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PROGRAM SAFEGUARD CONTRACTOR (PSC)

PSC 500-99-0009/0009

Outpatient Rehabilitation Services Payment System Evaluation

Development of a Model Episode-Based Payment System for Outpatient Therapy Services: Feasibility Analysis Using Existing CY 2002 Claims Data

Final Report

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The Centers for Medicare and Medicaid Services

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Table of Contents

1.0 Introduction

The Centers for Medicare and Medicaid Services (CMS) has contracted with AdvanceMed, a CSC Company (formerly DynCorp), to provide professional services that build upon prior studies related to the outpatient therapy benefit under Medicare Part B. Under the Program Safeguard Contract (PSC) for Outpatient Rehabilitation Payment System Service Evaluation Task Order, AdvanceMed is conducting a study of calendar year (CY) 2002 claims data that augments their previous analyses of calendar year (CY) 1998-2000[1] [2].

This is the third in a current series of analytic reports describing Part B therapy services[3] as they occurred in CY 2002. The prior two reports[4] [5] provided descriptive analyses of outpatient therapy utilization patterns while permitting an assessment of the usefulness of the more recent claim data for purposes of modeling alternative variations to the current payment system. The first report described the patterns of procedure code usage by type of therapy service. The second report more specifically described annual-per beneficiary therapy expenditure patterns by numerous variables including:

- Type of therapy (PT, OT or SLP);
- Provider setting, principal claim diagnosis; and
- Other demographic variables (age, gender, state).

In particular, the second report described average annual therapy expenditures and claim diagnoses of high cost therapy users to help identify groups more likely to be impacted by annual payment caps.

Overall, while these reports identified some limitations in CMS claims data and inconsistencies in claims diagnosis reporting requirements; the detail of the data available was significantly improved from what was available for prior therapy studies. Most notably, with the completed conversion of National Claims History (NCH) file data to Version I, we are now able to directly compare claim line procedure data generated by institutional providers (e.g. hospital outpatient departments) to professional providers (e.g., physical therapists in private practice [PTPP]). The findings from the first two reports of CY 2002 therapy claims data is that despite some identified limitations, existing claims data can be used to form the basis of preliminary outpatient therapy service classification schemes.

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[1] Olshin, J., Ciolek, D., Hwang, W.. *Study and Report on Outpatient Therapy Utilization: Physical Therapy, Occupational Therapy, and Speech-Language Pathology Services Billed to Medicare Part B in all Settings in 1998, 1999, and 2000*. September 2002. Available at: http://www.cms.hhs.gov/medlearn/therapy/dyncorprpt.asp.
[2] AdvanceMed. *Therapy Services Error Rate Study*. April 2003. CMS Contract No. 500-99-0009/002.
[3] Therapy service types: PT=physical therapy, OT=occupational therapy, and SLP=speech-language pathology.
[4] Ciolek, D., and Hwang, W.. *Feasibility and Impact Analysis: Application of Various Outpatient Therapy Service Claim HCPCS Edits*. July 2004. CMS Contract No. 500-99-0009/0009.
[5] Ciolek, D., and Hwang, W.. *Utilization Analysis: High Expenditure Users of Outpatient Therapy Services CY 2002 Beneficiary Characteristics*. July 2004. CMS Contract No. 500-99-0009/0009.

In the report titled *Strategy for Developing Short and Long-Term Therapy Payment Options*[6], we reported to CMS that after updating outpatient therapy utilization trends and other benchmark analysis, we would have a data set available for the construction and testing of basic outpatient therapy classification models based upon existing claim diagnosis information. This classification model could potentially be used as the foundation for Medicare payment to a broad range of outpatient therapy providers.

An underlying premise of any alternative payment policy model approach is that the following goals must be considered:

- The methods should continue to ensure beneficiary access to quality care;
- They should be easy to administer;
- They should be capable of being implemented quickly;
- They should ensure predictability of government outlays and integrity of the Medicare program;
- They should help providers predict their Medicare revenues;
- They should establish the Federal government as a prudent buyer of services; and
- They should minimize administrative burden.

CMS also indicated that consideration should also be given to ways to pay claims that minimize the need for manual review, create incentives for the appropriate use of services, reduce contractor workload, that could be budget neutral with other proposed approaches, and be appropriate for education of providers and contractors.

We suggested that an approach using existing CMS claims data would be the easiest to establish administratively as it would not require the use of a separate data collection instrument (e.g. MDS, OASIS, etc.) to classify beneficiaries for payment. Therefore, such a study would take an important step towards developing a patient classification methodology that is both clinically meaningful and administratively feasible. This report reflects the preliminary modeling analysis approved by CMS.

The purpose of this report is to describe the current progress in the development and testing of model classification systems with existing Medicare claims data. The modeling approach described in this report will consider and describe the three types of therapy services (PT, OT, and SLP) independently, while considering the beneficiary's condition, age, gender and state of residence. The outcome measurement in this analysis is per-episode Medicare expenditure[7].

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[6] Ciolek, D., Olshin, .J., and Hwang, W.. *Strategy for Developing Short and Long-Term Therapy Payment Options*. April 2004. CMS Contract No. 500-99-0009/0009.

[7] The term "expenditure(s)" is used in this report consistent with the definition found in the CMS online glossary (www.cms.hhs.gov/glossary); "The issuance of checks, disbursement of cash, or electronic transfer of funds made to liquidate an expense…the same as an outlay." Expenditure(s) therefore describes the amount paid by Medicare for allowed Part B therapy services after deductibles and coinsurance.

However, the model is designed to incorporate other variables into future refinements, including functional status, other outcomes measurements, prior use of services and other clinical characteristics. This report will describe the methodology used, provide descriptive and regression analysis results, and offer a summary.

2.0 Methodology

Analytic models were developed to identify individual beneficiaries who received outpatient therapy services and to assure that, within the limits of data available on the claim, the services furnished were actually therapy services. The initial procedures followed were consistent with the methodology described in our prior report describing annual per-beneficiary outpatient therapy utilization[8]. For example, both analytic models identified claim procedure lines billed and the types of providers furnishing the services. Those beneficiaries were identified as Part B therapy users if they received Medicare services that were paid using the physicians' fee schedule and met the Medicare definition of outpatient therapy services.

After individual therapy users were identified, this study changed analytic direction by separating the three types of therapy services for individual analysis and then describing a beneficiary's Part B therapy expenditures on a beneficiary per-episode basis rather than the previously reported annual per-beneficiary basis. Since Medicare currently does not have a formal definition of an outpatient therapy episode, an operational definition (described later) was created for this modeling analysis.

Another analytic variation of this report from the prior analysis is that the beneficiary's clinical condition is described by one of twenty-one clinical groups, referred to as the AdvanceMed Classification Groups in this report (described later), rather than by claim ICD-9-CM code.

The following sections describe the technical processes implemented to:

- Identify the source data for analysis;
- Obtain the source data for analysis;
- Create therapy data sets for analysis; and
- Conduct beneficiary-per episode analysis and modeling of outpatient PT, OT, and SLP services.

2.1 Identification of Source Therapy Data for Analysis

As described in prior reports, one of the most challenging aspects of the current scope of work (SOW) relates to timely, accurate and cost effective data gathering. The SOW necessitates use of data not currently available in research or public use files (PUFs). For prior studies, the CMS Office of Information Services (OIS) extracted the data from the NCH mainframe files and provided data tapes to the contractor for project use[9]. This approach has not always resulted in timely delivery of the files.

[8] Ciolek, D., and Hwang, W.. *Utilization Analysis: High Expenditure Users of Outpatient Therapy Services CY 2002-Beneficiary Characteristics*. July 2004. CMS Contract No. 500-99-0009/0009.

[9] AdvanceMed has used this approach extensively for current and past PSC task orders (Statistical Analysis Center, Therapy Review Program, Ohio/West Virginia, Tennessee/North Carolina, and Arkansas/Louisiana/Oklahoma).

In addition, the use of foreign tapes has resulted in problems with the completeness of the data files and the integrity of the tapes.

A new approach for data gathering was the use of a recently created NCH "data warehouse" within the CMS PSC Western Integrity Center (WIC).[10] AdvanceMed streamlined the process for obtaining the necessary data by obtaining the source claims data from the WIC files, which contained 100% of NCH data files for the elements necessary for the outpatient therapy analyses required in this SOW.

2.2 Obtaining Source Therapy Data for Analysis

The process for obtaining source data from another CMS PCS contractor instead of from CMS/ OIS required the development of new and innovative procedures. In order to facilitate the direct transfer of claims data from the WIC database to the current outpatient therapy study, data user agreements were obtained by both the source contract and the recipient contract, and systems security procedures were updated by both contracts to permit the coordination of this data sharing activity.

2.3 Creation of Therapy Data Sets for Analysis

The WIC NCH claims database contains data for 100% of the claims processed for a given time period. Selection criteria were established to assure that Medicare claims related to all beneficiaries who obtained therapy services in CY 2002 were included. However, only those beneficiaries receiving therapy were included in the AdvanceMed therapy database[11].

To accomplish this, AdvanceMed reviewed applicable outpatient therapy service payment and coding policy resources that applied during CY 2002[12] [13] [14] [15], and that reflect how CMS has administered the outpatient therapy cap policy when it was enforced in 2003[16] [17].

The criteria identified for inclusion in the AdvanceMed therapy data set was designed to identify unique beneficiaries that received some form of therapy (PT, OT, and/or SLP services) under Part A or

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[10] The WIC can provide current claims data for the most recent 18-month time frame with rather simple data manipulation. Archived WIC files can also be restored and formatted but require a more intensive level of effort. Because WIC data is constructed with monthly beneficiary enrollment data, AdvanceMed continues to require the source beneficiary denominator file from CMS to analyze annual beneficiary enrollment information.

[11] The prior outpatient therapy study (Olshin, J., et al. September 2002) indicated that only about 8.6 percent of Medicare enrollees receive outpatient therapy services in a given year. Limiting the AdvanceMed therapy database in this study to include only those beneficiaries that received therapy services significantly reduced system resource needs.

[12] Transmittal AB-01-68, May 1, 2001 *Subject: Consolidation of Program Memorandums for Outpatient Rehabilitation Therapy Services.*

[13] Federal Register, November 1, 2001. Medicare Program; Revision to Payment policies and Five-Year Review of and Adjustments to the Relative Value Units Under the Physician Fee Schedule for Calendar Year 2002; Final Rule. Addendum B.

[14] Numeric Level I HCPCS code definitions: *Current Procedural Terminology CPT 2002 Professional Edition*, AMA Press, Chicago, IL. 2001.

[15] Alphanumeric Level II HCPCS code definitions: *2002 HCPCS Level II Professional*, Ingenix, Inc., Salt Lake City, UT, 2001.

[16] Transmittal 30, Pub. 100-04, November 14, 2003, Change Request 2973.

[17] Pub. 100-04, Medicare Claims Processing Manual, Chapter 5, Section 10.2: The Financial Limitation. Available at: http://www.cms.hhs.gov/manuals/104_claims/clm104c05.pdf. Last accessed: June 8, 2004.

Part B during CY 2002 under a broad net[18]. Therefore, a beneficiary was included in the AdvanceMed therapy data set if at least one claim with a date of service during CY 2002 contained:

- In RIC[19] 1-5 - Revenue Center Code = 042x (PT), 043x (OT), and/or 044x (SLP), or
  - if revenue center is not 042x, 043x, and/or 044x, *and*
    - *at least one* Line HCPCS Code = 29065, 29075, 29085, 29086, 29105, 29125, 29126, 29130, 29131, 29200, 29220, 29240, 29260, 29280, 29345, 29355, 29365, 29405, 29425, 29445, 29505, 29515, 29520, 29530, 29540, 29550, 29580, 29590, 64550, 90901, 90911, 92506, 92507, 92508, 92510, 92525, 92526, 92597, 92598, 92601, 92602, 92603, 92604, 92607, 92608, 92609, 92610, 92611, 92612, 92614, 92616, 95831, 95832, 95833, 95834, 95851, 95852, 96000, 96001, 96002, 96003, 96105, 96110, 96111, 96115, 97001-97799, G0129, G0151, G0152, G0153, G0169, G0193, G0194, G0195, G0196, G0197, G0198, G0199, G0200, G0201, G0279, G0280, G0281, G0283, V5362, V5363, V5364, 0020T, 0029T

- In RIC 6 - Line HCFA Provider Specialty Codes = 65 or 67, or
  - if specialties are not 65 or 67, *and*
    - *at least one* Line HCPCS Code = 29065, 29075, 29085, 29086, 29105, 29125, 29126, 29130, 29131, 29200, 29220, 29240, 29260, 29280, 29345, 29355, 29365, 29405, 29425, 29445, 29505, 29515, 29520, 29530, 29540, 29550, 29580, 29590, 64550, 90901, 90911, 92506, 92507, 92508, 92510, 92525, 92526, 92597, 92598, 92601, 92602, 92603, 92604, 92607, 92608, 92609, 92610, 92611, 92612, 92614, 92616, 95831, 95832, 95833, 95834, 95851, 95852, 96000, 96001, 96002, 96003, 96105, 96110, 96111, 96115, 97001-97799, G0129, G0151, G0152, G0153, G0169, G0193, G0194, G0195, G0196, G0197, G0198, G0199, G0200, G0201, G0279, G0280, G0281, G0283, V5362, V5363, V5364, 0020T, 0029T

To ensure that the AdvanceMed therapy data set contained all claims for dates of service furnished to beneficiaries in CY 2002, all claims processed for an eighteen-month period (January 1, 2002-June 30, 2003) were examined for CY 2002 dates of service. CMS historically has reported that at least ninety-eight percent of claims for a given year have been processed[20] within six months of the close of a

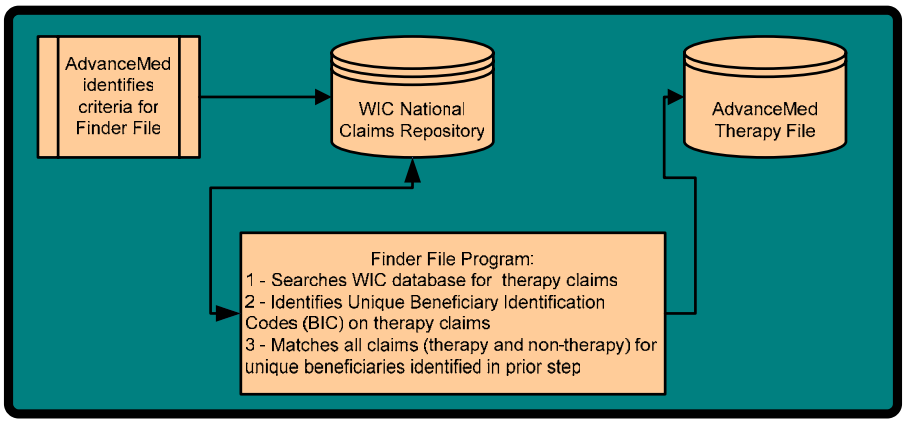
[18] Although analysis of Part A data and non-therapy services is not a component of the analysis of this particular report, later analyses that are part of this contract (payment modeling) will consider prior use of services and other utilization. Inclusion of this information in the AdvanceMed therapy database will also permit later data mining if necessary.

[19] RIC = NCH MQA RIC Code: 1 = Hospital (Part A benefit), 2 = SNF (Part A benefit), 3 = Hospice (Part A benefit), 4 = Outpatient (Part B benefit-institutional settings), 5 = Home Health Agency (Part A benefit), 6 = Physician/Supplier (Part B benefit - non-institutional settings), and 7 = Durable Medical Equipment (Part B benefit).

[20] *Specialty Utilization File Used to Create Resource-Based Practice Expense Relative Value Units for Calendar Year 2004 e*stimates 98.5% for CY 2002. Available at: http://www.cms.hhs.gov/regulations/pfs/2004fc/2004frutil.zip. Last accessed: July 7, 2004.

calendar year. Once a universe of beneficiaries was identified that met the inclusion criteria, all Medicare claims for that unique beneficiary with CY 2002 dates of services (therapy or not) were identified and included in the AdvanceMed therapy database (Figure 1).

