHF*RENAL (Exhibit 3.2). CHF*RENAL episodes have an average Medicare episode payment of \$29,088 (Exhibit 3.18) and an average of 6.6 chronic conditions per episode (data not shown). On average, CHF*RENAL episodes have 9.15 sequence stops, of which 4.62 are facility-based and 4.53 sequence stops are ambulatory-based.

Similar to the three chronic conditions presented previously, the average number of sequence stops increases as the number of chronic conditions increases. However, once episodes have 12 more sequence stops, the average numbers of both facility-based and ambulatory-based sequence stops decrease, as well as the average Medicare episode payment (Exhibit 3.19). The total average number of sequence stops for CHF*RENAL episodes ranges from 5.79 for episodes with two chronic conditions to 13.29 for episodes with 11 chronic conditions. The average number of facility-based sequence stops ranges from 2.92 for episodes with two chronic conditions to 6.73 for episodes with 11 chronic conditions. The average number of ambulatory-based sequence stops ranges from 2.87 for episodes with two chronic conditions to 6.57 for episodes with 11 chronic conditions.

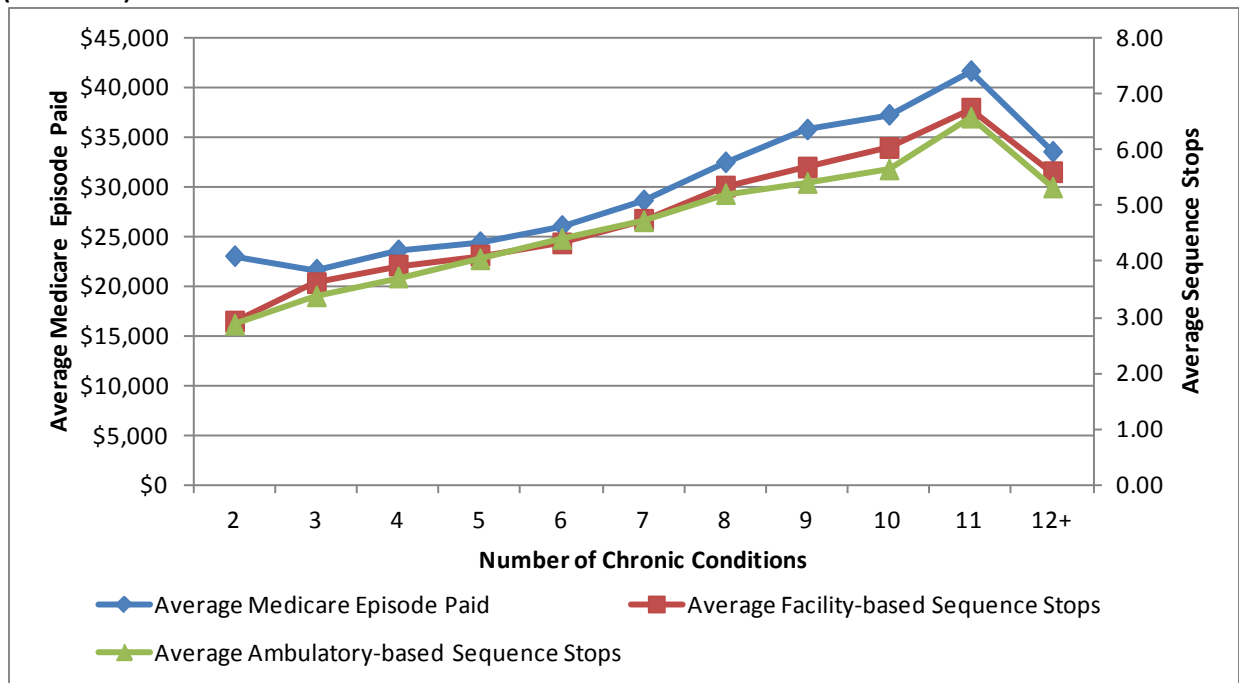
Episode Type 3: Non-Post-Acute Episodes

Exhibit 3.18: Average Medicare Episode Paid and Average Sequence Stops for Episodes Defined by CHF*RENAL for Nine-Month Fixed-Length Non-Post-Acute Community-based Episode (2007-2009)

Number of Chronic Conditions	Percent of Episodes	Average Medicare Episode Paid	Average Sequence Stops	Average Facility-based Sequence Stops	Average Ambulatory-based Sequence Stops
2	1.1%	\$23,012	5.79	2.92	2.87
3	4.8%	\$21,652	6.98	3.61	3.37
4	10.5%	\$23,598	7.63	3.92	3.71
5	16.9%	\$24,420	8.14	4.10	4.03
6	20.2%	\$26,045	8.72	4.32	4.40
7	18.8%	\$28,612	9.46	4.74	4.71
8	14.4%	\$32,445	10.53	5.33	5.20
9	8.0%	\$35,743	11.07	5.67	5.40
10	3.7%	\$37,221	11.66	6.02	5.64
11	1.3%	\$41,615	13.29	6.73	6.57
12+	0.3%	\$33,503	10.91	5.59	5.32
Overall Average	100.0%	\$28,088	9.15	4.62	4.53

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 Paid includes care from all facility-based and ambulatory care settings and excludes beneficiary co-payments.