Figure 1 - Key Steps in Obtaining the Source Therapy NCH Data



2.4 Development of Analytic Models for Part B Therapy Episodic Expenditures

This section describes the criteria established to further analyze the NCH claims data to create the data sets specific to our episodic analysis of outpatient therapy services. The procedures described to identify therapy service procedures, provider setting, and types of therapy services are consistent with our prior annual-per beneficiary analysis.

Since there have been no prior published reports or efforts of describing episodic models of outpatient therapy services, and because there is no current CMS policy defining a Part B therapy service episode of care, we needed to develop an operational definition for this analysis that was clinically intuitive, administratively feasible, and simple enough to perform in this modeling study. Also, in order to create a reasonably efficient classification scheme, we needed to identify a limited number of clinical classification groups using available claims ICD-9 information. Finally, we added analysis of the number of days of treatment per identified classification group.

2.4.1 Identification of Part B Therapy Claims and Setting

The analytic basis for the identification of outpatient therapy claims is the current published policy related to the implementation of the outpatient therapy caps as published in the Medicare Claims Processing Manual.[21] Essentially, the CMS therapy cap policy identified a list of HCPCS that are considered "always therapy" for the purposes of cap tracking. The list of "always therapy" procedures that the caps would apply to varies depending upon the type of provider setting furnishing the listed HCPCS code, the specialty of the provider if they are a professional billing a carrier, and whether or not a therapy service modifier[22] was used. Appendix A in our July 2004 Utilization report, titled:

[21] Pub. 100-04, Medicare Claims Processing Manual, Chapter 5, Section 10.2: The Financial Limitation. Available at: http://www.cms.hhs.gov/manuals/104_claims/clm104c05.pdf. Last accessed: June 8, 2004.
[22] Therapy Modifier = GP for physical therapy, GO for occupational therapy or GN for speech-language pathology services.

Always Therapy HCPCS Codes CY 2002[23] summarizes the "always therapy" HCPCS and the criteria used to identify if the HCPCS was considered to be "always therapy".

The following summarizes the claim criteria that were matched with the "always therapy" HCPCS by provider setting:

- **Hospital** – If bill type = 12 or 13 and revenue center = 042x (PT), 043x (OT), or 044x(SLP)
- **SNF** - If bill type = 22 or 23 and revenue center = 042x (PT), 043x (OT), or 044x(SLP)
- **HHA** - If bill type = 34 and revenue center = 042x (PT), 043x (OT), or 044x(SLP)
- **CORF** - If bill type = 74 and revenue center = 042x (PT), 043x (OT), or 044x(SLP)
- **ORF** - If bill type = 75 and revenue center = 042x (PT), 043x (OT), or 044x(SLP)
- **PTPP** (Physical therapist in private practice) – If provider specialty = 65
- **OTPP** (Occupational therapist in private practice - If provider specialty = 67
- **Physician**[24] – If provider specialty = 01, 02, 03, 04, 05, 06, 07, 08, 09, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 33, 34, 36, 37, 38, 39, 40, 41, 44, 46, 48, 66, 70, 72, 76, 77, 78, 79, 81, 82, 83, 84, 85, 86, 90, 91, 92, 93, 94, 98, or 99
- **Non-Physician Practitioner** – If Provider Specialty = 50, 89, or 97

2.4.2 Determining Type of Therapy Furnished

Once a claim line was identified as an "always therapy" service, the next step was to assign the type of therapy to that claim line. While currently published claim processing policy stipulates that any Part B "always therapy" procedure code line will be rejected unless it contains an outpatient therapy modifier (GP = physical therapy, GO = occupational therapy, GN = speech-language pathology), this was not implemented in CY 2002[25]. Preliminary analysis of CY 2002 claims indicated minimal use of the therapy modifiers, particularly in non-institutional provider settings, meaning that the modifiers could not be used to track type of therapy services furnished in CY 2002. Instead, this analysis applied a best-fit algorithm to the identified "always therapy" claim lines to label the type of service furnished.

For institutional provider settings, existing policies stipulate that therapy service claim lines be described by revenue center, in addition to the billed HCPCS. Since revenue center codes are present on all institutional provider claim lines, we assigned the therapy type to the lines as follows:

- Revenue center 042x (0420-0429) = physical therapy;
- Revenue center 043x (0430-0439) = occupational therapy; and

[23] Ciolek, D., and Hwang, W.. *Utilization Analysis: High Expenditure Users of Outpatient Therapy Services CY 2002: Beneficiary Characteristics*. July 2004. CMS Contract No. 500-99-0009/0009.
[24] NOTE: The chiropractic specialty (35) is not included in this analysis as it may not be paid for outpatient therapy services per 42CFR410.22(b)(2) and Section 1861(r)(5) of the Act.
[25] Transmittal AB-03-018, Change Request 2183 requiring mandatory use of modifiers was implemented on July 1, 2003.

- Revenue center 044x (0430-0439) = speech- language pathology.

For example, if a SNF Part B claim line contained a 042x revenue center label, the claim line was labeled a physical therapy service.

For non-institutional providers, existing policies attribute the provider specialty code of the treating clinician in addition to the billed HCPCS on the claim line. Since physical therapists in private practice use specialty code = 65 and occupational therapists in private practice use specialty code = 67, the "always therapy" HCPCS were assigned to the provider specialty number. For example, if a billed line of HCPCS 97110 – therapeutic exercise was billed on a line with provider specialty 67, the line was labeled an occupational therapy service.

The non-institutional provider algorithm was more complex when "always therapy" HCPCS were billed on lines with physician and non-physician practitioner provider specialty numbers. In the small number of lines that were assigned the GP, GO, or GN therapy modifiers, the lines were labeled as the type of therapy service designated by the modifier. Since preliminary analysis indicated that nearly ten percent of the CY 2002 Part B therapy expenditures were generated by physician and non-physician practitioners that did not use the therapy modifiers, we determined that it was not appropriate to exclude these lines from this modeling analysis. In our preliminary analysis we found that when the modifiers were used, the overwhelming majority of the lines were attributed to physical therapy services. Therefore, for the purposes of this analysis, if an "always therapy" HCPCS were billed on a physician or non-physician practitioner line that did not have a therapy modifier, then the services were labeled (operationally defined) as physical therapy.

2.4.3 Operationally Defining Clinical Classification Groups

To conduct the modeling analysis, we developed a preliminary outpatient therapy service clinical classification scheme derived from claim ICD-9 codes. The current ICD-9 coding system contains thousands of code options with distinctions that are too fine for classification. In order to create a reasonably efficient classification scheme, we needed to identify a limited number of clinical classification groups using available claims ICD-9 information. We considered various approaches and existing data to create a model that was both clinically intuitive and could reasonably predict Medicare expenditures for individual beneficiary episodes of care.

The methodology of using claims diagnostic information (ICD-9 codes) to identify individuals with certain clinical conditions or to classify patient groups according to severity of illness and potential costs of care has been well established in fields of health economics and epidemiology[26]. The methods differ in how they combine the specific ICD-9 codes to form the groups. Some methods require complex grouping algorithms while others aim for administrative simplicity. Thus, the same ICD-9 codes would be classified somewhat differently by each method. But one thing common in all diagnostic grouping methods is that they require constant modification.

We created 21 clinical groups based upon the review of prior published research, the clinical opinion of a physical therapist researcher on this project, and review of our prior analysis on annual per-beneficiaries therapy utilization patterns by principal claims diagnosis. Individuals who

[26] Ash, A.S., Ellis, R.P., Pope, G.C., et al.. Using Diagnosis to Describe Populations and Predict Costs. *Health Care Financing Review* 2000; 21:7-28.

are classified into the same group are assumed to be clinically similar, have similar level of health risk, and require a similar level of care/expenditures. The following describes how these groups were developed.

Initially, we reviewed various published articles and government studies describing the development of other Medicare payment systems including inpatient and outpatient models. Generally, if these models specifically included therapy service utilization in their development (e.g. inpatient rehabilitation or SNF PPS models), they also required an external assessment instrument, and generally do not classify by clinical groupings that are amenable to describing outpatient therapy service patterns. Since our modeling approach was limited to existing claims data, these approaches were not considered.

The RAND Institute conducted one study of interest in 1993[27]. During the early years of the development of the Outpatient Prospective Payment System (OPPS), RAND created a classification model for rehabilitation services that consisted of eleven distinct clinical groups derived from the inpatient DRG model. They were:

1. Stroke
2. Spinal cord injury
3. Neurologic disorder
4. Hip fracture
5. Back disorders
6. Amputation
7. Cardiopulmonary disorders
8. Rehabilitation
9. Musculoskeletal disorders
10. Ortho-surgical disorders
11. Other.

We conducted a pilot analysis testing of the RAND classification groups against the CY 2002 therapy claims data and identified several limitations of these groups. First, the RAND "Rehabilitation" group consisted of beneficiaries presenting with principal claim diagnoses within the generic V57 ICD-9 code group that describes services furnished and not clinical status. In our pilot analysis, V57 accounted for eleven percent of all PT episodes, nine percent of OT episodes and seven percent of SLP episodes. In addition, the "Other" RAND group accounted for seven percent of PT, fifteen percent of OT, and fourteen percent of SLP episodes. Therefore, if we applied the RAND classification groups to CY 2002 outpatient therapy claims data, eighteen

[27] Buchanan, J., Rumpel, J., and Hoenig, H.. *Outpatient Institutional Rehabilitation Services 1987-1990: Who Provides Them and How Do They Compare?* RAND/UCLA/HARVARD Center for Health Care Financing Policy Research. 1993. DHHS Cooperative Agreement No. 99-C-98489/9-08.

percent of PT episodes, twenty-four percent of OT episodes, and twenty-one percent of SLP episodes would not fit into a clinically identifiable classification group. An effective classification should classify nearly all the data into homogenous clinical groups and minimize these in a generic or "Other" class.

Secondly, we believed that the ICD-9 codes described within the individual RAND clinical groups were not clinically intuitive enough to describe differences in clinical expenditure patterns, particularly among orthopedic conditions. For example, general clinical intuition, and published reports indicate that an average ankle sprain will typically take less time and expense to resolve than a shoulder sprain. However, the RAND classification scheme groups both conditions within the "Musculoskeletal "disorders group.

Finally, there is a significant group size disparity when applying the RAND groups to current therapy data. Groups that are very large tend to be too heterogeneous to characterize appropriately, while very small groups are difficult to characterize meaningfully. For example, while there were over 3.7 million episodes of PT services in CY 2002, thirty-seven percent (1.4 million) fell into the "Musculoskeletal" disorders group, while less than one percent (ten thousand) fell into the "Spinal Cord Injury" group. We discussed these pilot findings with CMS and agreed to proceed with developing a more refined clinical grouping model that would address some of the limitations identified in the previously published RAND model.

In our prior report describing annual per-beneficiary utilization,[28] we identified that the top 100 most frequently reported claim principal ICD-9 codes represented about 70-80 percent of all therapy users, and that many of the diagnosis codes within the top 100 were clinically similar and had similar expenditure findings suggesting that they could fit into distinct clinical groups. Collapsing similar individual diagnoses into single diagnosis groups is useful for payment policy modeling purposes since it is administratively unrealistic to create a payment scheme based upon individual ICD-9 codes.

Based upon the review of prior published research, the clinical opinion of a physical therapist researcher on this project, and review of CY 2002 annual per-beneficiary therapy utilization patterns by principal claim diagnosis, we identified the following 21 distinct clinical groups for our modeling analysis[29]:

[28] Ciolek, D., and Hwang, W.. *Utilization Analysis: High Expenditure Users of Outpatient Therapy Services CY 2002: Beneficiary Characteristics*. July 2004. CMS Contract No. 500-99-0009/0009.

[29] This classification methodology is similar to that described by Ash, A. et al. in Using Diagnosis to Describe Populations and Predict Costs. *Health Care Financing Review* 2000; 21:7-28.

1. Amputation
2. Balance/Functional movement
3. Cardiac/Vascular/Pulmonary
4. Chronic ulcer of skin
5. Communication disorders
6. General symptoms/Non-specific impact/Others
7. Mental/Cognitive
8. Musculoskeletal – Ankle/Foot
9. Musculoskeletal – Elbow to Hand
10. Musculoskeletal – Hip/Pelvis/Thigh
11. Musculoskeletal – Knee/Lower leg
12. Musculoskeletal – Lumbar/Thoracic
13. Musculoskeletal – Multiple sites
14. Musculoskeletal – Neck
15. Musculoskeletal – Shoulder/Upper arm
16. Musculoskeletal – Site unspecified
17. Neurological – Central
18. Neurological – Peripheral
19. Spinal Cord Injury
20. Swallowing/Feeding disorders
21. Systemic disorders

Our prior study also revealed that there appears to be potentially significant differences between the three types of therapies under study in both the diagnoses treated and expenditures associated with these diagnoses. These findings justified our decision to create separate analytic models to describe PT, OT, and SLP services. Our hypothesis is that while we are initially applying the same 21 AdvanceMed clinical groups model to all three types of therapy, future versions would customize the groupings by therapy type. For example, the number of SLP groups may be reduced to fewer than 10 groups, while PT and OT may have somewhere between 10 and 20 groups.

2.4.4 Operationally Defining a Part B Therapy Episode

To operationally define an episode of care for this analysis in the absence of such NCH claims data or the ability to individually review the claims of over 3.7 million beneficiaries that received therapy services in CY 2002, we considered existing Medicare policy in order to create a

reasonable model. The following describes the operational definitions we have applied to describe an episode of outpatient therapy services in this report.

Episode - Describes the date of the beneficiary's first encounter until the last encounter (see "Last Encounter" definition) for the specific type of therapy. For example, if a beneficiary started PT on January 15 and ended PT on January 22, then the PT episode would be from 1/15-1/22. If the same beneficiary began SLP services on January 20 and concluded SLP on January 28, then the dates of the SLP episode would be 1/20-1/28. While there may be one or more conditions treated during an episode, an episode is described by the first condition billed (see "Condition" definition). The number of days in an episode equals the number of treatment dates, and not calendar days per episode. *NOTE: Later revisions of this model are intended to address therapy types treating a beneficiary concurrently; however, since in this example, PT could be treating an entirely different condition than SLP, the two therapy types are analyzed separately.*

Treatment Date - Describes an individual calendar date that the outpatient therapy service was furnished. If multiple services (or procedures) are furnished on a single date, or if the same treatment is furnished on two distinct occasions on a single calendar date (commonly referred to as twice a day or b.i.d. treatment), there is still only one treatment date in this analysis. It is important when considering the number of treatment dates during an episode that it not be confused with the number of services furnished in an episode. In the "episode" definition above, an episode could span from 1/15-1/22; however, if only three treatment dates were recorded during that span, then the episode duration would be described as having three treatment dates, and would not reveal the number of services furnished during the episode.

Last Encounter - Describes the last treatment date for the specific type of therapy for that calendar year, or the treatment date preceding a sixty-day break in Part B services for that type of therapy service. For example, if a beneficiary had a PT treatment on June 1, and then did not have another PT treatment until September 1, this would be treated as two episodes with the June 1 being treated as the last encounter for the first episode, even if they were for the same diagnosis. However, if the same beneficiary had PT on June 1 and the next identified visit on July 28, then that would be treated as one single episode, even if the July 28 date had a different principal claim diagnosis.

Note: Later revisions of this model may be able to further refine the last encounter date for an episode. Also, encounters that end in January or begin in December may be truncated by this approach, so a multiple year analysis could provide more precision in the analysis of episodes. However in the absence of specific policy or other guidance, we believe that this is clinically and statistically the most appropriate current approach.

Condition - In this analysis, an episode of care is assigned to one of the 21 AdvanceMed Outpatient Therapy Classification Groups based upon the principal claim diagnosis on the first claim treatment date during that episode. The only exception to this rule is, if the principal claim diagnosis is in the generic V57 series, then the second listed claim diagnosis is used.