Exhibit 3.19: Average Medicare Episode Paid and Average Facility-based and Ambulatory-based Sequence Stops for Episodes Defined by CHF*RENAL for Nine-Month Fixed-Length Non-Post-Acute Community-based Episode (2007-2009)



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

Episode Type 3: Non-Post-Acute Episodes

Patient demographic characteristics are correlated with the amount of care a beneficiary receives and whether care is facility-based or ambulatory. Exhibit 3.20 shows the total average number of sequence stops, and facility- and ambulatory-based stops by select beneficiary demographic characteristics for episodes defined by CHF*RENAL. Episodes that contain a hospital admission have slightly less than half as many sequence stops during the episode compared to episodes that do not contain a hospitalization (total sequence stops of 11.30 compared to 6.00). Episodes that contain a hospital admission have, on average, 5.30 more sequence stops, of which 3.67 are facility-based and 1.63 are ambulatory-based.

Whether or not an episode is for a beneficiary that lives a rural area has an impact on the average number of sequence stops as well. Episodes for beneficiaries who reside in rural areas have 0.95 more average sequence stops compared to episodes for beneficiaries who reside in urban areas. Episodes for beneficiaries in rural areas have 0.37 more facility-based sequence stops and 0.58 more ambulatory-based sequence stops.

Within CHF*RENAL episodes, dual eligible patients have 0.92 more stops than those who are not dual eligible (total sequence stops of 9.88 compared to 8.96). Episodes for dual eligibles have 0.45 more facility based sequence stops and 0.47 more ambulatory-based sequence stops than episodes for non-dual eligibles.

Episode Type 3: Non-Post-Acute Episodes

Exhibit 3.20: Average Sequence Stops for Beneficiary Demographic Characteristics for Episodes Defined by CHF*RENAL for Nine-Month Fixed-Length Non-Post-Acute Community-based Episode (2007-2009)

Beneficiary Demographic Characteristics	Percent of Episodes for "Yes"	Yes			No			Difference		
		Average Sequence Stops	Average Facility-based Sequence Stops	Average Ambulatory-based Sequence Stops	Average Sequence Stops	Average Facility-based Sequence Stops	Average Ambulatory-based Sequence Stops	Average Sequence Stops	Average Facility-based Sequence Stops	Average Ambulatory-based Sequence Stops
Live Alone	50.4%	9.40	4.77	4.63	8.90	4.47	4.43	0.50	0.30	0.20
Died during Episode	44.1%	9.11	4.76	4.35	9.19	4.52	4.67	-0.08	0.24	-0.32
Dual Eligible	20.8%	9.88	4.98	4.90	8.96	4.53	4.43	0.92	0.45	0.47
Female	71.6%	9.27	4.67	4.60	8.87	4.51	4.36	0.40	0.16	0.24
Non-white Race	15.3%	9.77	5.09	4.68	9.04	4.54	4.50	0.73	0.55	0.18
Resides in Rural Area	19.5%	9.92	4.92	5.00	8.97	4.55	4.42	0.95	0.37	0.58
Older than 84 Years	58.7%	8.86	4.49	4.37	9.57	4.81	4.76	-0.71	-0.32	-0.39
Episode Contains Hospital Admission	59.5%	11.30	6.11	5.19	6.00	2.44	3.56	5.30	3.67	1.63

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

Average Medicare Episode Paid includes care from all facility-based and ambulatory care settings.

Regional Variation

To explore the variation in beneficiary pathways by region for different first setting episodes (Type 1 – Post-Acute Care) and care settings within episodes (Type 2 – Pre-Acute Care and Type 3 – Non-Post-Acute Care), we conducted an analysis of average number of sequence stops by CMS region. We chose the 10 CMS regions because they represent smaller geographic regions than broader census areas, without compromising data presentation due to sample size issues. Appendix B contains a crosswalk of states to CMS regions. There are 10 CMS regions – see Exhibit 4.1 below.

Exhibit 4.1: Map of 10 CMS Regions



Source: Centers for Medicare & Medicaid Services

Regional Variation

Regional Variation in Episode Type 1: Post-Acute Care

Exhibit 4.2 shows the distribution of episodes, average number of sequence stops, and episodes per 1,000 fee-for-service beneficiaries by each of the 10 CMS regions for 60-day fixed-length post-acute episodes. Region IV – Atlanta – represents almost one-quarter of all post-acute care episodes (23.1 percent). Region X – Seattle – represents the smallest proportion of episodes. The average number of sequence stops within regions ranges from 3.29 (Region X – Seattle) to 3.67 (Region I – Boston).

Across all regions, Region IX – San Francisco – has the highest average Medicare expenditures per episode (\$20,812), but the second lowest average number of sequence stops (3.36). On average, 1.91 sequence stops are facility-based while 1.45 are ambulatory-based. Region I – Boston – has the highest average number of overall sequence stops (3.67) and the highest number of facility-based sequence stops (2.14). Despite the high reliance on facility-based care, the average Medicare episode payment for this region is very close to the national average.