Appendix A contains a table listing all ICD-9 codes that apply to each of the 21 AdvanceMed clinical groups. If a 5-digit ICD-9 code is listed, then that specific code applies. If a 3-digit ICD-9 code is listed, then all 4 and 5-digit ICD-9 combinations under that 3-digit code apply. Any ICD-9 code not listed on the table automatically defaults to the "General symptoms/Non-specific impact/Others" group.

Note: Current claims reporting requirements for institutional provider claims do not permit identification of distinct PT, OT, or SLP diagnoses. The principal claim diagnosis may reflect a PT, OT, SLP or other diagnosis, especially if the outpatient claim contains multiple revenue centers. Also, institutional provider outpatient claims may reflect changes in principal claim diagnosis even though the therapy diagnosis does not change. In the absence of specific policy, claims reporting requirement changes, or other guidance, we believe that using the initial principal claim diagnosis to describe the entire episode is clinically and statistically the most appropriate current approach.

Setting - For reasons similar to the discussion above regarding condition, an episode setting is described by the setting of the first encounter for that therapy type. The recorded setting is not changed for subsequent dates of service unless there has been at least a sixty-day break in Part B services for that type of therapy service (as described in "Last Encounter" above). For example, if a beneficiary receives outpatient occupational therapy services from a hospital from April 1 to April 15, then changes to an OTPP on April 18 through April 28, the entire episode from 4/1- 4/28 is regarded as a hospital outpatient OT episode. However, if the same beneficiary did not receive OT from the OTPP until July 1 to July 15, then this would be regarded as an outpatient hospital OT episode from 4/1-4/15 and a separate OT episode from an OTPP from 7/1-7/15.

Note: Prior outpatient therapy studies describing annual Part B therapy utilization indicate only about ten percent of beneficiaries receive therapy from more than one provider type during a calendar year.[30] [31] *We believe that the first scenario described above is the exception rather than the rule. Later revisions of this model could consider the impact of situations where beneficiaries change provider settings during an identified episode.*

2.4.5 Regression Analysis

Health-based payment models have used the diagnoses generated during patient encounters to infer which medical problems are present. These payment models include demographic and diagnosis profiling methods to predict expenditures through risk-adjustment. The ultimate goal of modeling is to be better able to match expenditures with the health care needs of beneficiaries. Regression analysis presumes that the services furnished were medically necessary.

[30] Olshin, J., et al., September 2002.

[31] Maxwell, S., Baseggio, C., and Storeygard, M.. Part B Therapy Services under Medicare in 1998-2000: Impact of Extending Fee Schedule Payments and Coverage Limits. September 2001. HCFA Contract No. 500-95-0055 (UI-06616-004-00). Available at http://cms.hhs.gov/medlearn/therapy/impactcover.asp.

Regression analysis provides an analysis of how well the model(s) perform. The regression analysis creates a single summary performance measure number, or R^2, for risk-adjustment. The R^2 is the proportion of variance in expenditures that the model explains. The higher the R^2 value is, the better the model is at predicting expenditures.

For reference, Ash, et al. report that demographic payment models for Medicare populations often have R^2 values of less than two percent. However, when using a Diagnosis Cost Group (DCG) model that includes age, gender, and diagnosis, Ash, et al. demonstrated that using data analysis and clinical judgment to identify variables that create more homogenous clinical groups, the Medicare population R^2 value improved to nearly nine percent[32]. Following is a discussion of the variables included in this analysis tailored to predict expenditures for episodes of outpatient therapy services.

When constructing the regression model for this study, we considered many factors that could explain the variation of therapy expenditures. However, purposeful decisions were made to construct these models with the intent to inform CMS in devising payment polices and not for academic exercise. Therefore, some factors that potentially could be used to predict Medicare therapy expenditures were considered, but were excluded from the models. For example, beneficiaries' race/ethnicity background has been shown in a prior study to have significant association with higher or lower Medicare therapy expenditures[33]; however, it is not appropriate that a payment system be partially based on beneficiary's racial/ethnicity characteristics.

The impact of prior use of other health care services, including inpatient therapy services, cannot be underestimated when considering the predicted expenditures associated with outpatient therapy services. However, logistic limitations, including the absence of medical review, prevented the inclusion of such analysis in the current study.

Another way to study the influence of certain variables on therapy services is to look at the outcomes, rather than expenditures. Unlike some Part A payment systems (e.g. SNF, home health, IRF), the current Medicare Part B data system does not have any mechanism to measure each beneficiary's functional ability, restoration potential, or functional outcome[34]. We are aware of current professional therapy association activities to develop outpatient therapy outcomes databases that may contribute to a better understanding of appropriate outcomes. In addition, we have considered outpatient therapy outcomes database information from a number of proprietary organizations. However promising, none of these approaches is currently able to adequately describe the range of beneficiary conditions treated by PT, OT, and SLP services under the Part B benefit. A new payment method based on such requirement is not feasible, at least in the short term.

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[32] Ash, A., et al. *Health Care Financing Review* 2000; 21:7-28.
[33] Olshin, J., et al., September 2002.
[34] Even the Part A payment system functional measurements are extremely limited and are not specific to therapy services. They generally serve only to identify and classify beneficiaries for resource needs of all inpatient (or home health services) and are not tailored to identify specific therapy resource needs or functional outcomes.

In addition, based on current payment policies and discussions with the CMS task leader, we decided to separate PT, OT, and SLP services when defining therapy episodes (as described in section 2.4.3). As a result, each PT episode includes only PT services and associated payments - although it is possible that a beneficiary may have other OT or SLP services during the same period of time. Multiple therapy types during a specific episode may be statistically indicative for the treatment needed for a patient, but inclusion of such a variable would contradict the construction of the dependent variable (Medicare paid amount) that is based solely on only type of therapy service. Moreover, including such a variable in a payment model may generate unintended financial incentives for providers to provide unnecessary multiple types of therapy for payment optimization purposes.

Our regression models do not require Medicare to collect additional information. Factors such as Medicare payment amount, beneficiaries' age, gender, geographic, diagnosis, and types of providers can be extracted from current Medicare data. The regression model is that the Medicare therapy payment per episode (dependent variable) is a function of beneficiaries' age, gender, state of residence, provider setting and diagnosis (independent variables). The general form of a prediction equation can be expressed as:

$$Y = \alpha + (\beta_1 * X_1) + (\beta_2 * X_2) + (\beta_3 * X_3) + (\beta_4 * X_4) + (\beta_5 * X_5) + \varepsilon$$

Where

Y = Medicare paid amount for the therapy episode
X_1 = age
X_2 = gender
X_3 = state
X_4 = provider setting
X_5 = diagnosis
α = Y intercept
β_1 to β_5 = regression coefficients

Because there is more than one explanatory variable (e.g., age, gender, state), each parameter is interpreted as a partial derivative, holding all other variables constant. The regression coefficients are the weights given to each variable. To facilitate the interpretation of regression results, we created a series of dichotomous variables (1 or 0) for each explanatory variable on the right hand side of the equation[35].

[35] If, for example, a beneficiary's age is 73, a series of age group variables were created as the following:
Age group 1 (< 65 years old) = 0
Age group 2 (65 – 69 years old) = 0
Age group 3 (70 – 74 years old) = 1
Age group 4 (75 – 79 years old) = 0
Age group 5 (80 – 84 years old) = 0
Age group 6 (85 – 89 years old) = 0

The same techniques are applied to gender, state, setting and diagnostic classification. The reference groups used in the regression models include female, age 65 to 69, the state of Iowa, and hospital setting. For diagnostic group, we used different reference groups for each therapy type model: PT model uses the "Musculoskeletal–lumbar/thoracic" group for reference, the OT model uses the "Musculoskeletal–elbow to hand" group and the SLP model uses the "Swallowing/Feeding Disorder" group.

Ordinary least squares (OLS) linear regression is the standard model most commonly applied to continuous outcome data. However, when used for cost data (whose distribution usually is very skewed), assumptions of the method are unlikely to be met. In particular, cost data are likely to be non-normal and heteroscedastic (i.e., not of constant variance) and relationships may not be truly linear. Violation of OLS model assumptions may mean that properties of normality and efficiency of estimators are not achieved; therefore, for cost data, this approach may not provide the best estimates of the average effects in the population. To provide better fits, we therefore transform the cost data (based on natural logarithm) and then apply OLS analysis[36].

In this analysis, we constructed models with independent variables of age, gender, state of residence, provider setting, and clinical classification group. The dependent variable was measured in both raw dollars and on a transformed scale using a natural logarithm of dollars. But to interpret the results, we focus on the models with dependent variable measured in raw dollars (Model with raw dollars is shown on the left hand side in Table 16 for PT, Table 17 for OT and Table 18 for SLP services – see Section 3.2). The coefficients for each variable (parameter estimate) represent "real dollars" and are more intuitive for policy analysis purposes. In addition, due to its length, these tables do not contain parameter estimates for the state, although they are adjusted for. For full regression results, see Appendix F for PT, Appendix G for OT, and Appendix H for SLP services.

Age group 7 (90 +) = 0

One age group is chosen as the reference group and omitted from the right hand side of equation.

[36] For reference, see Briggs, A., Gray, A.. "The distribution of health care costs and their statistical analysis for economic evaluation." *Journal of Health Services Research and Policy* 1998; 3:233-245.

3.0 Results

The results of this modeling analysis reveal that the interaction effects of therapy provider setting, beneficiary state of residence, and beneficiary condition appear to have the greatest effect on predicted per-episode outpatient therapy expenditures. In particular, these variables appear to reverse previously reported expenditures patterns associated with beneficiary age. In other words, while univariate and bivariate analysis suggests increasing expenditures associated with age, particularly for PT and OT services, the multivariate analysis in this report, which controls for such factors as age, gender, setting, condition, and state, demonstrates that average episodic expenditures actually decline with age.

This effect does not negate the importance of age; rather it suggests that other variables, such as beneficiary functional status or functional recovery expectations, need to be considered in future analysis to determine their influence on episodic outpatient therapy payments for beneficiaries. For example, is there a difference in the functional outcomes or expected recovery of a ninety-year-old beneficiary with a stroke versus someone who is only seventy? If so, how much does considering that variable improve the predictive power of the payment model? The following results are presented in sequence from descriptive analyses to more complex multivariate regression analysis.

3.1 Descriptive Analysis

As in most types of health service, expenditures for outpatient therapy services per episode varied widely. The skewed distribution toward the right hand side is evident by the fact that the standard deviation of $903 is higher than the average paid amount of $663, and median payment amount of $394 per PT episode. This means that while half of the PT outpatient therapy expenditures were for $394 or less per episode, a small portion of beneficiaries who had extremely high expenditures pulled the average per episode expenditures to the right (high) end of the scale[37]. This implication also applies to the observed OT and SLP episode expenditure skewing observed. A similarly skewed distribution can be found in OT (mean $743, median $414, SD $989) and SLP (mean $585, median, $278, SD $888).

The average number of treatment days per episode is similar for PT (10.6 days SD = 11.7) and OT (10.6 days SD = 11.8). A different pattern is observed for SLP services, which demonstrate an average of only 6.9 treatment days per episode (SD = 9.8). This suggests that on average, SLP episodes have required only about two-thirds the number of treatment dates as PT and OT per episode. However, all three therapy types demonstrate standard deviations in average treatment days per episode that are greater than the average rate indicating a right hand skewed distribution. This means that the majority of beneficiary episodes have fewer treatment days than average.

The implications of the observed skewing of outpatient therapy episodic expenditures and average number of treatment days should not be underestimated. The discussion in this report focuses on

[37] This analysis did not adjust for extreme high expenditure and extreme low expenditure outliers. Adjusting for the extreme outliers in future analysis would reduce the variance and skewing of the results observed.

episodic averages for simple comparisons of differences between groups. However, it must be noted that every table in this report that includes group averages, also includes the standard deviation amounts. From these, the reader can quickly estimate the episode payment and treatment day amounts for 68% (+ one standard deviation) of the beneficiaries in that group, for 95% of the beneficiaries (+ two standard deviations), or for 98% of the beneficiaries (+ three standard deviations).

Payment policy decisions should consider the implications of the wide standard deviations and the right handed skewing of the episodic distributions, in addition to the average payment and number of treatment days per episode values reported in the following tables. In particular, future analysis should address the potential impact of bi-modal episode payment distribution patterns. While the current analysis has indicated that average episodic payments can be skewed to the right by a relatively small number of high expenditure beneficiaries, there is also the possibility that the median payment amount was skewed to the left by a large number of short duration episodes (e.g. 1-2 treatment days). For example, many SLP episodes might be represented by one or two treatment days for a bedside swallowing evaluation and establishment of a plan of care for a modified diet. However, many other SLP episodes might be represented by medically necessary extensive retraining of swallowing techniques, which may take numerous treatment days. In this example, the SLP swallowing/feeding disorders group episode payment and treatment day averages (described in Section 3.1.5) may actually represent two distinct treatment groups.

3.1.1 Part B Therapy Episode Patterns By Gender

The gender distribution of outpatient therapy episodes is relatively consistent among the three therapy types with females accounting for about two-thirds of all episodes (67% of PT, 69% of OT and 63% of SLP services). There are small but significant differences between genders regarding the average number of treatment days per episode, the average payment per episode, or the average payment per treatment day.

The average episode payment varied between all three therapy types with OT demonstrating the highest average episode payment at $743 (SD = $990), followed by PT at $664 (SD = $903) and SLP at $586 (SD = $889). This pattern suggests that although there are significantly fewer OT episodes than PT episodes (0.8 million to 3.8 million), when a beneficiary does receive OT, they receive relatively more services than PT or SLP per episode.

A different pattern is evident with average payment per treatment day as SLP has the highest amount ($85), followed by OT at $71 and PT at $63[38]. A higher expenditure per treatment date does not necessarily reflect a higher intensity of services furnished per treatment day, because the three therapy service types billed different types of procedure codes. For example, in CY 2002,

[38] Since PT and OT use similar procedure codes, the higher OT per treatment day average payment may reflect a higher average daily number of services or units of service furnished than PT. However, in our earlier report (Ciolek and Hwang, *Feasibility and Impact Analysis*, September 2004) describing HCPCS procedure code usage by therapy type, we reported the most frequently provided SLP services are represented by non-timed procedure codes that have a higher price per unit than timed codes. Therefore, comparison of costs across types of service is not relevant for payment policy purposes.

forty-five percent of all SLP HCPCS billed were for the non-timed code 92526 (treatment of swallowing disorders)[39]. This procedure code was priced at an allowed amount in CY 2002 in Iowa[40] at $68.68 per unit. In contrast, PT and OT services are more frequently represented by lower priced 15-minute time based codes. For example, code 97110 (therapeutic exercise) was the most commonly reported HCPCS for PT (40%) and OT (32%) services in CY 2002. In Iowa, this 15-minute time based code was priced at $24.20. But the code can be billed multiple times in a day by PT or OT, so three units of time-based HCPCS per treatment present a per treatment day billing pattern similar to that observed for SLP that is limited to using primarily non-timed (once a treatment) HCPCS.

Since HCPCS procedure pricing is established based upon factors including the intensity of the services furnished, the technical and professional skills necessary, time, and other variables, and the fact that SLP episodes typically are of shorter duration and lower cost than PT or OT service episodes, the higher SLP payment per treatment day average may not be relevant. Tables 1, 2, and 3 present the Part B therapy episode payment and patterns by gender for PT, OT and SLP services respectively.