There is significant variation in the number of episodes per 1,000 beneficiaries within regions. Region X – Seattle – has the lowest number of episodes per 1,000 beneficiaries (210 episodes per 1,000 beneficiaries), suggesting that only one-fifth of beneficiaries experience a post-acute care episode. Region VII – Kansas City, however, has the highest number of episodes per 1,000 beneficiaries (321 episodes per 1,000 beneficiaries), suggesting that almost one-third of beneficiaries experience a post-acute care episode. There does not appear to be an association between episodes per 1,000 beneficiaries and average number of sequence stops or average Medicare episode payments, as both the highest and the lowest utilization regions approximate the mean on these measures.

Exhibit 4.2: Average Medicare Episode Paid, Average Sequence Stops, and Episodes per 1,000 Fee-for-Service Beneficiaries by Region for 60-day Fixed-Length Post-Acute Episode (2008)

Region	Percent of Episodes	Average Medicare Episode Paid	Average Sequence Stops	Average Facility-based Sequence Stops	Average Ambulatory-based Sequence Stops	Episodes Per 1,000 Fee-for-Service Beneficiaries
Region I-Boston	5.2%	\$19,633	3.67	2.14	1.53	245
Region II-New York	9.6%	\$20,746	3.39	2.01	1.38	270
Region III-Philadelphia	11.3%	\$19,876	3.45	1.97	1.48	294
Region IV-Atlanta	23.1%	\$18,993	3.40	1.88	1.52	276
Region V-Chicago	18.8%	\$19,143	3.48	1.94	1.54	277
Region VI-Dallas	10.5%	\$19,854	3.40	1.90	1.50	239
Region VII-Kansas City	6.5%	\$18,152	3.42	1.88	1.55	321
Region VIII-Denver	3.0%	\$18,134	3.38	1.84	1.54	276
Region IX-San Francisco	9.1%	\$20,812	3.36	1.91	1.45	215
Region X-Seattle	2.9%	\$18,331	3.29	1.76	1.53	210
Overall Average	100.0%	\$19,478	3.43	1.93	1.50	264

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

Regional Variation

Exhibit 4.3 shows the distribution of episodes, average number of sequence stops, and episodes per 1,000 beneficiaries by CMS regions for post-acute episodes with an index acute care hospitalization of MS-DRG 470. Region X – Seattle continues to have the lowest average number of sequence stops across regions (3.71), while Region I – Boston – continues to have the highest average number of sequence stops across regions (4.64).

Across all regions, Region II – New York – has the highest average Medicare expenditures per episode (\$26,489) and an average number of sequence stops near the mean (4.18). On average, 2.59 sequence stops are facility-based while 1.60 are ambulatory-based. Region X – Seattle, which has the lowest average number of sequence stops, has the lowest average Medicare expenditures per episode (\$19,264). About 2.08 sequence stops are facility-based while 1.64 are ambulatory-based.

There is considerable variation in the number of episodes per 1,000 beneficiaries within regions. Region II – New York – has the lowest number of episodes per 1,000 beneficiaries (9 episodes per 1,000 beneficiaries), while Region VIII – Denver – has the highest number of episodes per 1,000 beneficiaries (19 episodes per 1,000 beneficiaries) and the second lowest average Medicare expenditures per episode.

Exhibit 4.4 shows the distribution of episodes, average number of sequence stops, and episodes per 1,000 beneficiaries by CMS regions for post-acute episodes with an index acute care hospitalization of MS-DRG 291. Region X – Seattle continues to have the lowest average number of sequence stops across regions (3.49), of which 1.97 are facility-based and 1.52 are ambulatory-based. Region I – Boston – continues to have the highest average number of sequence stops across regions (3.93), of which 2.47 are facility-based and 1.46 are ambulatory-based.

Across all regions, Region II – New York – has the highest average Medicare expenditures per episode (\$24,016) and a fairly high average number of sequence stops (3.84). Region X – Seattle – has the lowest average Medicare expenditures per episode (\$18,120). There is some variation in the number of episodes per 1,000 beneficiaries within regions. Region VIII – Philadelphia – has the highest number of episodes per 1,000 beneficiaries (5 episodes per 1,000 beneficiaries), and the remaining regions are evenly divided between 3 and 4 episodes per 1,000 beneficiaries.

Regional Variation

Exhibit 4.3: Average Medicare Episode Paid, Average Sequence Stops, and Episodes per 1,000 Fee-for-Service Beneficiaries by Region for MS-DRG 470 for 60-day Fixed-Length Post-Acute Episode (2008)

Region	Percent of Episodes	Average Medicare Episode Paid	Average Sequence Stops	Average Facility-based Sequence Stops	Average Ambulatory-based Sequence Stops	Episodes Per 1,000 Fee-for-Service Beneficiaries
Region I-Boston	5.0%	\$25,032	4.64	2.84	1.81	11
Region II-New York	7.0%	\$26,489	4.18	2.59	1.60	9
Region III-Philadelphia	10.4%	\$23,417	4.21	2.46	1.74	12
Region IV-Atlanta	21.7%	\$23,187	4.30	2.49	1.81	12
Region V-Chicago	20.2%	\$21,997	4.34	2.34	2.00	14
Region VI-Dallas	10.9%	\$23,422	4.16	2.45	1.71	11
Region VII-Kansas City	7.1%	\$21,239	4.17	2.26	1.92	16
Region VIII-Denver	4.5%	\$20,859	4.10	2.20	1.91	19
Region IX-San Francisco	9.2%	\$22,417	3.87	2.37	1.50	10
Region X-Seattle	3.9%	\$19,264	3.71	2.08	1.64	13
Overall Average	100.0%	\$22,851	4.21	2.42	1.79	12

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

Exhibit 4.4: Average Medicare Episode Paid, Average Sequence Stops, and Episodes per 1,000 Fee-for-Service Beneficiaries by Region for MS-DRG 291 for 60-day Fixed-Length Post-Acute Episode (2008)

Region	Percent of Episodes	Average Medicare Episode Paid	Average Sequence Stops	Average Facility-based Sequence Stops	Average Ambulatory-based Sequence Stops	Episodes Per 1,000 Fee-for-Service Beneficiaries
Region I-Boston	4.9%	\$20,610	3.93	2.47	1.46	3
Region II-New York	10.0%	\$24,016	3.84	2.38	1.46	4
Region III-Philadelphia	12.8%	\$22,213	3.92	2.33	1.59	5
Region IV-Atlanta	23.4%	\$21,457	3.85	2.20	1.65	4
Region V-Chicago	19.1%	\$21,226	3.84	2.28	1.57	4
Region VI-Dallas	10.6%	\$21,612	3.81	2.20	1.61	4
Region VII-Kansas City	5.6%	\$19,359	3.84	2.28	1.55	4
Region VIII-Denver	2.0%	\$18,788	3.66	2.26	1.40	3
Region IX-San Francisco	9.2%	\$19,850	3.56	2.02	1.54	3
Region X-Seattle	2.4%	\$18,120	3.49	1.97	1.52	3
Overall Average	100.0%	\$21,341	3.82	2.25	1.57	4

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

Regional Variation in Episode Type 2: Pre-Acute Care

Exhibit 4.5 shows the distribution of episodes, average number of sequence stops, and episodes per 1,000 beneficiaries by each of the 10 CMS regions for 60-day fixed-length pre-acute episodes. Region IV – Atlanta Region – represents almost one-quarter of all pre-acute care episodes (23.1 percent). Region X – Seattle – represents the smallest proportion of episodes (2.9 percent). The average number of sequence stops within regions ranges from 2.71 (Region II – New York) to 2.96 (Region VII – Kansas City).

The ranking of the regions among the pre-acute care episodes is consistent with that of the post-acute care episodes. Across all regions, Region IX – San Francisco – has the highest average Medicare expenditures per episode (\$14,488), but the second lowest average number of sequence stops (2.79). On average, 1.19 sequence stops are facility-based while 1.61 are ambulatory-based. Region VII – Kansas City, which has the highest average number of sequence stops, has the lowest average Medicare expenditures per episode (\$12,525).

The variation in the number of episodes per 1,000 beneficiaries within regions for pre-acute episodes mirrors the variation observed in the post-acute episodes. Region X – Seattle – has the lowest number of episodes per 1,000 beneficiaries (210 episodes per 1,000 beneficiaries), while Region VII – Kansas City – has the highest number of episodes per 1,000 beneficiaries (321 episodes per 1,000 beneficiaries). There may be some association between episodes per 1,000 beneficiaries and the average number of sequence stops per episode, but high episodes per beneficiaries and sequence stops does not appear to be linked to high average Medicare expenditures per episode.

Exhibit 4.6 shows the distribution of episodes, average number of sequence stops, and episodes per 1,000 beneficiaries by CMS regions for pre-acute episodes defined by CHF* COPD. Region X – Seattle – has the highest average number of sequence stops across regions (3.33), while Region II – New York – has the lowest average number of sequence stops across regions (2.94).

Across all regions, Region IX – San Francisco – has the highest average Medicare expenditures per episode (\$16,135), but close to the overall average number of sequence stops (3.12). On average, 1.32 sequence stops are facility-based while 1.80 are ambulatory-based. Region VIII – Denver – has the lowest average Medicare expenditures per episode (\$13,068) and the second highest average number of sequence stops (3.26). About 1.27 sequence stops are facility-based while 1.99 are ambulatory-based. Across all regions, the number of facility-based sequence stops is very consistent, only ranging from 1.26 to 1.33.

Region X – Seattle – has the lowest number of episodes per 1,000 beneficiaries (44 episodes per 1,000 beneficiaries), while Region VII – Kansas City – has the highest number of episodes per 1,000 beneficiaries (82 episodes per 1,000 beneficiaries).

Regional Variation

Exhibit 4.7 on the next page shows the distribution of episodes, average number of sequence stops, and episodes per 1,000 beneficiaries by CMS regions for pre-acute episodes defined by osteoporosis, Exhibit 4.8 shows the same distribution for DIABETES*CHF, and Exhibit 4.9 shows the distribution for CHF*RENAL. These chronic conditions show similar trends to the distribution of episodes and average number of sequence stops for CHF*COPD.