Table 1 - Physical Therapy Outpatient Episode Patterns by Gender

PT Episodes Gender	Number of PT Episodes	Average Number Treatment Days	Standard Deviation Treatment Days	Average Episode Paid	Standard Deviation Episode Paid	Payment per Treatment Day	Percent of Total (N) Episodes
All PT Episodes	3,776,459	10.6	11.7	$664	$903	$63	100%
Female	2,512,579	10.6	11.5	$661	$887	$63	67%
Male	1,263,875	10.6	12.0	$670	$933	$63	33%
Unlisted	5	9.0	7.8	$792	$685	$88	0%

Table 2 - Occupational Therapy Outpatient Episode Patterns by Gender

OT Episodes Gender	Number of OT Episodes	Average Number Treatment Days	Standard Deviation Treatment Days	Average Episode Paid	Standard Deviation Episode Paid	Payment per Treatment Day	Percent of Total (N) Episodes
All OT Episodes	823,619	10.4	11.8	$743	$990	$71	100%
Female	565,339	10.5	11.7	$746	$975	$71	69%
Male	258,277	10.2	12.0	$736	$1,020	$72	31%
Unlisted	3	20.7	10.0	$2,123	$1,292	$103	0%

[39] Ibid., see Appendix C: CY 2002 Outpatient Therapy Procedure Code (HCPCS) Utilization: Rank by Unit Frequency.
[40] Iowa pricing was selected for this example to remain consistent with the regression analysis presented later in this report that uses Iowa as a state reference point.

Table 3 - Speech-Language Pathology Outpatient Episode Patterns by Gender

SLP Episodes Gender	Number of SLP Episodes	Average Number Treatment Days	Standard Deviation Treatment Days	Average Episode Paid	Standard Deviation Episode Paid	Payment per Treatment Day	Percent of Total (N) Episodes
All SLP Episodes	403,770	6.9	9.8	$586	$889	$85	100%
Female	254,099	6.9	9.6	$586	$873	$85	63%
Male	149,670	6.9	10.1	$584	$915	$85	37%
Unlisted	1	18.0	N/A	$1,924	N/A	$107	0%

3.1.2 Part B Therapy Episode Patterns by Age

The age distribution of outpatient therapy episodes varies by type of therapy. For PT services, the age distribution of treatment episodes reflects a relative normal distribution with the peak percentage of 20% observed for both the 70-74 and 75-79 year old age groups. The distribution of episodes of OT and SLP services skews towards older beneficiaries with both OT and SLP peaking at the 80-84 year old age group with 18% and 20% of their episodes respectively.

A different pattern emerges for average number of treatment days. PT and OT episode durations in terms of treatment days generally increased with each age group as PT increases from 9.5 days for those under 65 up to 11.6 days for those aged 90 and above, while OT episode durations increase from 9.2 days for those under 65 peaking at 11.1 days for those aged 85-89. SLP on the other hand demonstrated the highest average number of treatment days of 7.4 days with 65-69 year olds, which decreases with age to 6.4 days for those aged 90 and above. Regression analysis (described later) confirms that the age difference is significant for all therapy types.

The average episode payment patterns for PT and OT increase with age paralleling the age related increase in treatment days. SLP average episode payments decreased with age paralleling the decrease in average treatment dates. There is not an obvious difference in average payments per treatment day related to age as all PT age groups fall within the $61-65/treatment day range, OT falls within the $70-72/treatment day range and SLP falls within the $82-$86/treatment day range[41]. Tables 4, 5, and 6 present the Part B therapy episode patterns by age for PT, OT and SLP services respectively.

[41] See section 3.1.1 for discussion regarding differences in average per treatment day payments by therapy type.

Table 4 - Physical Therapy Outpatient Episode Patterns by Age

PT Episodes Age	Number of PT Episodes	Average Number Treatment Days	Standard Deviation Treatment Days	Average Episode Paid	Standard Deviation Episode Paid	Payment per Treatment Day	Percent of Total (N) Episodes
All PT Episodes	3,776,459	10.6	11.7	$664	$903	$63	100%
<65	495,372	9.5	12.1	$578	$929	$61	13%
65-69	676,143	10.3	11.1	$641	$856	$62	18%
70-74	750,794	10.6	11.3	$661	$877	$62	20%
75-79	738,025	10.7	11.5	$673	$887	$63	20%
80-84	570,586	10.8	11.8	$689	$916	$64	15%
85-89	346,008	11.2	12.4	$725	$972	$65	9%
90+	199,531	11.6	12.7	$750	$962	$65	5%

Table 5 - Occupational Therapy Outpatient Episode Patterns by Age

OT Episodes Age	Number of OT Episodes	Average Number Treatment Days	Standard Deviation Treatment Days	Average Episode Paid	Standard Deviation Episode Paid	Payment per Treatment Day	Percent of Total (N) Episodes
All OT Episodes	823,619	10.4	11.8	$743	$990	$71	100%
<65	95,554	9.2	12.3	$661	$1,111	$72	12%
65-69	89,423	9.9	11.9	$705	$991	$71	11%
70-74	112,812	10.2	11.9	$729	$991	$72	14%
75-79	139,461	10.4	11.9	$748	$987	$72	17%
80-84	149,886	10.8	11.8	$774	$983	$72	18%
85-89	130,085	11.1	11.7	$787	$956	$71	16%
90+	106,398	10.8	11.2	$759	$916	$70	13%

Table 6 - Speech-Language Pathology Outpatient Episode Patterns by Age

SLP Episodes Age	Number of SLP Episodes	Average Number Treatment Days	Standard Deviation Treatment Days	Average Episode Paid	Standard Deviation Episode Paid	Payment per Treatment Day	Percent of Total (N) Episodes
All SLP Episodes	403,770	6.9	9.8	$586	$889	$85	100%
<65	35,878	6.8	11.2	$564	$990	$83	9%
65-69	31,895	7.4	11.3	$607	$999	$82	8%
70-74	46,733	7.2	10.6	$604	$985	$84	12%
75-79	66,364	7.1	10.2	$604	$935	$85	16%
80-84	78,987	6.9	9.5	$590	$862	$85	20%
85-89	74,600	6.8	9.0	$584	$820	$86	18%
90+	69,313	6.4	8.2	$553	$755	$86	17%

3.1.3 Part B Therapy Episode Patterns By State

There are markedly different patterns of episodic payments, number of treatment days, and average payment per treatment day per episode for PT, OT, and SLP services (Tables 7-9) that suggest localized influences of geographic fee schedule variations[42] and access to particular types of therapy services. The variations could also be indicative of the influence of geography on the health status of the beneficiaries seeking outpatient therapy services as well as local variations in service delivery. For example, in states with limited inpatient rehabilitation facility, SNF, or home health therapy service access, there may be an increased need for outpatient therapy services.

In addition, local variations in Medicare contractor payment policies may influence the observed patterns. For example, if a contractor places utilization limits on the number of treatment dates for an identified diagnosis, a provider might increase the number of services or units of service furnished per treatment day in order to achieve the treatment goals within the contractor edits. Conversely, if a contractor places limits on the number of services, or units of a particular service per treatment date, then the provider may adjust the plan of care to furnish the services over an increased number of treatment dates. This potential influence of local Medicare contractor payment policies on provider service delivery behavior highlights the importance of considering payment policy influence on clinical practice patterns.

PT episode patterns by state

Average payments per PT episode varied by state from $299-$836 (Table 7). Mississippi was the state with the highest average PT per episode payment average at $836 (SD $1815). The next four states with the highest average PT episode payments were California ($817), New Jersey ($812), Nevada ($802), and Louisiana ($789). Conversely, North Dakota had the lowest average episodic outpatient PT expenditures at $299 (SD $404), followed by Minnesota ($370), Iowa ($405), South Dakota ($405), and Puerto Rico ($407).

The average number of treatment dates per PT episode varied by state from 7.1 to 12.8 days. In some, but not all cases, the states with the highest and lowest per episode PT expenditures correlated with the states with the highest and lowest average number of treatment days per episode. Mississippi had the highest number of PT treatment days per episode at 12.8 (SD 14.6). The next four states were New York (12.3 days), New Jersey and Louisiana (12.1 days), and Delaware (12.0 days). States averaging the least number of treatment days per PT episode included North Dakota with 7.1 days (SD 8.3 days), followed by Minnesota (7.5 days), Wisconsin (8.1 days), Maine (8.3 days), and Oregon (8.7 days).

The average payment per PT treatment day also varied by state, ranging from a low of $42, to a high of $74 depending upon the state. California and the District of Columbia both had the highest per day PT payment average at $74, followed by Maryland at $72, and Hawaii and Alaska at $71.

[42] The models described in this report did not adjust (or index) the reported payment amounts to account for geographic variations in the Medicare Fee Schedule.

North Dakota had the lowest per day PT payment average at $42, followed by Puerto Rico at $43, Iowa and South Dakota at $45, and Minnesota and Montana at $49.

OT episode patterns by state

Average payments per OT episode varied by state from $309-$1108 (Table 8). Florida was the state with the highest average OT per episode payment average at $1108 (SD $1164). The next four states with the highest average OT episode payments were Mississippi ($1012), Oklahoma ($983), Louisiana ($924), and Texas ($923). Conversely, North Dakota had the lowest average episodic outpatient OT expenditures at $309 (SD $536); followed by South Dakota ($386), Iowa ($394), Minnesota ($413), and Montana ($441).

The average number of treatment days per OT episode varied by state from 5.6 to 24.8 days. In some, but not all cases, the states with the highest and lowest per episode OT expenditures correlated with the states with the highest and lowest average number of treatment days per episode. Puerto Rico had the highest number of OT treatment days per episode at 24.8 (SD 28.9). The next four states were Mississippi (15.6 days), West Virginia (14.0 days), Kentucky (12.9 days), and Oklahoma (12.7 days). States averaging the least number of treatment days per OT episode included Alaska with 5.6 days (SD 8.3 days), followed by North Dakota (6.0 days), Oregon (7.0 days), Iowa (7.1 days), and Minnesota (7.3 days).

The average payment per OT treatment day also varied by state; ranging from a low of $37, to a high of $90 depending upon the state. Florida had the highest per day OT payment average at $90, followed by California ($89), Alaska ($84), Massachusetts ($82), and Maryland at ($81). Puerto Rico had the lowest per day OT payment average at $37, followed by North Dakota ($42), South Dakota ($54), Iowa ($55), and Minnesota ($57).

SLP episode patterns by state

Average payments per SLP episode varied by state from $312-$1002 (Table 9). Mississippi was the state with the highest average SLP per episode payment average at $1002 (SD $1384). The next four states with the highest average SLP episode payments were Louisiana ($987), Oklahoma ($810), Alabama ($785), and Nevada ($757). Conversely, Hawaii had the lowest average episodic outpatient SLP expenditures at $312 (SD $393); followed by North Dakota ($340), Minnesota ($380), Maine ($397), and Iowa ($399).

The average number of treatment days per SLP episode varied by state from 3.4 to 13.2 days. In some, but not all cases, the states with the highest and lowest per episode SLP expenditures correlated with the states with the highest and lowest average number of treatment days per episode. Mississippi had the highest number of SLP treatment days per episode at 13.2 (SD 15.8). The next four states were Louisiana (10.7 days), Alabama and Oklahoma (9.5 days), and West Virginia (8.7 days). States averaging the least number of treatment days per SLP episode included Hawaii with 3.4 days (SD 4.7 days), followed by New York (4.3 days), Alaska (4.6 days), Maine (4.7 days), and Minnesota (4.8 days).

The average payment per SLP treatment day also varied by state, ranging from a low of $64, to a high of $112, depending upon the state. California had the highest per day SLP payment average at $112, followed by Massachusetts ($105), Nevada ($102), Rhode Island ($100), and Maryland at ($98). Puerto Rico had the lowest per day SLP payment average at $64, followed by Montana and North Dakota ($71), and West Virginia and South Dakota ($72).

Table 7 – Physical Therapy Outpatient Episode Patterns by State

PT Episodes State	Number of PT Episodes	Average Number of Treatment Days	Standard Deviation Treatment Days	Average Episode Paid	Standard Deviation Episode Paid	Payment per Treatment day	Percent of Total (N) Episodes
All PT Episodes	3,776,459	10.6	11.7	$664	$903	$63	100.0%
Alaska	4,626	9.9	12.5	$705	$1,129	$71	0.1%
Alabama	55,173	9.5	10.7	$564	$782	$59	1.5%
Arkansas	34,805	10.2	10.4	$545	$711	$54	0.9%
Arizona	51,726	9.8	10.4	$632	$783	$65	1.4%
California	323,554	11.1	13.7	$817	$1,200	$74	8.6%
Colorado	42,477	10.1	11.5	$622	$856	$62	1.1%
Connecticut	62,442	11.0	11.2	$666	$777	$61	1.7%
District of Columbia	6,687	9.7	11.4	$722	$1,016	$74	0.2%
Delaware	13,247	12.0	11.1	$766	$819	$64	0.4%
Florida	346,464	10.5	10.3	$775	$915	$74	9.2%
Georgia	79,567	9.0	10.1	$561	$864	$62	2.1%
Hawaii	8,254	10.4	10.9	$736	$891	$71	0.2%
Iowa	56,629	8.9	9.9	$405	$523	$45	1.5%
Idaho	19,171	11.1	12.5	$587	$745	$53	0.5%
Illinois	159,091	10.3	11.2	$619	$819	$60	4.2%
Indiana	92,571	10.6	12.2	$584	$799	$55	2.5%
Kansas	40,701	9.5	10.2	$485	$664	$51	1.1%
Kentucky	52,712	10.9	12.5	$592	$904	$55	1.4%
Louisiana	50,156	12.1	13.0	$789	$997	$65	1.3%
Massachusetts	81,319	9.7	10.2	$640	$830	$66	2.2%
Maryland	70,646	10.9	11.2	$787	$907	$72	1.9%
Maine	22,599	8.3	9.1	$457	$598	$55	0.6%
Michigan	155,551	11.6	11.1	$756	$940	$65	4.1%
Minnesota	69,693	7.5	8.5	$370	$479	$49	1.8%
Missouri	76,329	10.2	11.4	$626	$924	$61	2.0%
Mississippi	39,034	12.8	14.6	$836	$1,815	$66	1.0%
Montana	15,918	9.1	10.5	$450	$594	$49	0.4%
North Carolina	99,571	10.6	12.3	$687	$982	$65	2.6%
North Dakota	10,772	7.1	8.3	$299	$404	$42	0.3%
Nebraska	27,264	9.4	10.1	$493	$628	$53	0.7%
New Hampshire	22,060	9.2	9.3	$573	$677	$63	0.6%
New Jersey	116,320	12.1	12.2	$812	$1,017	$67	3.1%
New Mexico	19,077	9.7	10.3	$591	$715	$61	0.5%
Nevada	16,628	11.5	12.9	$802	$1,065	$70	0.4%
New York	291,725	12.3	14.6	$740	$972	$60	7.7%
Ohio	171,551	10.5	11.1	$589	$737	$56	4.5%
Oklahoma	38,282	10.6	11.8	$644	$916	$61	1.0%
Oregon	36,423	8.7	8.9	$471	$557	$54	1.0%
Pennsylvania	181,640	11.4	11.9	$693	$856	$61	4.8%
Puerto Rico	32,439	9.4	9.8	$407	$409	$43	0.9%
Rhode Island	12,100	10.1	10.5	$614	$743	$61	0.3%
South Carolina	49,899	10.8	11.9	$645	$950	$60	1.3%
South Dakota	12,051	9.0	10.7	$405	$538	$45	0.3%
Tennessee	69,879	10.8	12.0	$643	$871	$60	1.9%
Texas	211,155	10.3	11.0	$670	$863	$65	5.6%
Utah	23,482	10.6	11.7	$633	$772	$60	0.6%
Virginia	90,027	10.7	11.6	$662	$866	$62	2.4%
Vermont	11,625	8.7	9.7	$516	$659	$59	0.3%
Washington	73,631	9.1	9.9	$569	$675	$63	1.9%
Wisconsin	90,331	8.1	9.1	$423	$568	$52	2.4%
West Virginia	26,686	11.2	12.4	$571	$746	$51	0.7%
Wyoming	8,503	11.3	13.4	$587	$792	$52	0.2%

Table 8 – Occupational Therapy Outpatient Episode Patterns by State

OT Episodes State	Number of OT Episodes	Average Number of Treatment Days	Standard Deviation Treatment Days	Average Episode Paid	Standard Deviation Episode Paid	Payment per Treatment day	Percent of Total (N) Episodes
All OT Episodes	823,619	10.4	11.8	$743	$990	$71	100.0%
Alaska	731	5.6	8.3	$468	$778	$84	0.1%
Alabama	11,281	10.8	10.8	$719	$904	$66	1.4%
Arkansas	8,817	9.2	9.8	$559	$743	$61	1.1%
Arizona	7,811	8.5	9.9	$632	$814	$74	0.9%
California	41,909	9.5	10.1	$842	$1,035	$89	5.1%
Colorado	9,592	8.7	10.5	$602	$819	$69	1.2%
Connecticut	14,338	10.2	12.0	$685	$941	$67	1.7%
District of Columbia	1,617	8.3	10.8	$677	$980	$81	0.2%
Delaware	1,971	9.8	11.3	$636	$795	$65	0.2%
Florida	78,774	12.4	11.4	$1,108	$1,164	$90	9.6%
Georgia	16,064	9.4	10.2	$672	$860	$72	2.0%
Hawaii	1,066	8.1	9.4	$581	$735	$72	0.1%
Iowa	15,425	7.1	9.2	$394	$584	$55	1.9%
Idaho	2,793	11.2	14.1	$683	$931	$61	0.3%
Illinois	33,461	10.3	11.7	$733	$929	$71	4.1%
Indiana	30,123	10.8	12.2	$677	$889	$63	3.7%
Kansas	12,178	9.6	10.1	$600	$735	$62	1.5%
Kentucky	13,124	12.9	13.8	$807	$1,006	$63	1.6%
Louisiana	16,890	12.5	13.6	$924	$1,123	$74	2.1%
Massachusetts	20,920	8.9	11.1	$729	$1,159	$82	2.5%
Maryland	14,613	8.4	9.6	$678	$900	$81	1.8%
Maine	4,692	6.9	8.5	$455	$669	$66	0.6%
Michigan	30,821	10.9	11.9	$821	$1,132	$75	3.7%
Minnesota	20,619	7.3	10.2	$413	$614	$57	2.5%
Missouri	23,193	10.2	10.8	$704	$835	$69	2.8%
Mississippi	9,483	15.6	16.1	$1,012	$1,232	$65	1.2%
Montana	2,710	7.5	10.5	$441	$699	$59	0.3%
North Carolina	23,376	12.0	14.0	$902	$1,367	$75	2.8%
North Dakota	3,256	6.0	8.5	$309	$536	$52	0.4%
Nebraska	7,322	8.1	10.0	$503	$709	$62	0.9%
New Hampshire	5,812	8.5	10.4	$605	$928	$71	0.7%
New Jersey	21,890	9.8	10.3	$724	$991	$74	2.7%
New Mexico	3,689	10.1	12.2	$679	$903	$67	0.4%
Nevada	2,741	10.8	13.2	$872	$1,325	$81	0.3%
New York	39,700	11.1	15.4	$655	$940	$59	4.8%
Ohio	52,431	10.3	11.5	$641	$809	$62	6.4%
Oklahoma	7,642	12.7	13.0	$983	$1,262	$77	0.9%
Oregon	5,494	7.0	8.5	$452	$639	$64	0.7%
Pennsylvania	54,057	9.8	10.7	$623	$817	$64	6.6%
Puerto Rico	793	24.8	28.9	$915	$867	$37	0.1%
Rhode Island	3,010	7.9	9.2	$614	$855	$78	0.4%
South Carolina	11,538	11.7	13.2	$769	$1,094	$66	1.4%
South Dakota	2,502	7.1	9.7	$386	$593	$54	0.3%
Tennessee	12,291	11.9	12.4	$814	$1,015	$68	1.5%
Texas	47,948	12.2	12.7	$923	$1,138	$76	5.8%
Utah	2,818	10.8	13.3	$758	$1,080	$70	0.3%
Virginia	21,487	10.7	11.9	$751	$995	$70	2.6%
Vermont	2,195	7.4	8.9	$539	$757	$73	0.3%
Washington	13,770	7.9	9.9	$584	$806	$74	1.7%
Wisconsin	25,095	8.6	9.9	$532	$737	$62	3.0%
West Virginia	5,780	14.0	14.8	$857	$1,049	$61	0.7%
Wyoming	1,620	10.6	14.1	$664	$1,090	$63	0.2%

Table 9 – Speech-Language Pathology Outpatient Episode Patterns by State

SLP Episodes State	Number of SLP Episodes	Average Number of Treatment Days	Standard Deviation Treatment Days	Average Episode Paid	Standard Deviation Episode Paid	Payment per Treatment day	Percent of Total (N) Episodes
All SLP Episodes	403,770	6.9	9.8	$586	$889	$85	100.0%
Alaska	378	4.6	7.5	$436	$629	$95	0.1%
Alabama	6,353	9.5	11.0	$785	$1,092	$82	1.6%
Arkansas	3,632	7.8	10.9	$584	$871	$75	0.9%
Arizona	3,845	5.8	8.6	$511	$930	$88	1.0%
California	22,344	6.3	8.5	$698	$1,089	$112	5.5%
Colorado	4,456	6.3	8.8	$539	$806	$86	1.1%
Connecticut	6,605	5.4	7.5	$504	$692	$94	1.6%
District of Columbia	904	7.4	9.3	$720	$989	$97	0.2%
Delaware	1,343	5.8	8.3	$468	$634	$80	0.3%
Florida	29,880	8.2	10.3	$659	$897	$80	7.4%
Georgia	7,978	6.9	9.4	$580	$819	$84	2.0%
Hawaii	878	3.4	4.7	$312	$393	$92	0.2%
Iowa	6,451	5.3	9.0	$399	$678	$75	1.6%
Idaho	1,778	7.2	9.4	$555	$766	$77	0.4%
Illinois	18,874	5.6	8.9	$484	$757	$86	4.7%
Indiana	12,194	7.0	9.6	$553	$822	$79	3.0%
Kansas	4,521	6.7	9.3	$517	$754	$77	1.1%
Kentucky	7,815	6.9	9.9	$517	$765	$75	1.9%
Louisiana	7,283	10.7	12.4	$987	$1,261	$92	1.8%
Massachusetts	10,749	5.2	7.3	$550	$787	$105	2.7%
Maryland	7,737	5.5	7.9	$543	$786	$98	1.9%
Maine	2,087	4.7	7.6	$397	$558	$84	0.5%
Michigan	15,252	5.8	8.7	$467	$755	$80	3.8%
Minnesota	7,016	4.8	8.4	$380	$657	$80	1.7%
Missouri	10,951	7.8	10.4	$675	$947	$86	2.7%
Mississippi	4,729	13.2	15.8	$1,002	$1,384	$76	1.2%
Montana	1,244	5.7	8.8	$407	$623	$71	0.3%
North Carolina	12,674	7.5	11.0	$669	$1,024	$89	3.1%
North Dakota	1,169	4.8	9.8	$340	$600	$71	0.3%
Nebraska	2,844	5.8	8.6	$464	$627	$80	0.7%
New Hampshire	2,181	5.3	7.2	$508	$773	$96	0.5%
New Jersey	11,004	6.5	9.5	$629	$947	$97	2.7%
New Mexico	2,069	8.3	13.8	$672	$1,165	$81	0.5%
Nevada	1,391	7.4	10.8	$757	$1,203	$102	0.3%
New York	22,058	4.3	8.5	$381	$830	$89	5.5%
Ohio	25,984	7.7	9.6	$590	$778	$77	6.4%
Oklahoma	3,928	9.5	11.8	$810	$1,087	$85	1.0%
Oregon	3,456	5.1	7.7	$445	$768	$88	0.9%
Pennsylvania	31,326	7.2	9.4	$573	$795	$79	7.8%
Puerto Rico	153	7.8	9.0	$496	$608	$64	0.0%
Rhode Island	1,854	5.2	6.1	$521	$614	$100	0.5%
South Carolina	5,864	8.0	11.1	$585	$874	$73	1.5%
South Dakota	1,038	5.7	7.9	$413	$597	$72	0.3%
Tennessee	8,631	7.6	10.8	$586	$947	$77	2.1%
Texas	21,817	8.3	11.0	$746	$1,065	$90	5.4%
Utah	1,560	6.1	10.6	$471	$893	$77	0.4%
Virginia	10,918	8.3	10.9	$660	$929	$79	2.7%
Vermont	1,038	5.1	7.6	$492	$798	$96	0.3%
Washington	7,781	5.3	7.5	$497	$722	$93	1.9%
Wisconsin	11,053	6.1	8.2	$461	$637	$76	2.7%
West Virginia	3,935	8.7	12.0	$627	$896	$72	1.0%
Wyoming	617	7.1	11.3	$570	$1,049	$81	0.2%

3.1.4 Part B Therapy Episode Patterns By Setting

Episodes per setting

Setting appears to play a major role in influencing the episodic payments for outpatient therapy service and very different patterns are apparent depending upon the type of therapy. Of the nearly 3.8 million PT episodes, seventy-one percent are represented by three settings (hospital = 34%, PTPP = 20% and physician = 17%). If SNF and ORF are included (14% each), these five settings account for nearly 99% of all PT service episodes. OT, on the other hand, has eighty percent of over 800 thousand episodes represented in only two settings (SNF = 49% and hospital = 31%). If the ten percent of OT episodes representing ORF settings is included, over 90% of OT service episodes are represented by only three settings. More dramatic is the SLP episode pattern. Two settings account for ninety-four percent of the 403,770 SLP episodes (SNF = 58% and hospital = 36%). If an additional four percent of SLP episodes representing ORF settings are considered, three settings represent 98% of all SLP service episodes.

Average treatment days per setting

There are also variations in the average number of treatment days per episode, average episode payment, and average payment per treatment day depending upon the setting and therapy type. However, the CORF setting stands out among all three therapy types. With regards to average payment per PT episode, CORF is $1,100, followed by SNF at $899 and ORF at $803. For OT services, CORF also has the highest average episode payment at $1,371, followed by ORF at $904 and SNF at $838. CORF also has the highest average episode payment for SLP services at $985, followed by ORF at $789 and HHA at $731.

Average payment per treatment day per setting

The average payment per treatment day for CORF PT is $86 while the average for all other settings ranges from $54-$69/treatment day. For CORF OT, the average payment for treatment day is $108 compared to all other OT treatment setting averages ranging from $49 to $79/treatment day. The higher average payment per treatment day for CORF SLP services is not as pronounced as observed with PT and OT services, however it is apparent. The average CORF SLP treatment day payment of $95 is higher than all other SLP settings that range from $65-86/treatment day.

While the number of visits, average payments, and average payments per treatment day per CORF episode are higher for all therapy types; they represent only a very small percentage of all episodes (2% of PT, 4% of OT, and 1% of SLP episodes).

PT episode patterns by setting

Hospital outpatient PT service reflects average episodic durations of 9.0 treatment days. Other common PT settings reflect more treatments per episode with 14.1 days in SNF, 12.0 days in PTPP, and 11.6 days for ORF. Physician office PT services averaged 7.9 treatment days per episode, slightly lower than hospital. The average hospital outpatient PT episode payment and payment per treatment day ($506/$56) were also generally lower than other common PT settings. For example, PTPP ($794/$66), SNF ($899/$64), and ORF ($904/79) had higher per episode and per treatment day PT payments. This suggests that PTPP, SNF and ORF PT services are furnished

at a higher intensity per treatment, and for a longer episodic duration than hospital outpatient PT services.

Another common outpatient PT setting, the physician office ($466/$49), had lower episode, but not per treatment day payments than hospital PT. This suggests that the treatment cost per visit is similar to hospital outpatient PT services, but the PT services are not furnished for as many treatment days[43].

OT episode patterns by setting

Outpatient OT in a hospital setting averaged 7.3 treatment days per episode, in contrast 12.2 days for SNF, 11.5 days for ORF, and 10.2 days for OTPP. The average outpatient hospital OT episodic payment, and average per treatment day payment of $483 and $67 were generally lower than other common OT settings. For example, in SNF, the most common site for OT episodes, the average episode payment of $838 is notably higher than hospital while the average per treatment day payment of $69 is only slightly higher than hospital OT. This suggests that SNF OT does not treat at increased intensity per visit, but treats for longer episode durations. Both the ORF OT average episode payment of $904 and per treatment date payment of $79 was higher than hospital outpatient OT services suggesting both an increased intensity of treatment per visit, and increased episode duration for ORF OT services.

SLP episode patterns by setting

With SLP services, hospital outpatient services averaged only 4.8 treatment days per episode while SNF averaged 8.0 treatment days per episode. Hospital outpatient SLP services demonstrated an average episodic paid amount of $389 reflecting a per treatment day average payment of $81. The other common setting for SLP episodes, the SNF, presents with higher average episodic payments at $689 but with only modestly higher per treatment day payments at $85. This suggests that the episodic payment difference is most likely attributed to more SLP treatment days in SNF, rather than increased per-visit treatment intensity. Tables 10, 11, and 12 present the Part B therapy episode patterns by setting for PT, OT and SLP services respectively.

[43] Our earlier report (Ciolek and Hwang. *Feasibility and Impact Analysis*, September 2004) also indicates that physician office providers are more likely to furnish different types of procedures than other outpatient therapy provider settings. In particular, modalities that do not require constant attendance are more likely to be furnished in physician office settings.

Table 10 - Physical Therapy Outpatient Episode Patterns by Setting

PT Episodes Setting	Number of PT Episodes	Average Number Treatment Days	Standard Deviation Treatment Days	Average Episode Paid	Standard Deviation Episode Paid	Payment per Treatment Day	Percent of Total (N) Episodes
All PT Episodes	3,776,459	10.6	11.7	$664	$903	$63	100%
Hospital	1,266,249	9.0	9.4	$506	$627	$56	34%
SNF	537,690	14.1	14.7	$899	$1,057	$64	14%
CORF	76,108	12.7	11.4	$1,100	$1,180	$86	2%
ORF	511,583	11.6	11.0	$803	$941	$69	14%
HHA	5,391	10.2	10.6	$659	$745	$64	0%
PTPP	738,521	12.0	12.1	$794	$947	$66	20%
Physician	636,772	7.9	11.9	$466	$995	$59	17%
Non-Physician	4,145	7.7	12.3	$415	$976	$54	0%

Table 11 - Occupational Therapy Outpatient Episode Patterns by Setting

OT Episodes Setting	Number of OT Episodes	Average Number Treatment Days	Standard Deviation Treatment Days	Average Episode Paid	Standard Deviation Episode Paid	Payment per Treatment Day	Percent of Total (N) Episodes
All OT Episodes	823,619	10.4	11.8	$743	$990	$71	100%
Hospital	255,126	7.3	9.6	$483	$744	$67	31%
SNF	405,052	12.2	12.6	$838	$987	$69	49%
CORF	29,088	12.7	10.8	$1,371	$1,333	$108	4%
ORF	82,150	11.5	12.6	$904	$1,191	$79	10%
HHA	1,713	6.8	8.5	$501	$682	$73	0%
OTPP	41,370	10.2	12.4	$775	$1,237	$76	5%
Physician	9,070	4.4	6.7	$254	$451	$58	1%
Non-Physician	50	2.4	3.6	$120	$160	$49	0%

Table 12 - Speech-Language Pathology Outpatient Episode Patterns by Setting

SLP Episodes Setting	Number of SLP Episodes	Average Number Treatment Days	Standard Deviation Treatment Days	Average Episode Paid	Standard Deviation Episode Paid	Payment per Treatment Day	Percent of Total (N) Episodes
All SLP Episodes	403,770	6.9	9.8	$586	$889	$85	100%
Hospital	146,174	4.8	8.7	$389	$738	$81	36%
SNF	233,799	8.0	9.9	$689	$922	$86	58%
CORF	3,608	10.4	12.0	$985	$1,246	$95	1%
ORF	17,798	9.3	12.3	$789	$1,161	$85	4%
HHA	829	9.1	12.4	$731	$982	$81	0%
Physician	1,529	3.2	7.1	$230	$447	$72	0%
Non-Physician	33	1.3	0.6	$84	$35	$65	0%

In addition, several appendices contain additional descriptive analysis tables detailing the relationships of setting with other variables. In particular:

- Appendix B contains tables describing the episode duration and expenditure relationships of setting and AdvanceMed clinical classification groups;
- Table 1 of Appendices C, D and E provide average episodic payments, standard error and confidence limits for gender and provider setting relationships for PT, OT and SLP service episodes respectively;
- Table 2 of Appendices C, D and E provide average episodic payments, standard error and confidence limits for age and provider setting relationships for PT, OT and SLP service episodes respectively; and
- Table 3 of Appendices C, D and E provide average episodic payments, standard error and confidence limits for AdvanceMed classification group and provider setting relationships for PT, OT and SLP service episodes respectively.