Region IX – San Francisco – generally has the highest average expenditures, while Region VII – Kansas City – and Region VIII – Denver – have the lowest average expenditures. Region X – Seattle has the highest average number of sequence stops and Region II – New York has the lowest average number of sequence stops across regions. Region I – Boston – and Region V – Chicago – typically have the highest average facility-based sequence stops, while Region X – Seattle has the lowest. There is less variation in facility-based than ambulatory-based sequence stops, where Region II – New York – has the lowest average ambulatory-based sequence stops across regions. Region IX – San Francisco – and Region X – Seattle – tend to have the lowest episodes per 1,000 beneficiaries, and Region VII – Kansas City has the highest.

Exhibit 4.5: Average Medicare Episode Paid, Average Sequence Stops, and Episodes per 1,000 Fee-for-Service Beneficiaries by Region for 60-day Fixed-Length Pre-Acute Episode (2008)

Region	Percent of Episodes	Average Medicare Episode Paid	Average Sequence Stops	Average Facility-based Sequence Stops	Average Ambulatory-based Sequence Stops	Episodes Per 1,000 Fee-for-Service Beneficiaries
Region I-Boston	5.2%	\$12,550	2.88	1.19	1.69	245
Region II-New York	9.6%	\$13,973	2.71	1.20	1.50	270
Region III-Philadelphia	11.3%	\$13,484	2.82	1.20	1.62	294
Region IV-Atlanta	23.1%	\$13,126	2.86	1.19	1.67	276
Region V-Chicago	18.8%	\$12,899	2.89	1.20	1.69	277
Region VI-Dallas	10.5%	\$13,463	2.86	1.19	1.67	239
Region VII-Kansas City	6.5%	\$12,525	2.96	1.19	1.77	321
Region VIII-Denver	3.0%	\$12,582	2.93	1.16	1.77	276
Region IX-San Francisco	9.1%	\$14,488	2.79	1.19	1.60	215
Region X-Seattle	2.9%	\$13,415	2.92	1.16	1.76	210
Overall Average	100.0%	\$13,287	2.85	1.19	1.66	264

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

Regional Variation

Exhibit 4.6: Average Medicare Episode Paid, Average Sequence Stops, and Episodes per 1,000 Fee-for-Service Beneficiaries by Region for Episodes Defined by CHF* COPD for 60-day Fixed-Length Pre-Acute Episode (2008)

Region	Percent of Episodes	Average Medicare Episode Paid	Average Sequence Stops	Average Facility-based Sequence Stops	Average Ambulatory-based Sequence Stops	Episodes Per 1,000 Fee-for-Service Beneficiaries
Region I-Boston	4.8%	\$13,544	3.09	1.29	1.80	58
Region II-New York	10.2%	\$15,567	2.94	1.32	1.62	73
Region III-Philadelphia	11.6%	\$14,815	3.10	1.33	1.77	77
Region IV-Atlanta	23.6%	\$14,346	3.16	1.31	1.85	72
Region V-Chicago	19.2%	\$14,197	3.21	1.33	1.88	72
Region VI-Dallas	10.4%	\$14,626	3.16	1.30	1.86	60
Region VII-Kansas City	6.5%	\$13,706	3.24	1.31	1.92	82
Region VIII-Denver	2.4%	\$13,068	3.26	1.27	1.99	56
Region IX-San Francisco	8.8%	\$16,135	3.12	1.32	1.80	53
Region X-Seattle	2.4%	\$14,606	3.33	1.26	2.07	44
Overall Average	100.0%	\$14,578	3.14	1.31	1.83	67

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

Exhibit 4.7: Average Medicare Episode Paid, Average Sequence Stops, and Episodes per 1,000 Fee-for-Service Beneficiaries by Region for Episodes Defined by Osteoporosis for 60-day Fixed-Length Pre-Acute Episode (2008)

Region	Percent of Episodes	Average Medicare Episode Paid	Average Sequence Stops	Average Facility-based Sequence Stops	Average Ambulatory-based Sequence Stops	Episodes Per 1,000 Fee-for-Service Beneficiaries
Region I-Boston	5.7%	\$10,948	2.76	1.14	1.62	40
Region II-New York	9.7%	\$11,550	2.53	1.13	1.40	41
Region III-Philadelphia	11.6%	\$11,403	2.65	1.12	1.52	46
Region IV-Atlanta	22.3%	\$11,167	2.67	1.12	1.56	40
Region V-Chicago	17.9%	\$10,924	2.77	1.14	1.64	40
Region VI-Dallas	10.0%	\$11,556	2.69	1.12	1.57	35
Region VII-Kansas City	6.4%	\$10,836	2.87	1.14	1.73	48
Region VIII-Denver	3.4%	\$11,513	2.84	1.13	1.71	46
Region IX-San Francisco	9.9%	\$12,231	2.66	1.13	1.53	35
Region X-Seattle	3.1%	\$11,439	2.75	1.12	1.64	33
Overall Average	100.0%	\$11,316	2.70	1.13	1.57	40

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

Regional Variation

Exhibit 4.8: Average Medicare Episode Paid, Average Sequence Stops, and Episodes per 1,000 Fee-for-Service Beneficiaries by Region for Episodes Defined by DIABETES*CHF for 60-day Fixed-Length Pre-Acute Episode (2008)

Region	Percent of Episodes	Average Medicare Episode Paid	Average Sequence Stops	Average Facility-based Sequence Stops	Average Ambulatory-based Sequence Stops	Episodes Per 1,000 Fee-for-Service Beneficiaries
Region I-Boston	4.5%	\$14,448	2.99	1.23	1.75	29
Region II-New York	12.8%	\$16,032	2.78	1.24	1.55	48
Region III-Philadelphia	11.5%	\$15,503	2.99	1.24	1.75	40
Region IV-Atlanta	21.8%	\$14,762	3.00	1.23	1.78	35
Region V-Chicago	18.5%	\$14,678	2.99	1.25	1.74	37
Region VI-Dallas	11.2%	\$15,605	3.07	1.24	1.83	34
Region VII-Kansas City	5.4%	\$14,231	3.09	1.23	1.87	36
Region VIII-Denver	2.5%	\$15,002	3.12	1.21	1.91	30
Region IX-San Francisco	9.5%	\$16,885	2.89	1.23	1.66	30
Region X-Seattle	2.5%	\$15,781	3.06	1.22	1.84	24
Overall Average	100.0%	\$15,278	2.98	1.23	1.74	36

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

Exhibit 4.9: Average Medicare Episode Paid, Average Sequence Stops, and Episodes per 1,000 Fee-for-Service Beneficiaries by Region for Episodes Defined by CHF*RENAL for 60-day Fixed-Length Pre-Acute Episode (2008)

Region	Percent of Episodes	Average Medicare Episode Paid	Average Sequence Stops	Average Facility-based Sequence Stops	Average Ambulatory-based Sequence Stops	Episodes Per 1,000 Fee-for-Service Beneficiaries
Region I-Boston	5.8%	\$14,115	2.92	1.23	1.69	15
Region II-New York	9.3%	\$15,838	2.75	1.21	1.54	15
Region III-Philadelphia	11.7%	\$14,615	2.87	1.22	1.64	17
Region IV-Atlanta	21.3%	\$15,065	2.91	1.22	1.69	14
Region V-Chicago	19.6%	\$13,887	2.94	1.21	1.73	16
Region VI-Dallas	10.2%	\$15,364	2.97	1.23	1.74	13
Region VII-Kansas City	6.3%	\$13,854	2.99	1.20	1.79	18
Region VIII-Denver	3.3%	\$12,974	2.99	1.21	1.78	17
Region IX-San Francisco	9.2%	\$15,993	2.84	1.22	1.62	12
Region X-Seattle	3.1%	\$13,599	3.05	1.21	1.84	13
Overall Average	100.0%	\$14,723	2.91	1.22	1.69	15

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

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

Exhibit 4.10 shows the distribution of episodes, average number of sequence stops, and episodes per 1,000 beneficiaries in each of the 10 CMS regions for nine-month fixed-length non-post-acute care community-based episodes for 2008. Region IV – Atlanta – represents over one-quarter of all non-post-acute care community-based episodes (28.3 percent). Region VIII – Denver – represents the smallest proportion of episodes (2.1 percent). The average number of sequence stops within regions range from 7.18 (Region II – New York) to 10.33 (Region VII – Dallas).

While the ranking of the regions on the non-post-acute care community-based episodes is similar to the other episode types, it differs in several important ways. Region VI – Dallas – has the highest average Medicare expenditures per episode (\$26,300). Dallas has the highest average number of sequence stops, as well as the highest average number of facility-based sequence stops (5.24) and ambulatory sequence stops (5.09). On average, across all regions there are 8.71 sequence stops per episode, with 4.23 facility-based and 4.49 ambulatory-based sequence stops. Region X – Seattle – has the lowest average Medicare expenditures per episode (\$19,343) and the lowest average number of facility-based sequence stops (3.26).

There is significant variation in the number of episodes per 1,000 beneficiaries within regions. Region X – Seattle – has the lowest number of episodes per 1,000 beneficiaries (28 episodes per 1,000 beneficiaries), suggesting that approximately 3 percent of beneficiaries have a non-post-acute care community-based episode. Region VI – Dallas – has the highest number of episodes per 1,000 beneficiaries (65 episodes per 1,000 beneficiaries), suggesting that nearly 7 percent of beneficiaries have a non-post-acute care community-based episode in this region. The association between average Medicare payments per episode and average number of sequence stops is stronger in non-post-acute care community-based episodes than in pre-acute episodes, although this relationship is weaker for episodes per 1,000 beneficiaries.

Exhibit 4.11 shows the distribution of episodes, average number of sequence stops, and episodes per 1,000 beneficiaries by CMS regions for non-post-acute care community-based episodes defined by CHF* COPD. Region II – New York – continues to have the lowest average number of sequence stops across regions (9.43), while Region VI – Dallas – continues to have the highest average number of sequence stops across regions (13.25).

Across all regions, Region VI – Dallas – has the highest average Medicare expenditures per episode (\$37,217) and the highest average number of sequence stops. On average, 6.97 sequence stops are facility-based while 6.28 are ambulatory-based. Region X – Seattle – has the lowest average Medicare expenditures per episode (\$26,737) and the lowest average number of facility-based sequence stops (4.29). The degree of variation in average number of sequence stops is much greater in non-post-acute care community-based episodes, ranging from 4.29 to 6.97 for facility-based sequence stops and 4.42 to 6.28 for ambulatory-based sequence stops.