3.1.5 Part B Therapy Episode Patterns by AdvanceMed Outpatient Therapy Classification Group

Similar to the setting results described above, the presenting clinical condition for the beneficiary episode appears to significantly impact the episodic payment amount for outpatient therapy services, and different patterns are apparent depending upon the type of therapy episode. As discussed in Sections 2.4.3 and 2.4.4 of this report, we created 21 distinct clinical classification groups that were based upon the principal claim diagnosis of the first claim submitted during an outpatient therapy service episode. We labeled these classification groups as the "AdvanceMed Clinical Classification Groups" (see Appendix A for ICD-9 selection criteria for the 21 groups). The groups were intended to be clinically meaningful and to begin the process of using claims data to identify distinct groups of diagnoses or conditions that could be compared as part of ongoing processes that consider alternative payment options for outpatient therapy services. Although very preliminary, the results clearly demonstrate differences in clinical conditions treated under PT, OT and SLP plans-of-care[44].

Physical Therapy

Musculoskeletal conditions overwhelmingly describe most PT episodes (Table 13). "Musculoskeletal-lumbar/thoracic" represents the most commonly occurring clinical group for PT

[44] NOTE: We recognize, as described in Section 2.4.4 that due to claim diagnosis reporting limitations that some clinical groupings may appear illogical for a particular therapy type. For example, it is unlikely that an SLP plan of care is actually being followed to treat a lumbar/thoracic disorder; however, they were so grouped in this current model version to determine the feasibility of using one single clinical grouping model across three therapy types. It is notable, however, that such illogical groupings are uncommon in this model (i.e., Table 12 indicates that only 0.3% of SLP episodes were classified as lumbar/thoracic disorders). In order to emphasize the limiting impact of current claim diagnosis requirements on the feasibility of using claims data for developing a payment model, we chose not to arbitrarily exclude such data from this preliminary model. Later iterations, which may include collapsing the number of available SLP (or PT or OT) groups from 21 to a smaller number, using additional data outside of the NCH to describe therapy treatment diagnosis, or changes in CMS therapy diagnosis reporting requirements, may permit more precision. In this report, we will avoid discussing the results in these apparently clinically illogical groups.

services at 18.5 percent of the 3.8 million episodes. In fact, nearly two-thirds of all PT episodes are represented by the top five Musculoskeletal clinical groups, as "Lumbar/thoracic" episodes are followed in frequency by "Musculoskeletal- site unspecified" group (13.9%), "Musculoskeletal-shoulder/upper arm" (11.1%), and "Musculoskeletal–neck" (7.5%). In addition, 11 percent of PT episodes were described by ICD-9 codes that were either too general, had a non-specific clinical impact, or were not otherwise classified in the AdvanceMed model[45]. In contrast, "Neurologic-Central" disorders, including Stroke and Parkinson's Disease, represent only 5.1 percent of PT treatment episodes.

However, the pattern for the average number of treatment days, average episode payment, and average payment per treatment is markedly different and unrelated to how common a clinical condition is observed for PT services. For example, although beneficiary episodes classified in the spinal cord injury group represent less than one-tenth of one percent of all PT episodes, they had the highest average episode payment at $1,012, the third highest average number of treatment days at 14.2, and the highest per treatment day average payment of $70 suggesting that although few in number, persons in the "Spinal Cord Injury" group that require PT, generally receive intensive treatment per visit and over a longer period of time than those with other conditions.

The condition group with the second highest average per episode PT paid amount ($984), was "Amputation." While it is not a common condition (only 0.3% of all PT episodes), the average duration of the episode for amputation was 15.0 days, the highest among all PT classification groups. This suggests treatment over a longer period of time than most PT conditions. However, the average payment per treatment day of $65 is similar to the overall PT average of $63 suggesting that individual amputee treatments are no more intensive than average.

"Neurologic-Central" disorders have the third highest average per episode PT payment ($885). With an average number of treatment days of 13.0 and an average payment per treatment day of $68, the results suggest that the "Neurologic-Central" condition PT episode involves more intensive treatment per visit over a longer period of time than the average PT condition.

Other notable findings among the PT clinical classification groups include the "Chronic ulcer of skin," "Musculoskeletal -multiple sites," and "Musculoskeletal-lumbar/thoracic region" episodes. "Chronic ulcer of the skin" represents only 0.6% of PT episodes, however, it ranks second in the average number of treatment days per episode at 14.7 days. This pattern suggests that chronic skin wounds take more time than most PT conditions to resolve. While the per episode average payment of $706 is slightly higher than the average condition, the per treatment day average payment of $48 is markedly lower than all other PT clinical groups.

[45] The 11.1% rate representing General/Non-specific/Other PT (clinically unidentifiable) episodes is not ideal but compares favorably to the 18% rate we observed when pilot testing a previously published classification scheme (described in Section 2.4.3).

This marked per treatment date/payment disparity with the other PT clinical groups may suggest a lower intensity of service furnished per treatment date. As suggested by the provider community, it may also reflect insufficient pricing for procedures used in the treatment of chronic skin ulcers.

Among the PT Musculoskeletal clinical groups, "Musculoskeletal-multiple sites" has the highest per episode payment average at $779 followed by "Musculoskeletal-knee/lower leg" ($732), "Musculoskeletal-shoulder/upper arm" ($715), and "Musculoskeletal-hip/pelvis/thigh" ($702)[46]. The average number of treatment days (11.1-11.8) and average payment per treatment day among these groups did not vary much ($61-$68) suggesting that these groups may be more similar than expected.

Finally, although the "Musculoskeletal-lumbar/thoracic" disorder clinical classification group represented the greatest number of PT episodes, it is also a condition that receives less intensive intervention on average than most other PT conditions. For example, the average episode payment of $602, average number of treatment days per episode of 9.7, and average payment per treatment day of $62 for "Musculoskeletal-lumbar/thoracic" condition PT episodes are below the averages for all groups as a whole, and most groups individually.

Table 13 - Physical Therapy Outpatient Episode Patterns by AdvanceMed Classification Group

PT Episodes AdvanceMed Clinical Classification Group	Number of PT Episodes	Average Number Treatment Days	Standard Deviation Treatment Days	Average Episode Paid	Standard Deviation Episode Paid	Payment per Treatment Day	Percent of Total (N) Episodes
All PT Episodes	3,776,459	10.6	11.7	$664	$903	$63	100.0%
Amputation	9,935	15.0	16.9	$984	$1,273	$65	0.3%
Balance/Functional Movement	87,897	11.9	12.2	$786	$902	$66	2.3%
Cardiac/Vascular/Pulmonary	125,355	11.4	14.0	$734	$1,040	$64	3.3%
Chronic ulcer of skin	23,875	14.7	22.1	$706	$1,480	$48	0.6%
Communication	14,124	5.3	9.1	$364	$663	$69	0.4%
General/Non-Specific Impact/Other	415,945	9.9	12.5	$600	$895	$61	11.0%
Mental/Cognitive	34,047	12.5	14.8	$768	$964	$61	0.9%
Musculoskeletal-ankle/foot	144,748	7.4	8.7	$416	$641	$56	3.8%
Musculoskeletal-elbow to hand	67,319	9.5	10.3	$570	$782	$60	1.8%
Musculoskeletal-hip/pelvis/thigh	189,446	11.1	11.3	$702	$884	$63	5.0%
Musculoskeletal-knee/lower leg	376,264	11.1	10.9	$732	$897	$66	10.0%
Musculoskeletal-lumbar/thoracic	697,037	9.7	10.3	$602	$825	$62	18.5%
Musculoskeletal-multiple sites	46,735	11.4	12.3	$779	$1,161	$68	1.2%
Musculoskeletal-neck	282,738	9.7	9.8	$574	$756	$59	7.5%
Musculoskeletal-shoulder/upper arm	419,079	11.8	11.4	$715	$857	$61	11.1%
Musculoskeletal-site unspecified	525,241	10.7	11.7	$701	$943	$66	13.9%
Neurologic-Central	193,242	13.0	14.8	$885	$1,165	$68	5.1%
Neurologic-Peripheral	47,381	8.9	11.2	$529	$835	$59	1.3%
Spinal Cord Injury	832	14.2	20.4	$1,012	$1,754	$71	0.0%
Swallowing/Feeding Disorder	19,444	7.3	11.4	$513	$808	$70	0.5%
Systemic	55,775	11.1	14.4	$686	$1,040	$62	1.5%

[46] We did not distinguish fractures from other musculoskeletal conditions in this analysis based upon analysis of our July 2004 utilization report (Appendix J) that suggested that, in general, expenditures of musculoskeletal conditions appeared more related to body region rather than to fracture vs. non-fracture. This decision permitted us to limit this preliminary analysis to 21 clinical groups. Future revisions to this model may distinguish if fractures within a body region have different episodic treatment days and payment outcomes.

In addition, several appendices contain additional descriptive analysis tables detailing the relationships of PT AdvanceMed classification group with other variables. In particular:

- Appendix B – Table 1 contains tables describing the PT episode duration and expenditure relationships of setting and AdvanceMed clinical classification groups;
- Appendix C – Table 3 provides average episodic payments, standard error and confidence limits for AdvanceMed classification group and provider setting relationships for PT service episodes;
- Appendix C – Table 4 provides average episodic payments, standard error and confidence limits for gender and AdvanceMed classification group relationships for PT service episodes; and
- Appendix C – Table 5 provides average episodic payments, standard error and confidence limits for age and AdvanceMed classification group relationships for PT service episodes.

Occupational Therapy

Using the same 21 AdvanceMed clinical classification groups for OT service episodes (Table 14) reveals a different and less homogenous pattern than observed with PT episodes. While the top five PT groups all represented musculoskeletal conditions, and nearly two-thirds of all PT episodes, the top five most common OT episode groups represent a variety of conditions, and just over one-half (55%) of all OT episodes.

"Musculoskeletal-site unspecified" conditions were the most frequently observed OT episodes at 16.7 percent. The classification groups describing the next most common OT episode types were "Neurologic-Central" conditions (including Stroke and Parkinson's Disease) at 15.6%, "Musculoskeletal -elbow to hand" at 9.5%, conditions affecting the "Cardiac/Vascular/Pulmonary" systems at 7.9%, and "Musculoskeletal-shoulder/ upper arm" at 5.1%. In addition, nearly nineteen percent of OT episodes were described by ICD-9 codes that were either too general, had a non-specific clinical impact, or were not otherwise able to be classified in the AdvanceMed model[47].

Similar to PT, the OT pattern for average number of treatment dates per episode, average payments per episode and average payment per treatment date demonstrates that some less commonly occurring clinical conditions receive more intensive OT than average. For example, while the "Balance/Functional Movement" disorders clinical group represents only 2.4% of OT episodes, it ranks first in average per episode payment at $954 and first in average number of treatment days per episode at 13.0. This group's average payment per treatment day of $74 is similar to the average for all OT groups suggesting that the OT "Balance/Functional Movement" disorders

[47] The 18.8% rate representing General/Non-specific/Other OT (clinically unidentifiable) episodes is not ideal but compares favorably to the 24% rate we observed when pilot testing a previously published classification scheme (described in Section 2.4.3).

clinical group's higher cost is related to more treatment days rather than a higher number of services or units per service per treatment date.

The second ranked OT clinical group by average payment per episode ($954) is "Amputation." Similar to the "Balance/Functional" disorders group, it represents only a small portion of OT episodes (0.3%), ranks second in number of treatment days per episode at 12.6 days, and has an unremarkable average payment per treatment day of $74. This suggests that the OT "Amputation" clinical group's higher cost is related to more treatments rather than a higher intensity of treatment per date of service.

"Musculoskeletal-neck" ranked third in average paid amount per OT episode at $904, with an average of 10.0 treatment days per episode. This translates to an average payment per treatment date of $90, which is the highest per-day average payment among all OT clinical groups. "Musculoskeletal-multiple sites" ranked fourth for OT average paid amount per episode, occurring over an average of 11.8 treatment dates. The average payment per treatment day for OT "Musculoskeletal-multiple sites" of $76 is similar to the OT average for all conditions and suggests that this group's higher episode payments are related to higher number of treatments rather than increased treatment intensity per visit.

Finally, the fifth ranked OT clinical classification group by average episode payment is the "Neurologic-Central" disorder group, averaging $836 in per episode payments spanning an average of 11.4 treatment dates. The average OT payment per treatment day of $73 for the "Neurologic-Central" disorder group is similar to the average for all groups suggesting that the increased episodic payment rate observed is related more to the number of treatments rather than the intensity of treatment on individual treatment dates.

Table 14 - Occupational Therapy Outpatient Episode Patterns by AdvanceMed Classification Group

OT Episodes AdvanceMed Clinical Classification Group	Number of OT Episodes	Average Number Treatment Days	Standard Deviation Treatment Days	Average Episode Paid	Standard Deviation Episode Paid	Payment per Treatment Day	Percent of Total (N) Episodes
All OT Episodes	823,619	10.4	11.8	$743	$990	$71	100.0%
Amputation	2,520	12.6	15.0	$936	$1,233	$74	0.3%
Balance/Functional Movement	20,114	13.0	12.7	$954	$1,035	$74	2.4%
Cardiac/Vascular/Pulmonary	64,804	10.9	12.3	$786	$1,019	$72	7.9%
Chronic ulcer of skin	3,988	9.9	12.7	$647	$957	$66	0.5%
Communication	3,974	11.1	12.2	$724	$958	$65	0.5%
General/Non-Specific Impact/Other	155,170	9.9	12.0	$692	$967	$70	18.8%
Mental/Cognitive	34,368	10.4	12.5	$661	$846	$64	4.2%
Musculoskeletal-ankle/foot	3,144	10.8	12.7	$799	$1,048	$74	0.4%
Musculoskeletal-elbow to hand	78,044	8.6	9.2	$547	$703	$64	9.5%
Musculoskeletal-hip/pelvis/thigh	22,184	11.1	12.6	$817	$1,054	$74	2.7%
Musculoskeletal-knee/lower leg	14,769	8.8	11.0	$745	$1,077	$85	1.8%
Musculoskeletal-lumbar/thoracic	19,389	9.1	9.6	$792	$956	$87	2.4%
Musculoskeletal-multiple sites	13,424	11.8	11.6	$888	$1,067	$76	1.6%
Musculoskeletal-neck	7,872	10.0	9.6	$904	$100	$90	1.0%
Musculoskeletal-shoulder/upper arm	41,832	11.4	11.3	$815	$962	$71	5.1%
Musculoskeletal-site unspecified	137,854	11.0	11.6	$796	$1,009	$73	16.7%
Neurologic-Central	128,817	11.4	13.3	$836	$1,158	$73	15.6%
Neurologic-Peripheral	27,359	6.5	8.3	$441	$693	$67	3.3%

OT Episodes AdvanceMed Clinical Classification Group	Number of OT Episodes	Average Number Treatment Days	Standard Deviation Treatment Days	Average Episode Paid	Standard Deviation Episode Paid	Payment per Treatment Day	Percent of Total (N) Episodes
Spinal Cord Injury	438	10.3	15.3	$779	$1,321	$76	0.1%
Swallowing/Feeding Disorder	13,553	10.2	11.0	$702	$848	$69	1.6%
Systemic	30,002	10.4	12.1	$719	$953	$69	3.6%

In addition, several appendices contain additional descriptive analysis tables detailing the relationships of OT AdvanceMed classification group with other variables. In particular:

- Appendix B – Table 2 contains tables describing the OT episode duration and expenditure relationships of setting and AdvanceMed clinical classification groups;
- Appendix D – Table 3 provides average episodic payments, standard error and confidence limits for AdvanceMed classification group and provider setting relationships for OT service episodes;
- Appendix D – Table 4 provides average episodic payments, standard error and confidence limits for gender and AdvanceMed classification group relationships for OT service episodes; and
- Appendix D – Table 5 provides average episodic payments, standard error and confidence limits for age and AdvanceMed classification group relationships for OT service episodes.

Speech-Language Pathology

Speech-language pathology service episodes (Table 15) appear to represent the most homogenous clinical conditions of the three therapy types studied. Of the 21 AdvanceMed clinical classification groups used in this study, five groups represent over seventy-five percent of all SLP episodes. For SLP, the ”Swallowing/Feeding Disorders” clinical group was by far the most commonly occurring type of clinical episode at 38.4%. Among the other more common SLP episode types were; “Neurologic-Central” conditions (including Stroke and Parkinson’s Disease) at 17.7%, “Communication” disorders at 7.8%, “Cardiac/Vascular/Pulmonary” disorders at 6.6%, and “Mental/Cognitive” disorders at 5.2%. In addition, twelve percent of SLP episodes were described by ICD-9 codes that were either too general, had a non-specific clinical impact, or were not otherwise able to be classified in the AdvanceMed model[48]. Because of the ICD-9 claim coding limitations that are more likely to impact SLP classification groups (see footnote #44), the following discussion will be limited to the five clinical classification groups representing the majority of SLP episodes.

One indicator of the relative intensity of services furnished for a given condition is the measurement of average payment per treatment date. Unlike the pattern observed for PT and OT episodes that demonstrated that certain clinical classification groups receive higher payments per

[48] The 12.0% rate representing General/Non-specific/Other SLP (clinically unidentifiable) episodes is not ideal but compares favorably to the 14% rate we observed when pilot testing a previously published classification scheme (described in Section 2.4.3). It emphasizes our frequent observation that diagnosis reporting needs improvement, or a new method of collecting clinical information other than the claim may be necessary.

treatment date than other groups, no such obvious pattern exists for SLP services. While the average payment per treatment date for all SLP services is $85, the average for the most commonly occurring SLP groups only varies within a small range ($83-88) around the mean. This could suggest that SLP services are typically furnished at a similar intensity for all patient conditions on any given treatment date (see discussion in Section 3.3.1), or could suggest a lack of sensitivity in the current fee schedule structure to describe variations in SLP treatment intensity. Note that most of the codes are non-timed, typically once-a-day codes. However, most SLP clinical groups also had an average number of treatment days per episode that were similar as well (range 4.9 days-9.5 days for common clinical groups).

Among the five most commonly occurring SLP clinical classification groups there appear to be different patterns in how the services are furnished during an episode. For example, the most common episode clinical group, "Swallowing/Feeding Disorders", reflects a markedly lower average paid amount per episode at $435. In addition, the average number of treatment days for this group of 4.9 dates is also the smallest of all SLP groups. It is likely, however, that this large group (38.4%) of SLP episodes may actually represent two or more different subgroups.

For example, the current AdvanceMed clinical classification model does not differentiate "Swallowing/Feeding Disorders" into subgroups of individuals that received only a swallowing evaluation during an episode from those individuals that received an evaluation and/or treatment[49]. If so, one would expect that the evaluation-only group would have a low average paid amount and low average number of treatment days while the evaluation and/or treatment group averages could increase to levels that might actually be higher than average rather than the currently reflected low numbers. This is an important distinction especially for payment policy considerations.

An SLP episodic payment pattern that appears more typical is that for the "Neurologic-Central" conditions group. It has the highest average per episode payment rate of $785 and the greatest average number of visits at 9.5 days. Similar to the "Swallowing/Feeding Disorders" group, consideration in future versions of this classification model could consider the actual treatment being provided under the SLP plan-of-care. For example, some individuals with central neurologic involvement may present with swallowing/feeding disorders, while others may present with communication disorders, or some individuals may present with both groups of disorders. Differentiating these sub-groups may help identify distinctive clinical patterns not currently apparent.

When communication disorders can be identified, that clinical group demonstrates an average episode payment amount of $638, with an average number of treatment days of 8.1 ranking it second in both categories for SLP. Rounding out the major SLP groups are "Cardiac/Vascular/Pulmonary" conditions and "Mental/Cognitive" disorders with episode cost averages of $644 and $604 respectively, and average per episode treatment days of 7.4 and 7.3 days. Overall, these three clinical groups do not appear to have obvious differences in payment or

[49] Such a differentiation could be considered in future versions of this model.

treatment intensity from each other, but they do appear to demonstrate different patterns from the "Swallowing/Feeding Disorders" group and "Neurologic-Central" group.

Table 15 - Speech-Language Pathology Outpatient Episode Patterns by AdvanceMed Classification Group

SLP Episodes AdvanceMed Clinical Classification Group	Number of SLP Episodes	Average Number Treatment Days	Standard Deviation Treatment Days	Average Episode Paid	Standard Deviation Episode Paid	Payment per Treatment Day	Percent of Total (N) Episodes
All SLP Episodes	403,770	6.9	9.8	$586	$889	$85	100.0%
Amputation	392	8.8	11.0	$750	$1,035	$85	0.1%
Balance/Functional Movement	4,526	9.7	10.6	$814	$971	$84	1.1%
Cardiac/Vascular/Pulmonary	26,806	7.4	9.9	$644	$911	$87	6.6%
Chronic ulcer of skin	1,248	7.4	9.4	$634	$855	$85	0.3%
Communication	31,319	8.1	11.5	$638	$1,006	$78	7.8%
General/Non-Specific Impact/Other	48,257	6.6	9.5	$560	$887	$85	12.0%
Mental/Cognitive	21,125	7.3	9.0	$604	$806	$83	5.2%
Musculoskeletal-ankle/foot	365	7.2	9.2	$586	$762	$82	0.1%
Musculoskeletal-elbow to hand	973	8.1	9.4	$698	$898	$86	0.2%
Musculoskeletal-hip/pelvis/thigh	5,125	7.8	9.6	$666	$891	$86	1.3%
Musculoskeletal-knee/lower leg	1,017	7.4	8.7	$622	$799	$84	0.3%
Musculoskeletal-lumbar/thoracic	1,412	7.5	9.1	$630	$923	$84	0.3%
Musculoskeletal-multiple sites	1,280	8.8	10.2	$769	$1,034	$87	0.3%
Musculoskeletal-neck	424	5.9	9.1	$508	$937	$86	0.1%
Musculoskeletal-shoulder/upper arm	1,069	8.2	9.6	$661	$812	$81	0.3%
Musculoskeletal-site unspecified	19,415	9.3	10.9	$780	$993	$84	4.8%
Neurologic-Central	71,463	9.5	12.2	$785	$1,117	$83	17.7%
Neurologic-Peripheral	1,251	7.8	10.1	$614	$882	$79	0.3%
Spinal Cord Injury	24	8.2	7.7	$635	$562	$77	0.0%
Swallowing/Feeding Disorder	155,015	4.9	7.6	$435	$684	$88	38.4%
Systemic	11,264	7.6	9.3	$656	$883	$87	2.8%

In addition, several appendices contain additional descriptive analysis tables detailing the relationships of SLP AdvanceMed classification group with other variables. In particular:

- Appendix B – Table 3 contains tables describing the SLP episode duration and expenditure relationships of setting and AdvanceMed clinical classification groups;
- Appendix E – Table 3 provides average episodic payments, standard error and confidence limits for AdvanceMed classification group and provider setting relationships for SLP service episodes;
- Appendix E – Table 4 provides average episodic payments, standard error and confidence limits for gender and AdvanceMed classification group relationships for SLP service episodes; and
- Appendix E – Table 5 provides average episodic payments, standard error and confidence limits for age and AdvanceMed classification group relationships for SLP service episodes.

3.2 Regression Analysis

Our descriptive analysis in Section 3.1 shows that Medicare payments were correlated with individual factors such as age, gender, provider setting, and clinical condition. However, such descriptive analysis can only consider one or two factors at a time. To control for multiple factors

that contribute to the observed differences in Medicare payment per therapy service episode, we used Ordinary Least Square (OLS) multiple regression. This section describes the regression results using the AdvanceMed outpatient rehabilitation clinical classification model developed for this study.

3.2.1. Overall Explanatory Power

As described earlier, the payment data was organized for each therapy type (PT, OT, or SLP) and aggregated by the episode. Beneficiaries' age, gender, state (of residence), treatment setting, and diagnosis are used as regressors. Table 16 shows two models for PT (one with the dependent variable measured in raw dollars and the second measured in transformed dollars based on natural logarithm). Tables 17 and 18 summarize these two models for OT and SLP respectively. For PT, OT, and SLP models with dependent variable measured in raw dollars, results show that these regression models had adjusted R^2 ranging from 6.5% to 7.5%, with overall relationship at $p<.0001$. Low adjusted R^2 is a common result among studies that attempt to predict health care expenditure.

Models with dependent variable measured in natural logarithm had much better fits, ranging from SLP (13.8%), OT (13.8%), and PT (15.9%).

Table 16 – AdvanceMed Classification Regression Model: PT

Regression Model -- PT Episode *

Dependent Variable -- Medicare Payment Amount Aggregated by Episode

	Raw $		Natural Logarithm $	
	Coefficient	P-value	Coefficient	P-value
Intercept	219.47	<.0001	5.32	<.0001
Male	13.39	<.0001	0.002	0.0388
Female	reference	reference	reference	reference
< 65	-44.74	<.0001	-0.17	<.0001
65 - 69	reference	reference	reference	reference
70 - 74	9.98	<.0001	0.02	<.0001
75 - 79	4.89	<.0001	0.01	<.0001
80 - 84	-9.99	<.0001	-0.02	<.0001
85 - 89	-20.29	<.0001	-0.05	<.0001
90 +	-50.3	<.0001	-0.11	<.0001
Hospital	reference	reference	reference	reference
SNF	394.06	<.0001	0.67	<.0001
CORF	542.55	<.0001	0.67	<.0001
ORF	277.26	<.0001	0.45	<.0001
HHA	173.65	<.0001	0.34	<.0001
PTPP	263.14	<.0001	0.39	<.0001
OTPP	N/A	N/A	N/A	N/A
MD	-53.45	<.0001	-0.69	<.0001
Non-MD	-70.47	<.0001	-1.07	<.0001
(1) Amputation	377.68	<.0001	0.23	<.0001
(2) Balance/Functional Movement	68.53	<.0001	-0.06	<.0001
(3) Cardiac/Vascular/Pulmonary	74.9	<.0001	-0.19	<.0001
(4) Chronic Ulcer of Skin	131.18	<.0001	-0.3	<.0001
(5) Communication	-125.81	<.0001	-0.29	<.0001
(6) General/Non-specific Impact/Other	0.51	0.7685	-0.28	<.0001
(7) Mental/Cognitive	-0.38	0.9385	-0.26	<.0001
(8) Musculoskeletal - Ankle/Foot	-150.76	<.0001	-0.58	<.0001
(9) Musculoskeletal - Elbow to Hand	-34.93	<.0001	-0.11	<.0001
(10) Musculoskeletal - Hip/Pelvis/Thigh	85.1	<.0001	0.06	<.0001
(11) Musculoskeletal - Knee/Lower Leg	132.76	<.0001	0.16	<.0001
(12) Musculoskeletal - Lumbar/Thoracic	reference	reference	reference	reference
(13) Musculoskeletal - Multiple Sites	119.5	<.0001	0.02	0.0072
(14) Musculoskeletal - Neck	-28.96	<.0001	-0.004	0.868
(15) Musculoskeletal - Shoulder/Upper Arm	114.24	<.0001	0.18	<.0001
(16) Musculoskeletal - Site Unspecified	67.92	<.0001	-0.06	<.0001
(17) Neurologic - Central	233.31	<.0001	0.104	<.0001
(18) Neurologic _ Peripheral	-30.42	<.0001	-0.29	<.0001
(19) Spinal Cord Injury	472.81	<.0001	0.16	<.0001
(20) Swallowing/Feeding Disorder	-71.82	<.0001	-0.12	<.0001
(21) Systemic	25.51	<.0001	-0.31	<.0001
	Adjust R-Square		Adjust R-Square	
	0.0647		0.1592	

* US states are included as independent variables (data not shown).

Table 17 – AdvanceMed Classification Regression Model: OT

Regression Model -- OT Episode *

Dependent Variable -- Medicare Payment Amount Aggregated by Episode

	Raw $		Natural Logarithm $	
	Coefficient	P-value	Coefficient	P-value
Intercept	60.42	<0.0001	4.87	<.0001
Male	-0.77	0.74	-0.016	<.0001
Female	reference	reference	reference	reference
< 65	-42.94	<0.0001	-0.13	<.0001
65 - 69	reference	reference	reference	reference
70 - 74	0.18	0.966	0.011	0.046
75 - 79	-16.16	<0.0001	-0.002	0.677
80 - 84	-31.75	<0.0001	-0.017	0.0009
85 - 89	-50.37	<0.0001	-0.03	<.0001
90 +	-99.69	<0.0001	-0.09	<.0001
Hospital	reference	reference	reference	reference
SNF	360.89	<0.0001	0.763	<.0001
CORF	718.48	<0.0001	0.972	<.0001
ORF	393.27	<0.0001	0.626	<.0001
HHA	21.12	0.3614	0.209	<.0001
PTPP	N/jA	N/A	N/A	N/A
OTPP	311.62	<0.0001	0.486	<.0001
MD	-140.49	<0.0001	-0.506	<.0001
Non-MD	-337.44	0.012	-1.04	<.0001
(1) Amputation	315.62	<.0001	0.199	<.0001
(2) Balance/Functional Movement	293.86	<.0001	0.305	<.0001
(3) Cardiac/Vascular/Pulmonary	199.24	<.0001	0.116	<.0001
(4) Chronic Ulcer of Skin	51.88	0.0008	-0.158	<.0001
(5) Communication	268.43	<.0001	0.305	<.0001
(6) General/Non-specific Impact/Other	128.81	<.0001	0.022	<.0001
(7) Mental/Cognitive	60.36	<.0001	-0.077	<.0001
(8) Musculoskeletal - Ankle/Foot	175.53	<.0001	0.04	0.063
(9) Musculoskeletal - Elbow to Hand	reference	reference	reference	reference
(10) Musculoskeletal - Hip/Pelvis/Thigh	219.2	<.0001	0.072	<.0001
(11) Musculoskeletal - Knee/Lower Leg	98.51	<.0001	-0.219	<.0001
(12) Musculoskeletal - Lumbar/Thoracic	95.62	<.0001	-0.016	0.098
(13) Musculoskeletal - Multiple Sites	190.15	<.0001	0.151	<.0001
(14) Musculoskeletal - Neck	180.72	<.0001	0.176	<.0001
(15) Musculoskeletal - Shoulder/Upper Arm	234.14	<.0001	0.347	<.0001
(16) Musculoskeletal - Site Unspecified	167.41	<.0001	0.125	<.0001
(17) Neurologic - Central	275.03	<.0001	0.259	<.0001
(18) Neurologic _ Peripheral	-47.86	<.0001	-0.188	<.0001
(19) Spinal Cord Injury	347.84	<.0001	0.219	<.0001
(20) Swallowing/Feeding Disorder	63.75	<.0001	-0.007	0.535
(21) Systemic	116.45	<.0001	-0.00003	0.997
	Adjust R-Square		Adjust R-Square	
	0.0763		0.1382	

* US states are included as independent variables (data not shown).