Regional Variation

Region X – Seattle – has the lowest number of episodes per 1,000 beneficiaries (5 episodes per 1,000 beneficiaries), while Region VI – Dallas – has the highest number of episodes per 1,000 beneficiaries (14 episodes per 1,000 beneficiaries).

Exhibit 4.12 on the next page shows the distribution of episodes, average number of sequence stops, and episodes per 1,000 beneficiaries by CMS region for non-post-acute episodes defined by osteoporosis. Exhibit 4.13 shows the same distribution for DIABETES*CHF, and Exhibit 4.14 shows the same distribution for CHF*RENAL. These chronic conditions show similar trends to the distribution of episodes and average number of sequence stops for CHF*COPD.

Region VI – Dallas – has the highest average Medicare expenditures, average number of sequence stops, average facility-based sequence stops, average ambulatory-based sequence stops, and episodes per 1,000 beneficiaries. Region X – Seattle – has the lowest average Medicare expenditures, average facility-based sequence stops, and episodes per 1,000 beneficiaries. Region II – New York – has the lowest average number of sequence stops and the lowest average ambulatory-based sequence stops, as well as generally low episodes per 1,000 beneficiaries.

Unlike the post-acute and pre-acute episodes, there appears to be a stronger relationship between high utilization regions (in terms of pathway complexity and episodes per 1,000 beneficiaries) and average Medicare payments per episode.

Exhibit 4.10: Average Medicare Episode Paid, Average Sequence Stops, and Episodes per 1,000 Fee-for-Service Beneficiaries by Region for Nine-Month Fixed-Length Non-Post-Acute Community-based Episode (2008)

Region	Percent of Episodes	Average Medicare Episode Paid	Average Sequence Stops	Average Facility-based Sequence Stops	Average Ambulatory-based Sequence Stops	Episodes Per 1,000 Fee-for-Service Beneficiaries
Region I-Boston	5.6%	\$22,104	8.12	3.93	4.18	43
Region II-New York	6.3%	\$23,614	7.18	3.58	3.61	29
Region III-Philadelphia	7.6%	\$23,833	7.84	3.81	4.04	32
Region IV-Atlanta	28.3%	\$25,921	8.89	4.17	4.72	55
Region V-Chicago	18.3%	\$24,508	8.89	4.35	4.54	44
Region VI-Dallas	17.4%	\$26,300	10.33	5.24	5.09	65
Region VII-Kansas City	3.6%	\$24,249	8.34	3.99	4.35	29
Region VIII-Denver	2.1%	\$21,329	7.71	3.45	4.26	32
Region IX-San Francisco	8.5%	\$23,821	7.49	3.66	3.83	33
Region X-Seattle	2.4%	\$19,343	7.35	3.26	4.09	28
Overall Average	100.0%	\$24,720	8.71	4.23	4.49	43

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

Regional Variation

Exhibit 4.11: Average Medicare Episode Paid, Average Sequence Stops, and Episodes per 1,000 Fee-for-Service Beneficiaries by Region for Episodes Defined by CHF* COPD for Nine-Month Fixed-Length Non-Post-Acute Community-based Episode (2008)

Region	Percent of Episodes	Average Medicare Episode Paid	Average Sequence Stops	Average Facility-based Sequence Stops	Average Ambulatory-based Sequence Stops	Episodes Per 1,000 Fee-for-Service Beneficiaries
Region I-Boston	4.8%	\$34,395	10.36	5.46	4.90	9
Region II-New York	5.8%	\$34,842	9.43	5.01	4.42	6
Region III-Philadelphia	7.4%	\$35,643	10.32	5.29	5.04	7
Region IV-Atlanta	29.3%	\$36,373	11.34	5.58	5.76	13
Region V-Chicago	21.0%	\$34,774	11.19	5.75	5.44	12
Region VI-Dallas	16.3%	\$37,217	13.25	6.97	6.28	14
Region VII-Kansas City	3.6%	\$32,932	10.67	5.43	5.25	7
Region VIII-Denver	1.7%	\$31,613	10.29	4.93	5.36	6
Region IX-San Francisco	8.3%	\$37,743	10.00	5.17	4.83	8
Region X-Seattle	1.8%	\$26,737	9.51	4.29	5.22	5
Overall Average	100.0%	\$35,675	11.20	5.71	5.49	10

Source: Dobson | DaVanzo analysis of research-identifiable 5% SAF for all sites of service, 2008, wage index adjusted by setting and geographic region; Centers for Medicare & Medicaid Services, Health Care Financing Review, Statistical Supplement, 2008. All episodes have been extrapolated to reflect the universe of Medicare beneficiaries.