Table 18 – AdvanceMed Classification Regression Model: SLP

Regression Model --SLP Episode *

Dependent Variable -- Medicare Payment Amount Aggregated by Episode

	Raw $		Natural Logarithm $	
	Coefficient	P-value	Coefficient	P-value
Intercept	156.89	<0.0001	4.84	<0.0001
Male	24.74	<0.0001	0.038	<0.0001
Female	reference	reference	reference	reference
< 65	-43.01	<0.0001	-0.107	<0.0001
65 - 69	reference	reference	reference	reference
70 - 74	-19.7	0.0015	-0.007	0.2957
75 - 79	-46.57	<0.0001	-0.042	<0.0001
80 - 84	-91.17	<0.0001	-0.088	<0.0001
85 - 89	-116.52	<0.0001	-0.119	<0.0001
90 +	-159.02	<0.0001	-0.166	<0.0001
Hospital	reference	reference	reference	reference
SNF	357.49	<0.0001	0.766	<0.0001
CORF	482.32	<0.0001	0.705	<0.0001
ORF	352.79	<0.0001	0.621	<0.0001
HHA	265.24	<0.0001	0.561	<0.0001
PTPP	N/A	N/A	N/A	N/A
OTPP	N/A	N/A	N/A	N/A
MD	-113.96	<0.0001	-0.259	<0.0001
Non-MD	-283.09	0.0578	-0.844	<0.0001
(1) Amputation	146.83	0.0007	0.22	<0.0001
(2) Balance/Functional Movement	257.18	<0.0001	0.44	<0.0001
(3) Cardiac/Vascular/Pulmonary	125.46	<0.0001	0.223	<0.0001
(4) Chronic Ulcer of Skin	61.66	0.0113	0.127	<0.0001
(5) Communication	267.52	<0.0001	0.462	<0.0001
(6) General/Non-specific Impact/Other	95.76	<0.0001	0.152	<0.0001
(7) Mental/Cognitive	66.47	<0.0001	0.147	<0.0001
(8) Musculoskeletal - Ankle/Foot	51.21	0.253	0.17	0.0014
(9) Musculoskeletal - Elbow to Hand	127.86	<0.0001	0.218	<0.0001
(10) Musculoskeletal - Hip/Pelvis/Thigh	125.1	<0.0001	0.233	<0.0001
(11) Musculoskeletal - Knee/Lower Leg	105.53	<0.0001	0.238	<0.0001
(12) Musculoskeletal - Lumbar/Thoracic	139.27	<0.0001	0.247	<0.0001
(13) Musculoskeletal - Multiple Sites	181.63	<0.0001	0.307	<0.0001
(14) Musculoskeletal - Neck	83.22	0.045	0.143	0.0014
(15) Musculoskeletal - Shoulder/Upper Arm	156.82	<0.0001	0.29	<0.0001
(16) Musculoskeletal - Site Unspecified	227.14	<0.0001	0.382	<0.0001
(17) Neurologic - Central	307.98	<0.0001	0.504	<0.0001
(18) Neurologic _ Peripheral	189.42	<0.0001	0.368	<0.0001
(19) Spinal Cord Injury	152.24	0.383	0.513	0.014
(20) Swallowing/Feeding Disorder	reference	reference	reference	reference
(21) Systemic	109.28	<0.0001	0.199	<0.0001
	Adjust R-Square		Adjust R-Square	
	0.0736		0.1656	

* US states are included as independent variables (data not shown).

3.2.2 PT Episode

When holding all factors constant, for PT episode, male beneficiaries generally incur slightly (but statistically significant with $p < .0001$) higher costs per episode with parameter coefficient at 13.38, or $13 more, compared to female beneficiaries. (See Table 16.) The effect of age is somewhat intriguing, with the expected episodic cost first increased with age, but after 75 years old, the expected expenditure gradually decreased. In fact, the oldest group of beneficiaries (age 90 and over) is the lowest cost group and is $50 less than the comparison group (65-69 year old).

Compared to hospital outpatient (PT episode average payment = $506), CORF, SNF, ORF, HHA, and PTPP patients all incur significantly higher Medicare expenditure per PT episode. The most notable are CORF and SNF episodes that result respectively in an average of $542 and $394 more than the hospital outpatient per episode on similar patients. Other higher cost providers include ORF (+$277), PTPP (+$263), and HHA (+$173). MD and non-MD providers show significantly lower costs (-$53 and -$70) per episode than hospital outpatient.

Compared to beneficiaries within the "Musculoskeletal-lumbar/thoracic" group (PT episode average payment = $602), patients within the "Spinal Cord Injury" group appear to have the highest average PT therapy cost per episode (+$472), followed by "Amputation" (+$377) and "Neurologic-Central" (+$233). "Musculoskeletal-ankle/foot" (-$150) and "Communication" (-$125) are the two lowest relative cost groups.

Most states had higher average PT cost per episode than the reference state (Iowa = $405). Among the higher expenditure states relative to Iowa were; Mississippi at +$432, California at +$431, New Jersey at +$391, Nevada at +$360, and New York at +$353., North Dakota at -$96 and South Dakota at -$3 were among lowest cost states relative to Iowa. (See Appendix F for a PT-episode full model.)

3.2.3 OT Episode

After adjusting for all other factors in the model, gender does not appear to be a significant factor ($p = 0.7376$) to Medicare expenditures. (See Table 17.) Age in OT episodes shows a similar pattern as PT, i.e., the groups of 65-69 and 70-74 years shows the highest cost of all. However, once beneficiaries reach 75 years old, the expected OT expenditures per episode decline steadily with increase of age. For example, the oldest group (90+ years old) is $100 less than the comparison group (65-69 years old).

The highest Medicare expenditures are for similar beneficiaries receiving OT treatments in CORFs. Medicare pays an average of $718 more per episode than beneficiaries receiving OT in the hospital outpatient setting (OT episode average payment = $483) . Other settings with higher OT expenditure per episode relative to hospital include ORF (+$393), SNF (+$360) and OTPP (+$311). Non-MD and MD have significantly lower expenditure per OT episode (-$337 and -$140 respectively) relative to hospital.

Compared to beneficiaries treated for elbow/hand (OT episode average payment = $547), the high cost diagnosis group for OT includes "Spinal Cord Injury" (+$347), "Amputation" (+$315), "Balance/Functional Movement" (+$293), and "Neurologic-Central" (+$275). Beneficiaries with "Neurologic-Peripheral" diagnosis for the OT episode have the lowest average cost at (-$47) relative to "Musculoskeletal-elbow to hand" conditions.

Using Iowa as a comparison group (OT episode average payment = $394), high Medicare expenditure states include Mississippi at +$589, Florida at +$552, Oklahoma at +$526, Texas at +$480, and North Carolina at +$462. States providing OT services with the lowest cost per episode relative to Iowa include North Dakota at -$63 and South Dakota at +$30. (See Appendix G for a full OT model.)

3.2.4 SLP Episode

Table 18 shows that males have an average of $24 higher expenditure per SLP episode than their female counterparts. The relationship between age and Medicare expenditure persists in SLP – beneficiaries in 65-69 years old and 70-74 years old groups have the highest Medicare spending. For those over 70 years old, the therapy spending declines linearly with the increase of beneficiaries' age. When holding other factors constant, the group of 90+ years old beneficiaries spends an average of $159 less than the group of 65-69 years old.

When comparing the Medicare spending in different settings, CORF and SNF continue to have the highest expenditure per SLP episode (with respectively $482 and $357 higher than the hospital outpatient SLP episode average of $389). HHA and ORF also have higher relative expenditures than hospital outpatient. MD and Non-MD have the least expenditures provider groups relative to hospital SLP with -$113 and -$283 in Medicare payments relative to hospital outpatient SLP.

Compared to those within the "Swallowing/Feeding Disorder" group (SLP episode average payment = $435), beneficiaries who were treated for other diagnoses all have higher cost per SLP episode. Among them, the "Neurologic-Central" group and the "Communication" group have the highest cost per episode relative to beneficiaries with swallowing/feeding disorders (+$307 and +$267).

Beneficiaries living in Mississippi have the highest average Medicare expenditure per SLP episode than any other states. When using Iowa as the reference group (SLP episode average payment = $399), the states with highest SLP episode expenditures include Mississippi at +$580, Louisiana at +$530, Oklahoma at $370, Nevada at +$320, and Texas at +$312. The lowest SLP expenditure per SLP episode states are Hawaii at -$64, North Dakota at -$54, and Minnesota at -$49.

4.0 Summary

Our results indicate that there are significant differences in Medicare expenditure across beneficiaries' age groups, states, provider settings, and diagnostic classifications. Although we constructed episodes of therapy service separately for PT, OT, and SLP, many similar patterns persist across three types of services.

With regards to beneficiary gender, the descriptive analysis indicates a small difference between genders. The actual dollar difference in payments for males and females ($9 for PT, $10 for OT, and $2 for SLP) may be small, but it is significant. The regression analysis indicates that there is a significant difference in episode payments of males and females for SLP under both models, for PT under raw dollar model, and OT under the natural logarithm dollar model, with males being slightly higher in average payment per episode for PT and OT.

With regards to beneficiary age, the descriptive analysis suggested that episode payments would increase as beneficiaries receiving PT and OT grew older, while SLP average episode payments increased until age 70-79 then declined again. The regression analysis, however, revealed a surprisingly different pattern. Except for the group of beneficiaries who are under 65, beneficiaries generally incur less therapy expenditures as they age. In our multiple regression result, after adjusting for treatment setting and diagnostic categories, older beneficiaries actually are shown to associate with lower Medicare expenditures across all therapy types.

This result is intriguing and may indicate that Medicare expenditures are driven by other beneficiary characteristics, including diagnoses (or AdvanceMed clinical classification group in this study), treatment setting, and functional status or restoration potential. When beneficiaries are frail and with poor functioning or reduced cognitive abilities, clinicians may choose to reduce the intensity of therapy. As a result, individuals with risk factors (e.g., older age) that are usually associated with higher resource use may turn out to use fewer services[50]. It is apparent that age is an important variable to consider in any alternative payment policy related to outpatient therapy services.

The significant state variation of outpatient therapy episode payment averages, treatment dates per episode, and average payments per treatment date indicate that geographic variations would need to be considered in an alternative payment policy. In particular, variations in geographic fee schedule pricing, local Medicare contractor utilization control policies, local availability of both inpatient and outpatient providers, and geographic influence on beneficiary health status may all play a role in expenditures and should be further analyzed.

[50] For discussion in the difficulties in risk adjusting therapy service outcomes or utilization, see Iezzoni, L.I., Risk Adjusting Rehabilitation Outcomes – An Overview of Methodologic Issues. *American Journal of Phys. Med. Rehabilitation* 2004; 83:316-326.

With regards to beneficiary setting, both the descriptive and regression analysis demonstrate that, for settings where the majority of PT, OT, and SLP episodes occur, the average episode payment for SNF, CORF, ORF, PTPP, and OTPP episodes are significantly greater than the average episode payment in a hospital outpatient setting. Conversely, the average episode payments for the same services furnished in a physician or non-physician setting are significantly lower than episode payments for outpatient hospital services. These setting differences are apparent, even when controlling for beneficiary gender, age, state, and clinical group. Again, further analysis of other factors, including functional status and restoration potential may identify the source of these setting-specific variations that are not apparent with analysis of currently available claims data.

These findings have significant policy implications, particularly in light of the outpatient therapy cap statutory provisions, because they exclude hospital outpatient therapy services from the annual per-beneficiary financial limitations for Part B therapy services. The policy question that this result generates is, "What variables are present that have not been included in the current analysis, that could account for the findings that therapy episodic payments are greater in some settings?" The introduction of clinical outcomes measurements or other variables in later modeling activities may help further explain the setting-specific variations in episode expenditures. It cannot be concluded at this time from claims data alone whether the clinical or other health related outcomes are any better or worse when a beneficiary receives outpatient therapy services from a CORF versus a hospital outpatient therapy department, or any other setting for that matter.

With regards to beneficiary diagnosis, or condition, this study operationally defined 21 distinct AdvanceMed clinical classification groups derived from therapy claim diagnosis data. Both the descriptive and regression analysis reveals significant average episode payment variations for a majority of PT, OT, and SLP clinical groups, and that the patterns vary by therapy type. However, some groups are similar enough that they could possibly be merged, while others are large enough and have enough variation that splitting them further may create more distinct groups.

Our prior analyses have shown the distribution of total Medicare payment among beneficiaries is highly skewed – a small percentage of beneficiaries account for a much larger share of total Medicare resources. This poses some challenges in statistical modeling that aims to predict or explain expenditures. To overcome this statistical difficulty, one common technique is to "re-shape" the expenditure data to become more normally distributed by applying natural logarithm. Due to the preliminary nature of this outpatient therapy classification-modeling scheme, we constructed regression models with the dependent variable (Medicare paid amount) measured in both raw dollars and in natural logarithm. Models with log transformation provide much better fits, with R^2 ranging from SLP (13.8%), OT (13.8%), and PT (15.9%). The higher the R2 coefficient, the better the model is at predicting expenditures. Although our analysis is preliminary, the results obtained were favorable compared with the predictive power of other healthcare models. These coefficients, however, are somewhat less intuitive for the readers and require calculations to covert to real dollar terms. Readers who are interested in the models' ability in predicting Medicare therapy payment should focus on this first set of natural logarithm models.

Our second model uses the dependent variable measured in raw dollars. The explanatory power (R^2) is lower; ranging from 6.5% to 7.5%, but the parameter coefficients are equivalent to actual dollars and more intuitive to read. Therefore, this report focuses on this set of results expressed in raw dollars.

Payment policy decisions should consider the implications of the wide standard deviations and the right handed skewing of the episodic distributions, in addition to the average payment and number of treatment days per episode values reported in this report. In particular, future analysis should address the potential impact of bi-modal episode payment distribution patterns. While the current analysis has indicated that average episodic payments can be skewed to the right by a relatively small number of high expenditure beneficiaries, there is also the possibility that the median payment amount was skewed to the left by a large number of short duration episodes (e.g. 1-2 treatment days). Other Medicare prospective payment systems that are based upon patient classification by an episode of care account for such outlier populations by incorporating outlier policies within the payment system. Future analysis of episodic outpatient therapy expenditure patterns should adopt such outlier methodology in order to better describe the utilization patterns of the normal population. Such analysis would be necessary if CMS were to consider implementing some form of episodic payment system for outpatient therapy services.

Overall, the findings strongly support the development of further refinements of the AdvanceMed clinical classification group model developed for this analysis. A classification group could be an important component within a long-term strategy to develop an alternative payment system for outpatient therapy services that uses existing claims data information, and that could incorporate other relevant clinical data from other sources.

The findings also suggest that differences in treatment patterns among clinical groups should be considered if services are intended to be limited in a manner that does not disproportionably burden beneficiaries with certain conditions. For example, some conditions have high per episode average payments while the average payment per treatment day is low. Increased paid amount is associated with increased number of treatments. With other conditions, the average payment per treatment day may be high; however, the average number of treatment days is low. Here, the average episode expenditures are driven by the higher individual day treatment intensity.

Any potential payment system modification must consider the potential impact of efforts to control expenditures by limiting measurable variables such as total episode expenditures, per treatment day expenditures, number of treatment days per episode, or other variables. The current observed variations in these patterns suggest that a single blanket approach will not be satisfactory, and will create unintended consequences. For example, some limits could negatively impact the services furnished to particular groups of beneficiaries, or could create financial incentives to providers to change clinical and/or billing practices. A balanced modeling approach that incorporates current practice pattern variations is least likely to result in such negative consequences. If CMS were to move forward with episodic modeling, then the gradual implementation of administrative measures to prevent unnecessary expenditures could be conducted using information gathered

while conducting further modeling development activities. Such modeling would be impaired by an unbalanced restriction on payments (e.g. annual payment limitations) that do not address the beneficiary's clinical need.

Future analysis should also consider clinical outcomes data. A particular limitation of using only claims data as done in this analysis is that while one clinical group, or provider setting, or other variable may influence higher or lower payments, there is no mechanism that addresses whether less or more therapy is most appropriate. Medicare dollars are better spent when given to a provider that furnishes the best outcomes, even at a higher cost, than when given to a lower-cost provider that does not produce results. If an episode-based payment system is to eventually become a cost-effective reality for the Medicare outpatient therapy benefit, then outcomes measurements must be a critical component of the model.