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

Exhibit 4.12: Average Medicare Episode Paid, Average Sequence Stops, and Episodes by 1,000 Fee-for-Service Beneficiaries by Region for Episodes Defined by Osteoporosis for Nine-Month Fixed-Length Non-Post-Acute Community-based Episode (2008)

Region	Percent of Episodes	Average Medicare Episode Paid	Average Sequence Stops	Average Facility-based Sequence Stops	Average Ambulatory-based Sequence Stops	Episodes Per 1,000 Fee-for-Service Beneficiaries
Region I-Boston	6.2%	\$18,063	7.57	3.39	4.18	9
Region II-New York	6.4%	\$15,785	6.03	2.76	3.27	6
Region III-Philadelphia	7.5%	\$17,147	6.69	3.04	3.65	6
Region IV-Atlanta	30.0%	\$20,556	8.03	3.48	4.55	11
Region V-Chicago	15.3%	\$18,853	7.90	3.63	4.28	7
Region VI-Dallas	17.3%	\$20,627	9.22	4.51	4.71	12
Region VII-Kansas City	3.3%	\$19,273	7.29	3.23	4.06	5
Region VIII-Denver	2.5%	\$18,857	7.22	3.07	4.15	7
Region IX-San Francisco	8.9%	\$17,605	6.50	2.95	3.56	7
Region X-Seattle	2.7%	\$16,041	6.60	2.73	3.87	6
Overall Average	100.0%	\$19,124	7.74	3.51	4.23	8

Source: Dobson | DaVanzo analysis of research-identifiable 5% SAF for all sites of service, 2008, wage index adjusted by setting and geographic region; Centers for Medicare & Medicaid Services, Health Care Financing Review, Statistical Supplement, 2008. All episodes have been extrapolated to reflect the universe of Medicare beneficiaries.

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

Regional Variation

Exhibit 4.13: Average Medicare Episode Paid, Average Sequence Stops, and Episodes per 1,000 Fee-for-Service Beneficiaries by Region for Episodes Defined by DIABETES*CHF for Nine-Month Fixed-Length Non-Post-Acute Community-based Episode (2008)

Region	Percent of Episodes	Average Medicare Episode Paid	Average Sequence Stops	Average Facility-based Sequence Stops	Average Ambulatory-based Sequence Stops	Episodes Per 1,000 Fee-for-Service Beneficiaries
Region I-Boston	4.4%	\$26,426	9.01	4.26	4.75	5
Region II-New York	8.1%	\$29,821	7.81	4.00	3.81	6
Region III-Philadelphia	8.0%	\$29,094	8.75	4.36	4.39	5
Region IV-Atlanta	23.7%	\$33,398	10.01	4.91	5.10	7
Region V-Chicago	20.8%	\$27,707	9.59	4.82	4.78	8
Region VI-Dallas	18.4%	\$33,237	11.62	5.90	5.72	11
Region VII-Kansas City	3.5%	\$32,766	9.46	4.71	4.75	4
Region VIII-Denver	1.7%	\$28,341	8.79	3.96	4.82	4
Region IX-San Francisco	9.4%	\$26,623	8.07	4.00	4.07	6
Region X-Seattle	2.0%	\$25,495	9.14	4.11	5.03	4
Overall Average	100.0%	\$30,342	9.66	4.80	4.85	7

Source: Dobson | DaVanzo analysis of research-identifiable 5% SAF for all sites of service, 2008, wage index adjusted by setting and geographic region; Centers for Medicare & Medicaid Services, Health Care Financing Review, Statistical Supplement, 2008. All episodes have been extrapolated to reflect the universe of Medicare beneficiaries.

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

Exhibit 4.14: Average Medicare Episode Paid, Average Sequence Stops, and Episodes per 1,000 Fee-for-Service Beneficiaries by Region for Episodes Defined by CHF*RENAL for Nine-Month Fixed-Length Non-Post-Acute Community-based Episode (2008)

Region	Percent of Episodes	Average Medicare Episode Paid	Average Sequence Stops	Average Facility-based Sequence Stops	Average Ambulatory-based Sequence Stops	Episodes Per 1,000 Fee-for-Service Beneficiaries
Region I-Boston	6.3%	\$26,724	9.15	4.86	4.29	3
Region II-New York	6.5%	\$27,188	7.82	4.21	3.61	2
Region III-Philadelphia	8.1%	\$27,549	8.59	4.45	4.14	2
Region IV-Atlanta	26.5%	\$28,025	9.31	4.56	4.75	3
Region V-Chicago	18.6%	\$29,239	9.22	4.63	4.59	2
Region VI-Dallas	15.1%	\$33,521	11.57	6.03	5.54	3
Region VII-Kansas City	4.3%	\$28,750	9.21	4.46	4.75	2
Region VIII-Denver	1.9%	\$25,564	8.07	4.04	4.03	1
Region IX-San Francisco	9.1%	\$27,839	8.39	4.21	4.18	2
Region X-Seattle	3.5%	\$23,443	7.82	3.70	4.12	2
Overall Average	100.0%	\$28,713	9.31	4.71	4.60	2

Source: Dobson | DaVanzo analysis of research-identifiable 5% SAF for all sites of service, 2008, wage index adjusted by setting and geographic region; Centers for Medicare & Medicaid Services, Health Care Financing Review, Statistical Supplement, 2008. All episodes have been extrapolated to reflect the universe of Medicare beneficiaries.

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

Appendix A: Determining Primary Chronic Conditions

Primary chronic conditions were determined by mapping each chronic condition onto one of the Medicare Advantage Hierarchical Condition Categories (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 failure (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